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HENRIQUE MIGUEL TORRES SIMÃO

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TRABALHO FINAL DO 6º ANO MÉDICO COM VISTA À ATRIBUIÇÃO DO GRAU DE MESTRE NO ÂMBITO DO CICLO DE ESTUDOS DE MESTRADO INTEGRADO EM MEDICINA

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List of abbreviations

T2D: Type 2 Diabetes

DKT: Diabetes Knowledge Test

USF: Unidade Saúde Familiar (Health Care Center)

n: number

nmed: number of medications

Resumo

Introdução: Diabetes é uma doença com grande incidência mundialmente, cujo manejo é desafiador para profissionais e pacientes, o conhecimento sobre a doença e o estatuto socioeconómico desempenham um papel na terapia.

Objetivo: Estudar a associação entre conhecimento sobre a doença, terapêutica e fatores socioeconómicos no controle do Diabetes.

Métodos: Um estudo observacional transversal foi conduzido na população de pacientes diabéticos tipo 2 da USF Topázio em Coimbra, Portugal. Dados de contexto sociodemográficos e clínicos foram recolhidos, bem como o Índice de Graffar e o resultado da aplicação do Diabetes Knowledge Test (DKT) pelo corpo clínico da USF. Foi realizada estatística descritiva e inferencial.

Resultados: Numa população de 249 pacientes, 74,5% tinham a doença analiticamente controlada e 58,6% eram do sexo masculino. A idade foi a única variável sociodemográfica com impacto significativo no desempenho do DKT, pacientes diabéticos mais jovens respondendo mais frequentemente corretamente, 8,99 vs 7.83, p = 0,001. O número de medicamentos tomados e o tempo desde o diagnóstico não mostraram relação com a pontuação do DKT. Pacientes tratados com insulina tiveram melhor desempenho no DKT com uma média de respostas corretas mais alta, 13,25±3,52 vs 8,32±2,44. Os fatores socioeconômicos não apresentaram diferenças significativas, embora um estatuto socioeconómico mais elevado tenha influenciado, com mais respostas corretas.

Discussão: A capacitação na Diabetes, doença crónica, é trabalho fundamental tanto para o melhor resultado medido pelo controlo da doença, como para as consequências em saúde pela redução de complicações pela Diabetes.

Conclusão: O nível de conhecimento sobre diabetes pelo DKT deve ser melhorado.

Pacientes diabéticos mais jovens parecem ter maior capacitação, um esforço de capacitação nos mais idosos sendo necessário. Pacientes com diabetes tipo insulinotratados revelaram melhor capacitação.

Melhores condições socioeconômicas estavam associadas a um melhor conhecimento e resultados.

Palavras-chave: Diabetes; Fatores Socioeconómicos; Escala de Graffar; Diabetes Knowledge Test, controlo

Abstract

Background: Diabetes is an ever worldwide incident disease whose management is challenging for professionals and patients, knowledge about the disease and socioeconomic status playing a role in the therapy.

Aim: To determine what association between knowledge about the disease, therapeutics and socioeconomics in the control of Diabetes.

Methods: An observational cross-sectional study was conducted in the population of the Type 2 Diabetic patients of Topázio Primary Care Unit, in Coimbra, Portugal. Sociodemographic and clinical data was collected as well as the Graffar Index and the result of the application of Diabetes Knowledge Test (DKT) by the clinical staff at the Primary Care Unit. Descriptive and inferential statistics were performed.

Results: In a population of 249 patients, 74,5% of participants had their disease controlled analytically and 58,6% being males. Age was the only sociodemographic variable with significant impact on the DKT performance, younger diabetic patients more correctly responding, 8.99 vs 7.83, p= 0,001. The number of medications taken and time since diagnosis did not show a relation with the DKT score. Insulin treated patients performed better on DKT with higher mean of correct answers, 13,25±3,52 vs 8,32±2,44. Socioeconomic factors had no significant differences, still higher socioeconomical status influenced knowledge, with more correct answering.

Discussion: Capacitation in Diabetes, a chronic disease, is a fundamental work for both the improved outcome measured by disease control and for health consequences by reducing complications of Diabetes.

