ORIGINAL ARTICLE

Prevalence and predictors of self-care practices among diabetic patients in Southern Tunisia

Prévalence et facteurs prédictifs des pratiques d'auto-soins chez les patients diabétiques dans le sud de la Tunisie

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Abstract

Introduction: Diabetic self-care practices (DSCP) refer to behavioral actions by people with diabetes to manage their condition effectively. This study aimed to determine the prevalence of inadequate DSCP among Tunisian diabetics and identify associated predictors.

Methods: A cross-sectional study was conducted from March to April 2022 at the University Hospital Center of Sfax, covering southern Tunisia. Adults with type 1 or type 2 diabetes attending the Endocrinology outpatient clinic during the study period were included. The validated SCODI questionnaire with a cut-off of 70 was used to assess DSCP.

Results: A total of 200 patients were enrolled to the study with a response rate of 93.8%. Median age was 55 years with IQR= [42-63] years. There were 128 females (64%) and 153 married patients (76.5%). The prevalence of inadequate self-care practice was 51 % (N=102 cases). Inadequate self-care maintenance, inadequate self-care monitoring, inadequate self-care management and inadequate self-care confidence were noted in 35 cases (17.5%), 127 cases (63.5%), 155 cases (77.5%) and 73 cases (36.5%), respectively. Independent factors of inadequate DSCP were male gender (AOR=2.8; CI=[1.3-6.1]), low income (AOR=5; CI= [2-10]), irregular physical activity (AOR=4; CI= [2-8]), irregular follow-up (AOR=5; CI= [1.6-16.6]), and irregular blood sugar monitoring (AOR=11.3; CI=[5-25]). Besides, being on insulin (AOR=0.27; CI= [0.1-0.7]) or mixed regimen (AOR=0.35; CI=[0.15-0.9]) was independently associated with better DSCP.

Conclusion: This study revealed a high prevalence of inadequate DSCP. It highlights the need for targeted interventions to promote healthier lifestyles, improve patient education, and enhance disease self-management among patients with diabetes.

Keywords: Diabetes mellitus, Diabetic patients, Disease management, SCODI questionnaire, Self-care practice, Tunisia

Résumé

Introduction : Les pratiques d'auto-soins chez les personnes diabétiques correspondent aux comportements adoptés pour gérer efficacement leur maladie. Cette étude visait à déterminer la prévalence des pratiques d'auto-soins inadéquates chez les diabétiques tunisiens et à en identifier les facteurs prédictifs.

Méthodes : Une étude transversale a été menée de mars à avril 2022 au Centre Hospitalier Universitaire de Sfax, couvrant le sud de la Tunisie. Les adultes atteints de diabète de type 1 ou 2, consultant au service d'endocrinologie en ambulatoire durant la période d'étude, ont été inclus. Le questionnaire SCODI a été utilisé. Les pratiques d'auto-soins inadéquates étaient défini par un score <70.

Résultats : Deux cents patients ont été inclus, avec un taux de réponse de 93,8%. L'âge médian était de 55 ans [IQR : 42–63], 64% étaient des femmes et 76,5% mariés. La prévalence des pratiques d'auto-soins inadéquates était de 51 % (N=102). Des insuffisances en matière d'auto-soins ont été relevées dans les dimensions suivantes : entretien (17,5%), surveillance (63,5%), gestion (77,5%) et confiance en soi (36,5%). Les facteurs indépendants associés aux pratiques d'auto-soins inadéquates étaient : le sexe masculin (ORa=2,8), l'indigence (ORa=5), l'activité physique irrégulière (ORa=4), le suivi médical irrégulier (ORa=5) et la surveillance glycémique irrégulière (ORa=11,3). L'usage d'insuline (ORa=0,27) ou d'un traitement mixte (ORa=0,35) était lié à de meilleures pratiques.

