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WHAT IS THE ROLE OF THE PHYSICIAN IN SELF-CARE OF THE PATIENTS WITH DIABETES TYPE 2?

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“When a human awakens to a great dream and throws the full force of his soul over it, all the universe conspires in your favor.”

– Johann Wolfgang von Goethe

What is the role of the physician in self-care of the patients with diabetes type 2?

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Abbreviations

FHU- Family Health Unit

GHC- Group of Health Centers

PCM- Patient-Centered Medicine

PPPC- Patient Perception of Patient-Centeredness

PCC- Patient-Centered Care

SDSCA- Summary of Diabetes Self-Care Activities

HbA1C- Glycated Hemoglobin

OECD- Organization for Economic Cooperation and Development

Abstract

Background

Portugal is Europe's highest diabetes prevalence country. Patient-centered medicine (PCM) increases therapy adherence mainly by doctor-patient relationship improvement. The absence of published studies in Portugal about the relationship between PCM, diabetes self-care and glycemic control makes the present study important.

Objectives

To study the influence of PCM in diabetes self-care activities in diabetics type 2 of two Family Health Units (FHU) of Portugal's central region according to gender and age.

Methods

A cross-sectional quasi-random study was conducted in the Mondego and Manuel Cunha FHU´s adults diabetic patients population. The Summary of Diabetes Self-Care Activities scale (SDSCA) and the Patient Perception of Patient-Centeredness (PPPC) scale were applied and were completed in the end of the consultation appointment for each diabetic patient invited in randomly chosen days in 2021. Latest Hemoglobin A1C value, age and gender were also collected. Linear regressions, logistic regressions, multivariate regression models and the Pearson correlation were used.

Results

A total of 298 type II diabetic patients were studied,136 (45,6%) females, age ranging from 29 to 93 years of age. Mean of HbA1C was 6.97±1.04 % and prevalence of HbA1c ≥7% was of 105 patients (35.2%). Linear regressions for SDSCA factors associations with PPPC adjusted for sex and age showed significant associations for general diet (β=-0.07, p<.001), for specific diet (β=-0.10, p<.001), for exercise, (β=-0.03, p=.008), for foot care (β=-0.11, p<.001) and for medication 6.1 (β=-0.06, p=.001). Multiple linear regression HbA1C association with the significant SDSCA dimensions, adjusted for sex and age, showed that specific diet was associated with less HbA1C (β=-0.01, p=.007), blood sugar testing (β=0.01, p<.001) and higher score in PPPC were associated with higher HbA1C (β=0.06, p<.001). Males (β=-6.93, p=.007) and older patients (β=-0.42, p=.001) were associated with less score of specific diet. Males were associated with higher score in exercise (β=7.62, p=.029), lower score in foot care (β=-6.06, p=.029) and with lower score in medication 6.2 (β=-0.73, p=.018). Age was associated with lower score in medication 6.2 (β=-0.03, p=.045) and with higher PPPC total score (β=0.07, p=.030). Logistic regression results for association of

smoking in the last seven days with PPPC, adjusted for sex and age showed that the chance of smoking in the last seven days increases 9% for each unit increase in PPPC score (aOR=1.09, p=.012). Also, the association with sex and age showed that the chance of smoking in the last seven days increases 2.91 times for males (aOR=2.91, p=.012) and decreases 3% for each year of age (aOR=0.97, p=.041).

Discussion

The influence of PCM on self-care behaviors in type 2 diabetic patients, had not yet been studied in Portugal. Its influence on better general diet, specific diet, exercise, foot care and medication adherence deserves more studies, this one serving as an exploratory one. Worst scores in PPPC being associated with higher HbA1C is a matter of concern for General Practice/Family Medicine doctors. This study reaffirms the vital role of the physician in self-care in type 2 diabetes for better glycemic control.

Conclusion

PCM influences self-care behaviors in type 2 diabetic patients, particularly general diet, specific diet, exercise, foot care and medication adherence. PCM and self-care activities, especially specific diet, lead to a better glycemic control. Gender and age differences exist in self-care behaviors and age differences in PCM total scores.

Keywords

Patient-centered Medicine, Self-care Activities, Diabetes Mellitus Type 2, HBA1C, Glycemic Control, Doctor-patient Relationship.

Background

Diabetes is a major global cause of death and incapacity. It is one of the most common noncommunicable diseases and its prevalence continues to grow, affecting 451 million adults. [1,2]

In Portugal, diabetes affects 13.3% of the population aged between 20 and 79 years. Every day, around 200 new patients are diagnosed with diabetes in Portugal. It is the country in Europe with the highest prevalence rate of the disease as per the Organization for Economic Cooperation and Development (OECD) report on health.[3,4]

Diabetes self-care activities contribute to successful self-management. These self-care behaviors have a positive correlation with a glycemic levels control, improvement in quality of life and reduction of diabetic complications.[1]

It is known that multiple demographic, socio-economic and social factors can positively influence self-care activities in diabetic patients. However, clinician's role in promoting self-care is vital.[5]

According to American Diabetic Association and the International Diabetes Federation, patient-doctor communication should be advocated in the management of diabetes. It allows to improve disease knowledge, quality of life, self-care and better glycemic control. However, communication negligence is a very common cause of patient complaints [6] and contributes to prevent patients from discussing self-care problems with doctors.[7]

Patient-centered medicine (PCM) is a clinical method with evidence of promoting a better relationship between doctor and patient, enabling him and facilitating therapy adherence.[8]

According to Moira Stewart et al, it is based on four components: (1) exploring health, illness and illness experience; (2) understand the patient as a whole; (3) seek understanding; and (4) improve the doctor-patient relationship.[9]

Improved doctor-patient relationships as well as increased patient education and diabetes knowledge, are likely to promote an increase of awareness and adherence to self-care.[10]

A review article advocates that PCM allows a 1% reduction in blood glucose and in HbA1C levels. Also, it increases therapeutic adherence, the knowledge of their disease and the commitment to decision-making.[11]

The purpose of this project was to study the practice of Patient-Centered Medicine (PCM) and self-care behaviors in people suffering of Diabetes Mellitus type 2 from Family Health Unit (FHU) Mondego e FHU Manuel da Cunha, simultaneously performing its correlation. Furthermore, we intended to study the relationship between PCM and glycemic control

(HbA1C) and self-care activities and glycemic control. Also, we aimed to determine whether they were correlated for gender and age.