Conclusion: The level of knowledge about diabetes by the DKT needs to be improved. Younger diabetic patients seem to have higher capacitation, with capacitation efforts needed in the elderly. Patients with insulin-treated diabetes showed better capacitation. Better socioeconomic conditions were associated with better knowledge and outcomes

Keywords: Diabetes; Socioeconomic factors; Graffar Index; Diabetes Knowledge Test, control

Introduction

Type 2 Diabetes is a well-documented chronic disease caused by a progressive loss of o insulin output by the pancreas combined with an increase of insulin resistance which, in turn leads to high levels of glycemia and metabolic alterations (1). There are several risk factors to take into consideration when evaluating a person with diabetes which include age, body mass index (BMI), practice of regular physical activity, certain medications, personal and family history of diabetes (1,11).

Diabetes has become increasingly more predominant in the last few years all around the world contributing to a higher mortality rate due to several degenerative diseases caused by T2D. People over the age of 65 or older are the ones more probable to develop diabetes with a prevalence rate higher than 20% worldwide, and this statistic tends to increase as people get even older with peak of 24,4% registered for those between 75 and 79 years of age. (3)

It was calculated that over half a billion people in the world have been diagnosed with diabetes, with estimates that this could more than double in next 30 years. T2D has become one of the 10 leading causes of death and disability, reaching a global prevalence of 6,1%. (3)

 In Portugal several studies indicate a significant higher prevalence of T2D compared with other European countries. In 2022 around 883 074 Portuguese people between the ages of 20 and 79 years old have been registered with the disease in just the mainland. This number corresponds to an estimate of 8,4% of prevalence and it as shown to be increasing as the years go by. (2)

Over the years, T2D treatment has revolved around educational, non-pharmacological and if necessary pharmacological measures. With this being said, it has come to the attention that several parameters seem to influence the end results of treatment, among those include capacitation of the disease, socioeconomics factors, gender and even family dynamics to name a few. (5,10,11)

In order to understand the impact these factors have on treatment results and diabetes control, the Diabetes Knowledge Test (DKT) was developed and it consists of several items with questions targeted to a diabetic person in order to get an idea of how informed they are about their disease. The number of correct answers dictates the score of the test. (4)

Even though the test itself has some limitations, it has been the most frequently used instrument for these types of situations and the test itself has seen some improvements over the years in order to modernize and adjust to our current therapeutic methods and population. (4)

In Portugal the DKT was adapted to the population and studies have shown a correlation between knowledge and efficient treatment. It would seem that a person with a higher score on the DKT have a better health outcome in general. However, it was evidenced that several questions had a

lower percentage of being correct than others, which indicates a need to better educate the population. (5,11) The same situation seems to be true in other countries. (6,7,8)

With all this in mind, our aim with this study is to better investigate this correlation between awareness and analytical control of diabetes, also considering their socioeconomic status as a way to optimize diabetic therapy.

Methods

For this study, a cross-sectional observational method was utilized on a random sample with replacement, from the alphabetical ordering of the type 2 diabetes population, inviting every third person with T2D followed at the Topázio USF with the help of technical assistants to fill in the "Diabetes Knowledge Test" (DKT). The study period was from October 2022 to July 2023.

After the filling-in of the questionnaire, each patient was informed about the answer's mistakes by nurses and doctors in each consultation.

In order to get a better sample, cognitive deficit, refusing patients and those who had previously participated on the DKT exposures were excluded.

The sample size was calculated for a 95% confidence interval and a 5% margin of error, taking into consideration the total population of diabetes mellitus patients from the Topázio USF.

After obtaining favorable ethical approval, data was collected from SClínico by internal physicians regarding the submitted data, with the exception of the results from the questionnaire.

After transcribing the data into the final database, any data capable of correctly identifying the patient was carefully removed in order to ensure anonymity at the end of the collection process and prior to statistical analysis.

Several other variables were taken into consideration for this study such as clinical information on the patient (age, gender, number of medications for diabetes, necessity for immunotherapy, number of years passed since the diagnosis of the disease, analytical control of diabetes) and socioeconomic factors with the use of the Graffar Scale which differentiates patients into five socioeconomical classes based on profession, other income sources, education, housing conditions and housing location.