Conclusion : L'étude met en évidence une forte prévalence de pratiques d'auto-soins inadéquates et souligne la nécessité d'interventions ciblées pour promouvoir un mode de vie sain, renforcer l'éducation thérapeutique et améliorer l'autogestion du diabète.

Mots clés : Diabète sucré, Gestion de la maladie, Patients diabétiques, Pratiques d'auto-soins, Questionnaire SCODI, Tunisie

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Introduction

Diabetes mellitus (DM) had been a major burden worldwide with increasing prevalence and alarming morbidity and mortality rates (1). According the world international diabetes federation (IDF), diabetic people worldwide counted 537 million people in 2021 and the majority are living in low-and middle-income countries. Each year, 7 million new cases of DM appear (2) and over 1 million deaths are directly attributed to this disease (3). Thus, it became a serious challenge for health care systems in both developed and developing countries especially in the 21st century. In Tunisia, a previous survey conducted in 2019 found a prevalence of Diabetes type 2 of 18.2 % among Tunisian (4). This prevalence was higher among elderly patient, male gender, urban areas, in South-Eastern the country (5) and was supposed to reach 26.6% in 2027(6). Behind this worrying situation of DM that face Tunisia, the WHO affirmed existence of operational policy, national strategy and action plans for DM in Tunisia (7,8). Therefore, American Diabetes Association (ADA) (9) highlighted the importance of self-care practice and health education as a key element in the management of diabetic patients (DP). In fact, self-care practice accounts for 98% of diabetes care (10) which means that DP have a crucial role in management of their disease, and must be integrated for better medical care. Self-care included several fields such as hygiene, nutrition, lifestyle, environmental and socioeconomic factors. Diabetic self-care practices (DSCP) are defined as a dynamic and active process composed of a set of behavioral practices performed by people with diabetes in order to successfully self-manage their disease (11). It had been admitted as an evidence that adequate DSCP was related with better diabetes control and lower incidence of DM complications (12,13). Thus, promoting DSCP could be a way to empower individuals, families, and communities to improve the efficiency of health systems and then contribute to health equity. In Tunisia, prevalence of untreated DP was 11.7% (5) and rates of well controlled DP did not exceed 16.7% (14). In order to argue these worrying outcomes in local area, more investigation of DSCP and its sociodemographic, personal and environmental factors seems to be recommended. In this perspective and in light of scariness of published data in Tunisia, this study aimed to determinate prevalence of inadequate DSCP among Tunisian DP and to explore their predictors.

Methods

Study design and sampling procedures

A cross-sectional study was conducted at the Endocrinology Department of the university hospital center of Sfax governorate, which drained all regions of southern Tunisia, from March to April 2022. Based on a precision of 6.5%, an expected prevalence of inadequate Diabetes Self-Care Practices (DSCP) of 69%, as identified in a prior pilot study conducted among 20 diabetic patients attending the Endocrinology department, along with a 95% confidence level and a 5% margin of error, the minimum required sample size was calculated to be 194 participants. The objective of the pilot was to test the clarity, relevance, and feasibility of the questionnaire and to provide an initial estimate of the prevalence of inadequate self-care practices, which served as the basis for the main study's sample size estimation. Then, 10% were added to allow adjustment of other factors such as missing data and withdraws giving a total of 213 recruited patients. Finally, 200 cases (93.8%) completed the questionnaire.

Study population and inclusion criteria

All DP (Type 1 and type 2) enrolled in the Endocrinology department' outpatient during the study period were eligible for the study. The participants completed the administered questionnaire immediately.

Inclusion criteria

All DP attending Endocrinology outcome, aged above 18 years old, diagnosed with diabetes for at least 12 months and able to procure their self-care without surroundings helps were included in the study.

Non-inclusion criteria

Patients who were under 18 years, who did not consent to participate or difficulty of getting consent, those who were unable to procure their own self-care practice or physically disabled, DP on dietary regimen and patients having other types of diabetes were not included in the study.