The absence of published Portuguese studies on both topics simultaneously was the reason for carrying out this study.

We hypothesized that a more patient-centered medicine practice would be associated with better self-care activities and, consequently, improved glycemic control.

Materials and Methods

Ethical considerations

This study was approved by the Ethics Committee of the Regional Health Administration of the Center. Authorization for scales use was requested to the authors, as well as Primary Health Care Units involved.

Design and population

A cross-sectional quasi-random study was conducted in the 1321 Mondego and Manuel Cunha FHU´s adults diabetic patients population, a sample size being calculated for a confidence interval of 95% and error margin of 5% using the *praticaclinica.com.br* website.
All Type 2 diabetic patients with a diabetes consultation appointment between the 25th of November of 2021 and the 15th of January of 2022 were invited by the clerk in this period of time by the administrative and health professionals of respective FHU´s to participate in the study. Patients with cognitive impairment due to dementia or severe diabetic retinopathy or with reading and comprehension difficulties were excluded.

Procedures

After invitation, patients completed the informed consent, followed by filling out the Patient Perception of Patient-Centeredness (PPPC) scale, while waiting for the medical appointment, and the Summary of Diabetes Self-Care Activities scale (SDSCA) was completed in the end of the medical appointment. Both scales are adapted and validated for european spoken portuguese language.
After medical appointment, doctor or nurse wrote in a separate sheet stapled with the questionnaires, the latest Hemoglobin A1C value, as well as sociodemographic data, such as age and gender of patient. Diabetes was considered controlled if HBA1c was <7%.[12] Subsequently, questionnaires were placed in an urn, completely anonymously, except patient's age, gender and hemoglobin A1C.

Instruments

Self-care variables

Diabetes self-care behaviors were assessed using the 7-item scale version of the Summary of Diabetes Self-Care Activities (SDSCA). Each item (from 1 to 6) contained a score from 0 to 7 corresponding to the weekdays, and the aim of the studying was the frequency of self-care activities. Self-care behaviors included general diet (healthy diet, vegetable and fruit consumption), specific diet (weekly consumption of red meat, carbohydrates, alcoholic beverages and sugar), physical exercise, blood glucose monitoring, foot care and medication adherence. Item 7 included smoking habits and it had “yes” or “no”, “if so, how many cigarettes per day” and “when did you smoke your last cigarette” as response options. Better scores on general diet, physical exercise, blood glucose monitoring, foot care and medication items reveal better self-care. While lower scores on specific food item, as well as smoking habits and having a higher number of cigarettes per day, are associated with worse self-care. [1,10,13]

Patient-Centered Medicine

The quality of medical practice was assessed using the Patient Perception of Patient-Centeredness (PPPC) scale. The scale includes 9 items, created by Moira Stewart such as (1) Were your reasons for today's appointment discussed?, (2) Were you satisfied with the conversation about your problem(s)?, (3)) Did the doctor listen to what you had to say?, (4) Did the doctor explain your problem?, (5) Did they talk about what each one should do to improve?, (6) Did the doctor explain the treatment?, (7) Did the doctor talk to you about the ease of this treatment for you?, (8) Do you feel that your doctor understands you? and (9) Has the doctor talked to you about personal or family issues that may affect your health?. The answer options were “Completely”, “Partially”, “A little” and “None”. The options were converted in the SPPS statistical program to “0”, “1”, “2” and “3”, with lower scores being associated with a more patient-centered medical practice.[14]

Statistical analyses

Statistical analysis was performed with SPSS, version 26. Descriptive statistics were presented as means (M) and standard deviations (SD) for quantitative variables with symmetrical distributions and frequencies (n) and percentages (%) for categorical variables. Symmetry was considered when the skewness coefficient was [-1, 1]. Linear regressions

were implemented to assess linear associations with continuous outcomes, after screening for Pearson correlations. Unstandardized coefficients (β) were used to measure the effect size of the independent variables in the outcome. Residual's normality was assessed with Shapiro Wilk test and by observing histograms. Variance's homoscedasticity was assessed by observing no trend in the plot of standardized residuals vs standardized predicted values. No outliers were found outside the interval [-3; 3]. Logistic regressions were used to assess associations with binary outcomes. Adjusted odds ratios (aOR) were calculated to measure the effect size of the independent variables in the outcome. Multivariate regression models were implemented including significant ($p<.05$) and marginally significant ($p<.10$) independent variables for both linear and logistic regression models.

Results

Sample characterization

A total sample of 298 was calculated and 298 type II diabetic patients were included in the analysis. The sample was composed of n=136 (45.6%) females, was aged between 29 and 93 years of age, mean 67.40±10.19. Mean of HbA1C was 6.97±1.04%, ranging from 4.4% to 10.6%. Prevalence of HbA1c ≥7% was of 35.2%, n=105 patients.

SDSCA-Scale and PPPC-Questionnaire

Table 1 shows responses distribution (n, %) of SDSCA regarding the dimensions of general diet, specific diet, exercise, blood sugar testing, foot care and medication.