Descriptive and inferential statistics were performed, after Kolmogorov testing for normality of numeric ones, with chi square and inferential non-prametric tests and correlacional studies.

Results

The population used for this study was of 249 patients with T2D from the Topázio USF and out of these 249, 103 were female (41,4%) and 146 were male (58,6%). For age the participants were divided in two groups, one of those under 65 years another one of equal or more than 65 years this one predominant (60,6%). (Table 1)

In terms of clinical variables considered in this study, a distinction was made between participants with a controlled T2D, which translates to a value of HbA1c inferior to 7 or 8,5 depending on the age. In this category 64 patient (25,7%) didn't have T2D controlled contrary to the rest of the sample. The mean of the time after diagnosis was 9 years, and with this information, the population was divided in 2 groups, one below the mean and another equal or over the mean with the latter having around 52,2 percent of the sample included. (Table 1)

Table 1 – Sociodemographic and clinical characteristics of the sample.

Variable	Value	Female n (%)	Male n (%)	Total n (%)	p
		Gender			
Age	<65 years	34 (33,0)	64 (43,8)	98 (39,4)	0.055
	≥ 65 years	69 (67,0)	82 (56,2)	151 (60,6)	
Control over diabetes with HbA1c <7 or < 8.5 considering age	No	19 (18,4)	45 (30,8)	64 (25,7)	0.019
	Yes	84 (81,6)	101 (69,2)	185 (74,3)	
Time after diagnosis (years)	< Mean (9)	52 (50,5)	67 (45,9)	119 (47,8)	0.279
	≥ Mean (9)	51 (49,5)	79 (54,1)	130 (52,2)	
Total of participants		103 (100,0)	146 (100,0)	249 (100,0)	

In order to attribute socioeconomical standings to our sample, the Graffar scale was used, which demonstrated a higher population on medium (58,8%) and medium high (34,0%) socioeconomic status. (Table 2)

Table 2 – Socioeconomic characteristic of the sample.

		Gender*		Total n (%)	Sig.
		Female n (%)	Male n (%)		
Graffar	Medium Low	3 (8,6)	3 (4,8)	6 (6,2)	0.812
	Meduim	20 (57,1)	37 (59,7)	57 (58,8)	
	Medium High	11 (31,4)	22 (35,5)	33 (34,0)	
	High	1 (2,9)	0 (0,0)	1 (1,0)	
Total		35 (100,0)	62 (100,0)	97 (100,0)	

(*) Mann Whitney U

The Kolmogorov-Smirnov test was used in order to investigate the distribution of several variables such as number of right answers by patients in or not in insulin therapy, age, number of medication and time after diagnosis (years), revealed they all had normal distribution The test verified a normal distribution. For those on Insulin treatment a 13,25±3,52 and for those not on insulin treatment 8,32±2,44 correct answers were perceived.

With the use of parametric studies, we were able to associate several the number of right answers in the DKT with several sociodemographic, clinical and socioeconomic variables discussed previously. (Table 3)

On table 3 we observe one significant difference between people under 65 years old and participant with 65 years or older not including the insulin part of the questionnaire. With a p value of 0,001 we can infer a higher performance on the DKT by people younger than 65 years old.

On another note, with the objective of studying the relation between Graffar scale and the performance on the DKT, the Kruskal Wallis test was performed, revealing no difference for **n** right answers not in insulin therapy, p=0.550 and n right answers in insulin therapy, p=0.221.

Table 3 – Parametric studies of variables

	Gender	HbA1c control*	Age	Time After Diagnosis (years)	N	Mean	Standar Deviation	p **
n of right answers not in insulin therapy	Female				85	8,22	2,58	0,627
	Male				108	8,4	2,33	
		No			37	8,46	2,73	0,728
		Yes			156	8,29	2,37	
			<65 years		82	8,99	2,02	0,001
			≥ 65 years		111	7,83	2,61	
				< Mean (9)	109	8,28	2,40	0,767
				≥ Mean (9)	84	8,38	2,50	
n of right answers in insulin therapy	Female				18	13,11	3,38	0,832
	Male				37	13,32	3,64	
		No			26	12,62	3,49	0,206
		Yes			29	13,83	3,52	
			<65 years		16	14,38	4,67	0,223
			≥ 65 years		39	12,79	2,88	
				< Mean (9)	10	13,8	3,26	0,575
				≥ Mean (9)	45	13,13	3,60	

(*) Control over diabetes with HbA1c <7 or <8.5 depending on age; ** Mann Whitney U

The correlation between number of medicines and number of right answers not in insulin therapy was negative, very weak and not significant, ρ=0.012, p=0.850, the same being revealed for the number of right answers in insulin therapy with a weak positive and non-significant correlation coefficient of ρ =0,074 and a of p=0,485.