Ethical considerations

The study adhered to the ethical principles outlined in the Declaration of Helsinki. Participation was entirely voluntary, and informed consent was obtained from all participants prior to their inclusion in the study. Data collection ensured both confidentiality and anonymity. No human subjects or experimental procedures were involved in this research.

Data collection and study tools

A self-administrated questionnaire was used. It was composed of 3 parts. The first part comprised sociodemographic characteristics of patients such as gender, age, marital status and socioeconomic level. The second part was devoted to medical history of patients (history of other chronic diseases, use of any psychoactive substance or practice of regular physical activity) and to diabetes characteristics (type, seniority, treatments, self-monitoring of blood glucose and attending training session for their diabetes). The final part consisted on the validated SCODI questionnaire (15,16). It was a 5-likert scale questionnaire: from 1 (never) to 5 (always) composed of 40 items divided into 4 dimensions. The first dimension was self-care maintenance which was covered

by the first 12 questions and its score ranged from 12 to 60. The second consist of the self-care monitoring which was constituted by 8 questions from item 13 to item 20 and had score varying from 8 to 40. The third dimension was self-care management formed of 9 items from item 21 to 29. The 29 th item was responded exclusively by DP on insulin which had a score ranging from 9 to 45. While patients on pills had a score ranging from 8 to 40. The fourth dimension was involving self-care confidence and comprising 11 items (from 30 to 40). Its scores wary from 11 to 55. Finally, the total self-care practice score was calculated by summing up these 4 dimensions' scores. The higher the score is, the better the level of self-care practice is. All scores were adjusted out of 100. A cut-off of 70 was chosen for the total self-care practice score and to the four dimensions scores (17) to define inadequate self-care.

Statistical analysis

For continuous variables, normality of distribution was checked by the Kolmogorov-Smirnov test and the Shapiro-Wilk test and were presented as mean ± standard deviation (SD) or median and inter-quartile range (IQR). For categorial variables, numbers and percentages were used. Chi-square test was used for categorical variables. Then, all variables significant at $p<0.2$ in the univariate analysis were fitted into a multivariate model using a backward stepwise logistic binary regression. Adjusted Odds Ratio (AOR), 95%Confidence Interval (CI) and p value were calculated in order to find out the independent factors of inadequate selfcare practice. P values lower than 0.05 were considered statistically significant for both univariate and multivariate analysis. Statistical analysis was performed using SPSS.25.

Results

Patients characteristics

A total of 200 patients were enrolled to the study with a response rate of 93.8%. Median age was 55 years with IQR=[42-63] years. There were 128 females (64%), 153 married patients (76.5%) and 129 patients from urban area (64.5%). Dyslipidaemia was the most frequent comorbidity in 90 cases (45.5%) followed by hypertension in 85 cases (42.5%). Type 2 DM was noted in 150 patients (75%) and 70 patients (35%) were on pills. Diabetic microangiopathy was noted in 123 cases (61.5). The follow up was regular in 174 DP (87%) and 111 patients (55.5%) had training session about their disease (Table1).

Descriptive results

Prevalence of inadequate self-care practice was 51 % (N=102 cases). The prevalence of inadequate self-care was reported in 17.5% of DP for self-care maintenance (n = 35), 63.5% for self-care monitoring (n = 127), 77.5% for self-care management (n = 155), and 36.5% for self-care confidence (n = 73).

Table 1. Patients' characteristics of the study participants (N=200)