Table 1. Responses distribution of SDSCA

	0 days n (%)	***1 day*** n (%)	***2 days*** n (%)	***3 days*** n (%)	***4 days*** n (%)	***5 days*** n (%)	***6 days*** n (%)	***7 days*** n (%)
General diet								
SDSCA 1.1	16 (5.4%)	6 (2.0%)	5 (1.7%)	43 (14.4%)	47 (15.8%)	55 (18.5%)	48 (16.1%)	78 (26.2%)
SDSCA 1.2	115 (38.6%)	1 (0.3%)	9 (3.0%)	22 (7.4%)	33 (11.1%)	40 (13.4%)	33 (11.1%)	45 (15.1%)
SDSCA 1.3	15 (5.0%)	3 (1.0%)	9 (3.0%)	34 (11.4%)	14 (4.7%)	38 (12.8%)	26 (8.7%)	159 (53.4%)
Specific diet								
SDSCA 2.1	30 (10.1%)	31 (10.4%)	48 (16.1%)	83 (27.9%)	47 (15.8%)	35 (11.7%)	7 (2.3%)	17 (5.7%)
SDSCA 2.2	77 (25.8%)	28 (9.4%)	33 (11.1%)	20 (6.7%)	23 (7.7%)	5 (1.7%)	19 (6.4%)	93 (31.2%)
SDSCA 2.3	59 (19.8%)	32 (10.7%)	31 (10.4%)	29 (9.7%)	35 (11.7%)	26 (8.7%)	22 (7.4%)	64 (21.5%)
SDSCA 2.4	124 (41.6%)	31 (10.4%)	15 (5.0%)	28 (9.4%)	8 (2.7%)	19 (6.4%)	14 (4.7%)	59 (19.8%)
SDSCA 2.5	65 (21.8%)	54 (18.1%)	62 (20.8%)	45 (15.1%)	18 (6.0%)	13 (4.4%)	13 (4.4%)	28 (9.4%)
SDSCA 2.6	149 (50.0%)	13 (4.4%)	21 (7.0%)	13 (4.4%)	14 (4.7%)	10 (3.4%)	9 (3.0%)	69 (23.2%)
Exercise								
SDSCA 3.1	94 (31.5%)	32 (10.7%)	36 (12.1%)	45 (15.1%)	22 (7.4%)	30 (10.1%)	5 (1.7%)	34 (11.4%)
SDSCA 3.2	128 (43.0%)	24 (8.1%)	38 (12.8%)	41 (13.8%)	17 (5.7%)	19 (6.4%)	6 (2.0%)	25 (8.4%)
Blood sugar testing								
SDSCA 4.1	100 (33.6%)	41 (13.8%)	35 (11.7%)	29 (9.7%)	14 (4.7%)	17 (5.7%)	20 (6.7%)	42 (14.1%)

SDSCA 4.2	124 (41.6%)	33 (11.1%)	36 (12.1%)	23 (7.7%)	21 (7.0%)	4 (1.3%)	15 (5.0%)	42 (14.1%)
Foot care								
SDSCA 5.1	36 (12.1%)	25 (8.4%)	12 (4.0%)	21 (7.0%)	13 (4.4%)	11 (3.7%)	24 (8.1%)	156 (52.3%)
SDSCA 5.2	3 (1.0%)	2 (0.7%)	9 (3.0%)	11 (3.7%)	12 (4.0%)	6 (2.0%)	10 (3.4%)	245 (82.2%)
SDSCA 5.3	14 (4.7%)	3 (1.0%)	7 (2.3%)	13 (4.4%)	9 (3.0%)	7 (2.3%)	9 (3.0%)	236 (79.2%)
Medication								
SDSCA 6.1	19 (6.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (2.3%)	6 (2.0%)	10 (3.4%)	256 (85.9%)
SDSCA 6.2	246 (82.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	52 (17.4%)
SDSCA 6.3	34 (11.4%)	0 (0.0%)	0 (0.0%)	3 (1.0%)	13 (4.4%)	6 (2.0%)	4 (1.3%)	238 (79.9%)

Scale 1. Summary of Diabetes Self-Care Activities de Glasgow R, Toobert D, Hampson S (2000), version adapted by F. Bastos e C. Lopes (2004) [13]

1. General Diet l Number of days

1.1 How many of the last SEVEN DAYS have you followed a healthful eating plan? 0 1 2 3 4 5 6 7

1.2 On average, over the past month, how many DAYS PER WEEK have you followed your eating plan? 0 1 2 3 4 5 6 7

1.3 On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables? 0 1 2 3 4 5 6 7

2. Specific Diet

2.1 On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full-fat dairy products? 0 1 2 3 4 5 6 7

2.2 On how many of the last SEVEN DAYS did you eat bread during lunch or dinner? 0 1 2 3 4 5 6 7

2.3 On how many of the last SEVEN DAYS did you mix two or more of the following foods: rice, potatoes, pasta, beans? 0 1 2 3 4 5 6 7

2.4 On how many of the last SEVEN DAYS did you consume more than one cup of any type of alcoholic beverage? 0 1 2 3 4 5 6 7

2.5 On how many of the last SEVEN DAYS did you eat cakes, pastries, jams, honey, marmalade, chocolates? 0 1 2 3 4 5 6 7

2.6 On how many of the last SEVEN DAYS did you sweeten your drinks with sugar? 0 1 2 3 4 5 6 7

3. Exercise

3.1 On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity? (Total minutes of continuous activity, including walking). 0 1 2 3 4 5 6 7

3.2 On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work? 0 1 2 3 4 5 6 7

4. Blood Sugar Testing

4.1 On how many of the last SEVEN DAYS did you test your blood sugar? 0 1 2 3 4 5 6 7

4.2 On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your health care provider? 0 1 2 3 4 5 6 7

5. Medications

5.1 On how many of the last SEVEN DAYS, did you take your recommended diabetes medication?

0 1 2 3 4 5 6 7

OR

5.2 On how many of the last SEVEN DAYS did you take your recommended insulin injections?

0 1 2 3 4 5 6 7

5.3 On how many of the last SEVEN DAYS did you take your recommended number of diabetes pills? 0 1 2 3 4 5 6 7

6. Foot Care

6.1 On how many of the last SEVEN DAYS did you soak your feet? 0 1 2 3 4 5 6 7

6.2 On how many of the last SEVEN DAYS did you wash your feet? 0 1 2 3 4 5 6 7

6.3 On how many of the last SEVEN DAYS did you dry between your toes after washing? 0 1 2 3 4 5 6 7

7. Smoking

7.1 Have you smoked a cigarette—even one puff—during the past SEVEN DAYS? 0. No 1. Yes.

7.2 If yes, how many cigarettes did you smoke on an average day? Number of cigarettes: _____

7.3 When did you last smoke a cigarette? 0. Never smoked 1. More than two years ago

Table 2 shows the responses distribution (n, %) of smoking, 34 (11.4%) patients stating to have smoked in the past 7 days. Prevalence of smoking of at least one cigarette per day was of 12.8%.

Table 2. Responses distribution of SDSCA - smoking

Smoking	n (%)

SDSCA 7.1 – Smoked at least once in the past 7 days	
Yes	34 (11.4%)
No	264 (88.6%)
SDSCA 7.2 – Number of cigarettes usually smoked in a day	
None	260 (87.2%)
≥ 1	38 (12.8%)
SDSCA 7.3 – Last smoked cigarette	
Never	209 (70.1%)
More than 2 years	89 (29.9%)

Table 3 shows the responses distribution of PPPC, judged by the patients, which prevalence of response was more concentrated in the “completely” one.

Table 3. Responses distribution of Patient Perception of Patient-Centeredness (PPPC)

	Completely n (%)	Partially n (%)	A little n (%)	None n (%)
QMCP 1	230 (77.2%)	36 (12.1%)	25 (8.4%)	7 (2.3%)
QMCP 2	223 (74.8%)	50 (16.8%)	16 (5.4%)	9 (3.0%)
QMCP 3	244 (81.9%)	30 (10.1%)	21 (7.0%)	3 (1.0%)
QMCP 4	237 (79.5%)	35 (11.7%)	21 (7.0%)	5 (1.7%)
QMCP 5	240 (80.5%)	33 (11.1%)	16 (5.4%)	9 (3.0%)
QMCP 6	223 (74.8%)	39 (13.1%)	21 (7.0%)	15 (5.0%)
QMCP 7	212 (71.1%)	46 (15.4%)	29 (9.7%)	11 (3.7%)
QMCP 8	212 (71.1%)	57 (19.1%)	23 (7.7%)	6 (2.0%)
QMCP 9	95 (31.9%)	67 (22.5%)	62 (20.8%)	74 (24.8%)

Scale 2. Patient Perception of Patient-Centeredness (PPPC) scale by Moira Stewart[14]

1. Were your reasons for today's appointment discussed?

0 Completely 1 Partially 2 A little 3 None

2. Were you satisfied with the conversation about your problem(s)?

0 Completely 1 Partially 2 A little 3 None

3. Did the doctor listen to what you had to say?

0 Completely 1 Partially 2 A little 3 None

4. Did the doctor explain your problem?

0 Completely 1 Partially 2 A little 3 None

5. Did they talk about what each one should do to improve?

0 Completely 1 Partially 2 A little 3 None

6. Did the doctor explain the treatment?

0 Completely 1 Partially 2 A little 3 None

7. Did the doctor talk to you about the ease of this treatment for you?

0 Completely 1 Partially 2 A little 3 None

8. Do you feel that your doctor understands you?

0 Completely 1 Partially 2 A little 3 None

9. Has the doctor talked to you about personal or family issues that may affect your health?

0 Completely 1 Partially 2 A little 3 None

After observing the distribution of SDSCA and PPPC the corresponding scores were calculated. For SDSCA the recommendations of transforming scores in [0-100] were followed, by using the formula: [(sum of items/max range) x 100]. PPPC total score was calculated as the sum of all its items. Table 4 shows descriptive results for SDSCA dimensions, PPPC total score and HbA1C and Pearson correlations for all these variables. Considering the goal of studying the associations of SDSCA dimensions with PPPC, correlations screening between these variables showed significant associations for general diet ($r=-.264$, $p<.01$), specific diet ($r=-.408$, $p<.01$), exercise ($r=-.136$, $p<.05$), foot care ($r=-450$, $p<.01$) and 6.1 DM medication ($r=-.180$, $p<.01$). Because it was also important to assess the association between HbA1C and SDSCA dimensions, these results were also included in the correlation matrix. Significant associations were detected between HbA1C and specific diet ($r=-.216$, $p<.01$), blood sugar testing ($r=.327$, $p<.01$), medication 6.1 ($r=.126$, $p<.05$), medication 6.2 ($r=.206$, $p<.01$), medication 6.3 ($r=.157$, $p<.01$) and PPPC total score ($r=.366$, $p<.01$).

Table 4. Descriptive statistics and matrix correlations of the measures in this study

	Range	M (SD)	Correlations									
SDSCA			1	2	3	4	5	6.1	6.2	6.3	7	8
1 General diet	[0-100]	64.08 (21.93)	1	,055	,307**	,273**	,264**	,227**	,104	,200**	**-,264****	-,061
2 Specific diet	[0-100]	58.48 (22.52)		1	,113	,104	,204**	,097	,195**	,059	**-,408****	**-,216****
3 Exercise	[0-100]	32.17 (30.06)			1	,184**	,235**	,169**	,033	,172**	**-,136***	,106
4 BS testing	[0-100]	33.92 (32.31)				1	,145*	,161**	,390**	,125*	,070	**,327****
5 Foot care	[0-100]	83.00 (23.85)					1	,349**	-,054	,196**	**-,450****	-,041
6.1 Medication	[0-7]	6.41 (1.76)						1	,134*	,713**	**-,180****	**,126***
6.1 Medication	[0-7]	1.22 (2.66)							1	,098	,023	**,206****
6.2 Medication	[0-7]	5.98 (2.28)								1	-,084	**,157****
7 PPPC total score	[0-27]	4.29 (5.50)									1	**,366****
8 HbA1C	[4.4-10.6]	6.97 (1.04)										1

PPPC, Patient Perception of Patient-Centeredness; *p<.05;**p<.01; BS testing, Blood sugar testing

T-tests showed that smoking at least once in the past 7 days was significantly associated with higher PPPC total score (p=.048).