Variables	Effectif	Percentage (%)
Gender		
Male	72	36
Female	128	64
Age categories (years)		
18-49	69	34.5
50-64	88	44
≥65	43	21.5
Marital status		
Single	34	17
Married	153	76.5
Divorced/widowed	13	6.5
Living with		
Community	188	94
Alone	12	6
Residency area		
Urban	129	64.5
Rural	71	35.5
Education level		
Unable to read and write	52	26
Primary school	90	45
Secondary school	46	23
University	12	6
Profession		
Active	65	32.5
No occupation	99	49.5
Retirement	29	13.5
Student	7	3.5
Monthly income		
Low	98	49
Medium	90	45
High	12	6
Health insurance coverage		
Full insurance coverage (standard contribution)	6	3
Partial insurance coverage (reduced contribution)	108	54
State-assisted insurance (low-income/	76	38
No health insurance coverage	10	5
Co-morbidities		
Hypertension	85	42.5
Dyslipidemia	90	45
Heartfailure	31	15.5
Hypothyroidy	23	11.5
Obesity	52	26
Lifestyle behaviors		
Tobacco use	31	15.5
Alcohol consumption	6	3
Exercising physical activity	128	64
Regular physical activity	89	44.5
Familial history of diabetes	138	69
Type of diabetes		
type 1	50	25
type 2	150	75
Diabetes seniority		
<5 years	44	22
5-10 years	45	22.5
10-20 years	85	42.5
>20 years	26	13

Table 1. Patients' characteristics of the study participants (N=200)

Variables	Effectif	Percentage (%)
Complication of diabetes	128	64
Diabetic microangiopathy	123	61.5
Diabetic macroangiopathy	30	15
Diabetic foot	23	11.5
Hospitalisation for diabetes	132	66
Diabetes treatement		
Pills	70	35
Insulin	68	34
Mixed regimen	62	31
Disease follow-up		
Regular	174	87
Irregular	26	13
Owner of glucometer	124	62
Regular blood sugar monitoring	86	43
Health education on Diabetes	111	55.5

Multivariate analysis: Independent factors of inadequate self-care practice

Independent factors of inadequate self-care practice were male gender (AOR=2.8; CI=[1.3-6.1]), low income (AOR=5; CI= [2-10]), irregular physical activity (AOR=4; CI= [2-8]), irregular disease follow up (AOR=5; CI= [1.6-16.6]), having irregular blood sugar monitoring (AOR=11.3; CI=[5-25]). Besides, being on insulin (AOR=0.27; CI=[0.1-0.7]) or mixed regimen(AOR=0.35; CI=[0.15-0.9]) was independently associated with better DSCP (Table 2).

Table 2. independent factors of inadequate self-care practice among diabetic patients: Results of multivariate analysis

Variables	Adjusted OR	95% CI of Adjusted OR	p
Male Gender	2.8	[1.3-6.1]	***0.008***
Health insurance coverage			***0.01***
Full insurance coverage (standard contribution)	1		
Partial insurance coverage (reduced contribution)	1.4	[0.8-14.2]	0.7
State-assisted insurance (low-income)	5	[2-10]	***0.002***
No health insurance coverage	10	[0.9-50]	0.07
Irregular physical activity	4	[2-8]	***<0.001***
Irregular disease follow-up	5	[1.6-16.6]	***0.007***
Irregular blood sugar monitoring	11.3	[5-25]	***<0.001***
Diabetes treatement			***0.01***
Pills	1		
Insulin	0.27	[0.1-0.7]	***0.004***
Mixed regimen	0.35	[0.15-0.9]	***0.019***

OR: Odds ratio: **CI**: Confidence Interval

Discussion

For the best of our knowledge, this original survey was the first to explore the level of DSCP and its associated factors at the local area, in Southern Tunisia. The prevalence of inadequate self-care practice was relatively high, about 51%. This result was in line with findings from India (18), Saudi Arabia (19), eastern (20) and western Ethiopia (21). In fact, a meta-analysis reported an overall prevalence of poor DSCP of 49.7% in Ethiopia (22). However, our prevalence was much lower than that reported in another Asian study, which found 90% poor self-care practices in Saudi Arabia (19). This discrepancy may be partly explained by differences in study methodology across countries.

Male gender was independently associated with inadequate DSCP among patients. This matched with findings from previous surveys (11,23,24). Besides, female gender was a predictor of inadequate DSCP according to an African survey (21). This result could be explained by the fact that women are allocated to perform more daily tasks every day and thus adhere better for self-care practice.