After observing correlations and T-tests results, linear regressions were implemented.

Table 5 shows linear regressions for SDSCA factors (DV) associations with PPPC (IV) adjusted for sex and age. Only significant associations observed in the correlation matrix were presented. Significant associations were found for general diet, decreasing, in average, -0.07 for each unit of PPPC score (β=-0.07, p<.001), for specific diet, decreasing, in average, -0.10 for each unit of PPPC score (β=-0.10, p<.001), for exercise, decreasing, in average, -0.03 for each unit of PPPC score (β=-0.03, p=.008), for foot care, decreasing, in average, -0.11 for each unit of PPPC score (β=-0.11, p<.001) and for medication 6.1, decreasing, in average, -0.06 for each unit of PPPC score (β=-0.06, p=.001). The model with the highest quality was model 2, for specific diet, with 17.1% of specific diet variance, explained by PPPC, sex and age.

Table 5. Linear regressions for SDSCA factors association with PPPC

DV	β	SE	p-value	R^2
Model 1: General diet	-0.07	0.01	p<.001	0.083
Model 2: Specific diet	-0.10	0.01	p<.001	0.171
Model 3: Exercise	-0.03	0.01	p=.008	0.030
Model 4: Foot care	-0.11	0.01	p<.001	0.214

Regressions adjusted for sex and age.

Logistic regression results for association of smoking in the last seven days with PPPC, adjusted for sex and age showed that the chance of smoking in the last seven days increases 9% for each unit increase in PCM score (aOR=1.09, p=.012).

Table 6 shows a multiple linear regression HbA1C (DV) association with the significant SDSCA dimensions (IVs), detected in the correlation matrix, adjusted for sex and age. Specific diet was associated with less HbA1C (β=-0.01, p=.007), blood sugar testing (β=0.01, p<.001) and higher score in PPPC were associated with higher HbA1C (β=0.06,

p<.001). 25.8% of HbA1C was explained by specific diet, blood sugar testing, medication, PPPC, sex, and age.

In this context, a logistic regression was also implemented, considering HbA1C > 7%. Results showed significant association for blood sugar testing (aOR=1.02, p<.001), with 2% more chance of HbA1C > 7% for each unit increase in blood sugar testing and for PPPC (aOR=1.15, p<.001), with 15% more chance of HbA1C > 7% for each unit in PPPC.

Table 6. Linear regressions for HbA1C association with SDSCA dimensions and PPPC

IV	B	SE	p-value	R^2
Specific diet	-0.01	≈0.00	p=.007	0.258
BS testing	0.01	≈0.00	p<.001	
Medication 6.1	-0.01	0.04	p=.427	
Medication 6.2	0.05	0.02	p=.051	
Medication 6.3	0.06	0.03	p=.138	
PPPC	0.06	0.01	p<.001	

Regressions adjusted for sex and age; BS testing, Blood sugar testing

Table 7 presents associations of age and gender with each SDSCA dimension, PPPC total score and HbA1C. Males (β=-6.93, p=.007) and older patients (β=-0.42, p=.001) were associated with less score of specific diet. Males were associated with higher score in exercise (β=7.62, p=.029), lower score in foot care (β=-6.06, p=.029). Males were associated with lower score in medication 6.2 (β=-0.73, p=.018). Age was associated with lower score in medication 6.2 (β=-0.03, p=.045). Age was associated with higher PPPC total score (β=0.07, p=.030).

Table 7. Linear regressions for age and gender association with SDSCA dimensions, PPPC total score and HbA1C

	Independent variables β (SE) p-value		
DV	Sex (male)	Age	R^2
Model 1: General diet	-2.39 (2.55) p=.349	0.18 (0.13) p=.147	≈0.00

Model 2: Specific diet	**-6.93 (2.56) p=.007**	**-0.42 (0.13) p=.001**	0.049
Model 3: Exercise	**7.62 (3.47) p=.029**	0.32 (0.17) p=.063	0.019
Model 4: BS testing	-3.91 (3.77) p=.301	-0.02 (0.19) p=.920	≈0.00
Model 5: Foot care	**-6.06 (2.77) p=.029**	0.03 (0.14) p=.854	0.010
Model 6.1: Medication	-0.16 (0.21) p=.433	0.14 (0.01) p=.159	≈0.00
Model 6.2: Medication	**-0.73 (0.31) p=.018**	**-0.03 (0.02) p=.045**	0.023
Model 6.3: Medication	0.12 (0.27) p=.654	0.01 (0.01) p=.420	≈0.00
Model 7: PPPC total score	0.22 (0.64) p=.734	**0.07 (0.03) p=.030**	0.010
Model 8: HbA1C	-0.09 (0.12) p=.455	0.01 (0.01) p=.120	≈0.00

PPPC, Patient Perception of Patient-Centeredness; BS testing, Blood sugar testing

Logistic regression results for association of smoking in the last seven days showed with sex and age showed that the chance of smoking in the last seven days increases 2.91 times for males (aOR=2.91, p=.012) and decreases 3% for each year of age (a OR=0.97, p=.041).

Discussion

It is already known that self-care activities, involving medication adherence, blood sugar testing, foot care and diet are necessary for successful management of diabetes.[10]

Patient-Centered Medicine (PCM) must be fused with alliance, communication, health promotion and self-care care [10,15] for better results and health outcomes. For this reason, it is easily deduced that conclusions about PCM can be bridged to the present study. We used the PPPC questionnaire, created by Moira Stewart, which assesses the four dimensions of MCP.[14]

To our knowledge the current study is the first one to investigate the influence of PCM practice on self-care activities and its influence in disease control among diabetic Portuguese.

The sample was mostly constituted by male patients (n=162, 53,7%), as expected, since in Portugal there are more male diabetic patients.[16]

Prevalence of HbA1c ≥7% was of 35.2%, a total of 105 patients from the two FHUs.

Significant associations for general diet, specific diet, exercise, foot care and medication adherence (item 6.1) to PCM, adjusted for sex and age were found. Thus, a better patient-centred medical practice, is likely to increase exercise levels and promote a better general and specific diet, foot care and medication adherence. Specific diet scores were scaled from 0-100, with the remaining dimensions of SDSCA. Therefore, better scores correspond to higher scores, closer to 100. Regarding medication adherence, one of the topics is “On how many of the last seven days, did you take your recommended diabetes medication?” and another topic is “Or on how many of the last seven days did you take your recommended insulin injections?”. Patients chose to answer to item 6.1 or 6.2 or both, and statistics were performed separately, according to the original scale validation article.[13]

In type 2 diabetic patients, PCM was considered an important factor in their self-management, being significantly associated with better self-care behaviors.[10]

Effective doctor-patient communication favors interactions and has a significant impact on patient behaviors and health outcomes.[17]

Association of smoking in the last seven days with PCM, adjusted for sex and age showed that worse values on the PCM scale are associated with greater probability of smoking.

PCM elements may be applied to patient-cent tobacco management. Thus, it is concluded that maintaining a long-standing doctor-patient relationship enables the adoption of solutions and goals that favor an eventual smoking cessation.[18]

HbA1C (DV) association with the significant SDSCA dimensions (IVs), adjusted for sex and age, showed that better levels of HbA1C were associated to a better specific diet.

High levels of diabetes self-care behaviors with a good glycemic control have been found.[19] Self-care activities mediate the influence of diabetes knowledge on glycemic control.[1]

Higher scores in blood sugar testing were associated with higher HbA1C. These results in blood sugar testing dimension are probably due to the fact that self-monitoring in type 2 diabetes is currently not recommended, as the scale is outdated.[20]

Worse scores in PCM were associated with higher HbA1C.

Studies results are divided, some researchers having found an improvement of glycemic control of type 2 diabetes by PCM [10,21], others found that patient-centered care does not contribute for an improved glycemic control after adjusting for appropriate confounders.[10]

Slingerland et al. suggested that PCM is not effective for patients with a baseline HbA1c <7% but providing value for diabetic patients with a baseline HbA1C > 8,5%, so deserving implementation.[22]

Associations of age and gender with each SDSCA dimension, PPPC total score and HbA1C revealed that males and older patients were associated with a worse specific diet score. A review article shows that men were less likely to attend medical appointments, make preventive care and were more overweight compared to women.[23] Women tended to have more health care responsibilities than men.[24]

Males practice more exercise and have less foot care. However, previous research demonstrates that women reported significantly higher exercise than men.[25]

Males and elderly have a worse medication adherence (item 6.2). Older patients have worse PPPC total scores. The explanation for age-related differences in health care communication is ambiguous. Prior studies suggest that health care providers communicate less effectively with older patients. On the other hand, it has been suggested that older

patients are more easily satisfied with care due to their greater conformation with health system´s defects and for being more tolerant of its inadequacies. In addition, elderly satisfaction levels rise between 65 to 80 years old and then decrease.[26]

Males in this study showed more smoking habits and older patients showed less ones in line with previous results.[23]

Our study has some limitations. The present results cannot be generalized, due to its limited geographic settlement although it was size representative of the studied population and also due to its quality of a quasi-randomized study for authors have only selected the days of patient's collection. As an additional issue the SDSCA scale was outdated in the item referring to fasting glucose measurement, since it is no longer recommended and the self-reported data may bring some biases to the results obtained. In future studies the understanding of parameters that influence diabetes evolution and control must be done. A social desirability response and a memory bias are to be recognized.

Conclusion

This study revealed that the practice of Patient-Centered Medicine (PCM) influences self-care behaviors in Diabetes Mellitus type 2 patients, particularly for general diet, specific diet, exercise, foot care and medication adherence of the Summary of Diabetes Self-Care Activities scale. PCM and self-care activities, especially specific diet, can lead to a better glycemic control. There are gender and age differences in self-care behaviors, males and older ones rating worse. No significant gender and age differences in HA1C levels were found. The important role of the general practice/family medicine physician in self-care of type 2 diabetes patients influences health outcomes and must be reinforced.

Larger sample studies covering other regions and districts of Portugal will allow a better picture and probably less health bad outcomes.

Acknowledgment

Ao Mestre Albino Miguel Pereira e ao Professor Doutor Luiz Miguel Santiago por toda a dedicação, pelo apoio e prontidão no esclarecimento de dúvidas neste projeto. Juntos conseguimos uma notável capacidade de trabalho, de adaptação aos obstáculos, uma verdadeira antítese daquilo que é a resignação. Foram um alicerce essencial na concretização deste sonho.

A todos os profissionais das FHU Mondego e FHU Manuel da Cunha, que amavelmente me acolheram e permitiram toda a fase de entrega e recolha de questionários. Em especial, um agradecimento à Drª. Filipa Murta e à Drª Tânia Caseiro.

Aos utentes que aceitaram despender do seu tempo e atenção para responder aos questionários.

Aos meus pais, irmãs e restante família, por serem um exemplo de sucesso, persistência, de amor e de humildade. Ensinaram-me que a humildade é a mais sólida base do ser humano.

Mãe, és o apoio constante não só neste projeto, como em toda a minha vida. A minha felicidade é o espelho da tua força e perseverança.

Aos meus amigos da vida, de curso e aos da vida e de curso, por me compreenderem tão bem e por me fazerem sentir sempre em casa, mesmo quando não estou.