The present survey elucidated the role of socioeconomic status in influencing DSCP as indigents were 5 time exposed to inadequate self-care practice than others. This outcome was previously supported by surveys showing that unemployed patients (18) and low-income patients (10,25) were more likely to have inadequate selfcare practice. It can be assumed that poorer patients had lesser access to appropriate information regarding diabetes care and management, to balanced diet and to reliable training session on their diseases. Then, poorer DSCP among them seem to be logical.

A key relevant of this survey was finding irregular physical activity multiplied the risk of inadequate DSCP of 4. In fact, self-care practice is a subjective characteristic amenable to change and could not be considered as a trait. On the other hand, the management of diabetes is complex and multifaceted family and social support play an important role in patient's adherence to selfcare and treatment. In this context, previous surveys showed importance of social and family support on patients' adherence to selfcare practice (21,25). With this approach, when considering selfcare practice as behavioral habit, patients practicing regular physical activity, seem to have better self-confidence and better influence on their beliefs and actions about themselves and consequently, better DSCP. In this context, high perceived self-efficacy was associated with better selfcare practice among diabetic patients (26). From a theoretical perspective, when assessing self-care practice, encouraging patients to have more healthy habits, more regular physical activity and enhancing their confidence in their ability to care for their diabetes may yield multiple benefits in terms of their self-care evaluation.

It was not surprising to find irregular disease follows up as well as irregular blood sugar monitoring independently associated with inadequate DSCP.Our outcomes corroborated several research papers indicating that access for self-monitoring blood glucose (23) and having personal glucometer (25,27) enhance selfcare practice among patients.

Furthermore, diabetes complications (24) and hospitalizations (26,27) were previously mentioned as predictors of inadequate DSCP. One of reasons explaining this finding is that patients who know the update of their blood glucose level by regular follow up or regular monitoring might help them to have good self-care practice accordingly to that blood glucose level. Another point of fact, low socioeconomic status of patients with irregular follow up and monitoring with the lack of their awareness on the glucometer usefulness could explain this result. Thus, all patients should receive targeted training on glycemic level self-control during clinic visits.

Interestingly, being on insulin or mixed regimen among diabetic patients was independently associated with better DSCP. According to an Ethiopian metanalysis, medication adherence among DP is the most important predictor of better diabetes management among patients (22). Not far from treatment regimen, former surveys affirmed that longer duration of diabetes (19,25) as well as of diabetes treatment (21) predicted better selfcare practice among patients. In fact, former patients with high duration of disease remain accustomed to their disease management which becomes a daily routine. Nevertheless, it is imperative that a massive public health initiative aimed at improving awareness and control of diabetes among the general population be undertaken as patient education for self-management was documented to enhance practice in self-management and improve diabetes control (19).

This unicentric cross-sectional study conducted among DP enrolled at the endocrinology department has several limitations. The cross-sectional design limits the ability to establish causal relationships between variables, as data were collected at a single time point. Self-reported information may be affected by recall biases, potentially leading to underreporting or overreporting of behaviors such as self-care practices. Moreover, despite accommodations for participants with low literacy levels, misinterpretation of questionnaire items may have influenced the accuracy of the responses.

Conclusion

In conclusion, high level of inadequate self-care practices was pointed through this study. Gender, regular physical activity, follow up of diabetes and treatment regimen influenced this level. Therefore, the attitude toward diabetic management needs to be modified and strengthened in these groups. Our study emphasized on the need for promotional approach to a lifestyle favorable for better health with better knowledge and awareness to be provided for diabetic patients. the inevitable preliminary step in diabetes management is to provide adequate knowledge regarding the importance of self-care practices. Hence, there is a greater need to intensify patient's education for self-care to achieve substantial benefits in glycemic control. Thus, we recommend that health care providers should begin by taking time to evaluate their patients' adherence and make specific recommendations in order to increase targets including blood glucose monitoring, diet maintenance, physical activity and medical attention among adults.

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