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Attachments

Annex I. Document delivered to the patient in portuguese (next 7 pages)

Hemoglobina A1C:_____

Sexo:_____

Idade:_____

(A preencher pelo médico ou enfermeiro)

Informed Consent in portuguese

Este questionário destina-se à realização de um estudo no âmbito de Tese de Mestrado Integrado da Faculdade de Medicina da Universidade de Coimbra de Solange Rodrigues Sousa, orientado pelo Dr. Albino Miguel Palhares Santos Pereira e co-orientado pelo Professor Doutor Luiz Miguel de Mendonça Soares Santiago. O título do estudo: Qual é o papel do médico nos autocuidados do doente com diabetes tipo 2? A explicação do estudo: é um estudo cujo objetivo é estudar, em 298 pessoas sofrendo de Diabetes Mellitus tipo 2 da USF Mondego e USF Manuel Cunha, a prática médica centrada no paciente, através da escala adaptada Patient Perception of Patient-Centeredness (PPPC) e os autocuidados por parte do doente, usando a escala adaptada de Summary of Diabetes Self-Care Activities, realizando simultaneamente a sua relação. Os questionários serão entregues e preenchidos na sala de espera, durante e/ou após a consulta. Aos questionários será agrafada uma folha em branco para que o médico possa apontar o valor de Hemoglobina A1C na presente consulta, sem ter acesso aos questionários que estão atrás. Posteriormente, no fim da consulta, os questionários são colocados numa urna, completamente anónimos, tendo apenas acesso à idade e sexo do doente. Ninguém saberá quem respondeu nem como respondeu. O próprio investigador financiará o estudo e não há pagamentos a investigadores ou participantes. A participação será voluntária e não haverá prejuízos caso não queira participar ou abandonar o estudo a qualquer momento. Os dados obtidos são completamente confidenciais e serão utilizados unicamente com o propósito de análise deste estudo.

Li e aceito participar tendo sido informada(o) acerca das minhas dúvidas.

_____, __/__/____

_____

Assinatura do participante

_____

Assinatura do autor

Escala de Actividade de Auto-cuidados com a Diabetes

Versão traduzida e adaptada para português de Summary of Diabetes Self-Care Activities de Glasgow R, Toobert D, Hampson S (2000), por F. Bastos e C. Lopes (2004)

A perguntas que se seguem questionam-no acerca dos cuidados com a diabetes durante os últimos sete dias. Se esteve doente os últimos sete dias, por favor lembre-se dos últimos sete dias em que não estava doente.

1. ALIMENTAÇÃO GERAL Nº DE DIAS

1.1 Em quantos dos últimos SETE DIAS seguiu uma alimentação saudável 0 1 2 3 4 5 6 7

1.2 Em média, durante o último mês, quantos DIAS POR SEMANA seguiu um plano alimentar recomendado por algum profissional de saúde? 0 1 2 3 4 5 6 7

1.3 Em quantos dos últimos SETE DIAS comeu cinco ou mais peças de fruta e/ou doses de vegetais (incluindo os de sopa)? 0 1 2 3 4 5 6 7

2. ALIMENTAÇÃO ESPECÍFICA

2.1 Em quantos dos últimos 7 dias comeu carnes vermelhas (vaca, porco, cabrito)? 0 1 2 3 4 5 6 7

2.2 Em quantos dos últimos SETE DIAS comeu pão acompanhando a refeição do almoço ou jantar? 0 1 2 3 4 5 6 7

2.3 Em quantos dos últimos SETE DIAS misturou, no acompanhamento de refeição, dois ou mais dos seguintes alimentos: arroz, batatas, massa, feijão? 0 1 2 3 4 5 6 7

2.4 Em quantos dos últimos SETE DIAS consumiu mais que um copo, de qualquer tipo de bebida alcoólica, às principais refeições? 0 1 2 3 4 5 6 7

2.5 Em quantos dos últimos SETE DIAS comeu alimentos doces como Bolos, pastéis, compotas, mel, marmelada ou chocolates? 0 1 2 3 4 5 6 7

2.6 Em quantos dos últimos SETE DIAS adoçou as suas bebidas com açúcar? 0 1 2 3 4 5 6 7

3. ACTIVIDADE FÍSICA

3.1 Em quantos dos últimos SETE DIAS praticou actividade física durante pelo menos 30 minutos? (Minutos totais de actividade contínua, inclusive andar) 0 1 2 3 4 5 6 7

3.2 Em quantos dos últimos SETE DIAS participou numa sessão de exercício físico específico (como nadar, caminhar, andar de bicicleta) para além da actividade dísica que faz em casa ou como parte do seu trabalho? 0 1 2 3 4 5 6 7

4. MONITORIZAÇÃO DE GLICEMIA

4.1 Em quantos dos últimos SETE DIAS avaliou o açúcar no sangue? 0 1 2 3 4 5 6 7

4.2 Quantos dias por semana lhe foi recomendado que avaliasse o açúcar no sangue pelo seu médico, enfermeiro ou farmacêutico? 0 1 2 3 4 5 6 7

5. CUIDADOS COM OS PÉS

5.1 Em quantos dos últimos SETE DIAS examinou os seus pés? 0 1 2 3 4 5 6 7

5.2 Em quantos dos últimos SETE DIAS lavou os seus pés? 0 1 2 3 4 5 6 7

5.3 Em quantos dos últimos SETE DIAS secou os espaços entre os dedos do pé, depois de os lavar? 0 1 2 3 4 5 6 7

6. MEDICAMENTOS

6.1 Em quantos dos últimos SETE DIAS, tomou conforme lhe foi indicado, os seus medicamentos da diabetes? 0 1 2 3 4 5 6 7

OU (se insulina ou comprimidos):

6.2 Em quantos dos últimos SETE DIAS tomou, conforme lhe foi indicado, injeções de insulina? 0 1 2 3 4 5 6 7

6.3 Em quantos dos últimos SETE DIAS tomou o número indicado de comprimidos da diabetes? 0 1 2 3 4 5 6 7

7. HÁBITOS TABÁGICOS

7.1 Você fumou um cigarro, ainda que só uma passa, durante os últimos SETE DIAS? SIM ☐ NÃO ☐

7.2 Se sim, quantos cigarros fuma, habitualmente, num dia? Número de cigarros:_____

7.3 Quando fumou o seu último cigarro? NUNCA ☐ HÁ MAIS DE 2 ANOS ATRÁS ☐

Escala da Percepção do Cuidado Centrado na Pessoa

Adaptado de Moira Stewart

Por favor, para cada questão, assinale a opção de resposta que mais se adequa ao que sentiu na consulta:

Na consulta de hoje até que ponto:	**Resposta:**
1- O(s) seus motivos para a consulta de hoje foram falados?	Completamente Parcialmente Um pouco Nada
2- Ficou satisfeito com a conversa sobre o(s) seu(s) problema(s)?	Completamente Parcialmente Um pouco Nada
3- O médico ouviu o que tinha a dizer?	Completamente Parcialmente Um pouco Nada
4- O médico explicou o seu problema?	Completamente Parcialmente Um pouco Nada

5- Falaram sobre o que cada um deve fazer para poder melhorar? Completamente

Parcialmente

Um pouco

Nada

6- O médico explicou o tratamento? Completamente

Parcialmente

Um pouco

Nada

7- O médico falou consigo sobre a facilidade deste tratamento Completamente

Para si? Parcialmente

Um pouco

Nada

8- Sente que o seu médico o/a compreendeu? Completamente

Parcialmente

Um pouco

Nada

9- O médico falou consigo sobre questões pessoais Completamente

ou familiares que possam afetar a sua saúde? Parcialmente

Um pouco

Nada

Annex II. Approval by the Ethics Committee of the Regional Health Administration of the Center

GOVERNO DE PORTUGAL
MINISTÉRIO DA SAÚDE

ARSC ADMINISTRAÇÃO REGIONAL DE SAÚDE DO CENTRO, I.P.

COMISSÃO DE ÉTICA PARA A SAÚDE

PARECER FINAL:	DESPACHO:
FAVORÁVEL	Tomado conhecimento e homologado o parecer final da Comissão de Ética para a Saúde. 25.11.2021

Conselho Diretivo da A.R.S. do Centro, I.P.

Dra Rosa Reis Marques
Presidente

Dr. Mário Ruivo
Vogal,

Dr. Fernando Cravo
Vogal,

ASSUNTO:

93/2021 - Título: "Qual é o papel do médico nos autocuidados do doente com diabetes tipo 2?"

Investigadores: Solange Rodrigues Sousa (IP; FMUC), Alberto Miguel Palhares Santos Pereira (USF Mondego) e Luiz Miguel Santiago (FMUC)

O objetivo é estudar em pessoas com diabetes mellitus tipo 2 a prática da medicina centrada no doente, através da escala Medicina Centrada no Paciente (MCP) e os autocuidados por parte do doente, usando a escala adaptada de *Summary of Diabetes Self-Care Activities,* realizando-se simultaneamente a sua relação. Para além disso, pretende-se estudar se existe uma correlação entre os resultados das escalas e o controlo do valor da Hemoglobina A1c.
Vai ser estudada uma amostra de 298 utentes (calculada). Os questionários serão entregues na sala de espera (o questionário de Actividade de Auto-cuidados com a Diabetes será preenchido na sala de espera pelos doentes e o questionário da *Medicina Centrada no Paciente (MCP)* será preenchido no fim da consulta). Posteriormente, os questionários são colocados numa urna, completamente anónimos, tendo apenas acesso à idade e sexo do doente.
O financiamento é dos próprios investigadores.
Há autorização para a utilização das escalas pelos autores.
Há autorização das instituições envolvidas.
Foram enviados os curricula e cópia das escalas.
O consentimento informado é aceitável (falta o contacto mas poderá ser feito através dos centros de saúde envolvidos).

O relator e Presidente da CES da ARS do Centro

Prof. Doutor Carlos A Fontes Ribeiro

Annex III. Approval by FHU Manuel Cunha Technical Council

REPÚBLICA PORTUGUESA SAÚDE | SNS SERVIÇO NACIONAL DE SAÚDE | ARSC ADMINISTRAÇÃO REGIONAL DE SAÚDE DO CENTRO, I.P. | ACES DO BAIXO MONDEGO | USF Manuel Cunha

Exmo.s Sr.s
Comissão de Ética da ARS Centro
Alameda Júlio Henriques,
3000-457 Coimbra

Sua referência	Sua comunicação	Nossa referência	Data
			13-08-2021

Assunto: Participação em trabalho final do mestrado integrado em Medicina

Para os devidos efeitos, o Conselho Técnico da USF Manuel Cunha declara aceitar participar no projecto de trabalho final do mestrado integrado em Medicina de Solange Rodrigues Sousa, com o título: " Qual o papel do médico nos autocuidados do doente diabético tipo 2 ?" que têm como Co-Orientadores o Dr. Miguel Pereira da USF Mondego e Prof. Luiz Miguel Santiago, Professor da Faculdade de Medicina da Universidade de Coimbra.

Com os melhores cumprimentos,

Pelo Conselho Técnico

[Assinatura Qualificada] CARLA SOFIA SIMÕES DOS SANTOS

Assinado de forma digital por [Assinatura Qualificada] CARLA SOFIA SIMÕES DOS SANTOS
Dados: 2021.08.13 16:48:41 +01'00'

Dra. Carla Santos

E.C.

UNIDADE DE SAÚDE FAMILIAR MONDEGO

CERTIFICADO

ACES DO BAIXO MONDEGO

Para os devidos efeitos o Conselho Técnico da USF Mondego, declar aceitar a participação desta USF no projecto de trabalho final do Mestrado Integrado em Medicina de **Solange Rodrigues Sousa**, com o título: **"Qual o papel do médico nos autocuidados do doente diabetico tipo 2?"** que tem como Co-Orientadores o Dr. Miguel Pereira da USF Mondego e Prof. Luiz Miguel Santiago, Professor da Faculdade de Medicina da Universidade de Coimbra.

São Martinho do Bispo, 30 de Julho 2021

Dr. João Arcanjo

Conselho técnico,
Enf.ª Susana Jorge

A.T. Paulo Rodrigues