Discussion

T2D is multifactorial disease. This study aimed to understand how the knowledge about diabetes, applying the DKT, along with other socio-economic variables influence Diabetics control.

Our sample showed a relatively good percentage of people with controlled diabetes (74,5%). The results show that this doesn't seem to impact the performance on the DKT test, coinciding with a previous study performed in Portugal (11). For this study, controlled diabetes refers to an HbA1c inferior to 7 or inferior to 8.5 taking into consideration the age of the patient, which was not the exact same used in aforementioned article.

This study also revealed insufficient statistical evidence to support the idea that gender is a variable that can influence the performance on the DKT test. Past investigations have come to the same conclusion, in Slovenia (7), Thailand (8), Saudi Arabia (9) and Portugal (11).

For age, this study found significant differences for the number of right answers not including the insulin therapy on the DKT test, younger people (under 65 years old) with a better DKT performance. Even though some of the other studies conducted in this area have not used the same values as us (under 65 an equal/over 65), they still seem to arrive at similar results, concluding that younger participants seem to get a higher score on the DKT (1,3,5). This may represent inaptitude and difficulty for older ones in having acquired information on diabetes either reading or the internet or by their attending Primary Care Team, the study in Thailand not showing significant differences for age. (8)

Time after being diagnosed with T2D (years) does not seem to not have a significant impact on knowledge considering in our sample like in Thailand (8). However, other studies tend to disagree, reaching an opposite conclusion, like one in Portugal with a significant increase of knowledge in patients with more than 3 years of diagnosis only non-insulin treated patients. (11)

Another variable that didn't have a significant impact on the number of right answers was the number of medications self-reported by the respondant.

When it comes to socioeconomics, with the Graffar scale we divided our sample into several economic classes and studying its impact on knowledge, and the results stated no significant difference on the DKT performance. No participant was classified with a low economic status Graffar probably having limitations, overestimating certain aspects that nowadays are much more accessible in modern society such as obligatory education, social housing, and others, that were veried when it was released (13). A study in Portugal demonstrated that extreme Graffar classifications (Low and High) have significant influence in diabetes control. However, the same doesn't verify for the intermediate classes. (10)

The DKT test itself is possibly difficult to standardize for global use because of the different cultures and realities across the world in some geographic contexts (8). However, because knowledge is such an important key piece for an optimized therapy and control of the diabetes (7,8,11,12), constant adaptations and actualizations need to be done to turn the DKT as accurate as it can be.

Overall, looking at the data and statistical analysis conducted, we can observe a lack of knowledge of the participants when it comes to the performance in the DKT, similar to other studies (7,8,11). Notably there is a discrepancy between patients in and not in insulin therapy, where the first group shows a lower mean of right answers. This could be a key factor when managing and control diabetes which has been shown to be increasingly difficult as the years go by.

A need for better preventive measures arises in order for people to acquire knowledge about the disease, avoiding a rise in diabetes complications. It would seem people gain better knowledge of the disease after being in a more advanced stage of T2D. The objective would be to intervene in a more precocious stage, helping people obtain more knowledge on how to control or avoid complications.

Without the proper education, T2D patients could have misconceptions about how to better regulate their disease, and could end up making prejudicial life choices without them even realizing it. This could also interfere with health care services.

The poor performance on the DKT, should raise awareness and concern to primary health care. Professionals should incentivize and help patients acquire more knowledge in order for them to have a more active role in therapy. Several topics should be thoroughly addressed including life choices, diet and other risk factors, this way patients could make better informed decisions to help their cause, reach a controlled T2D. This should be done with increasingly more care for older people since studies show a lesser knowledge level for those groups.

A therapeutic guide could be implemented and printed, with all the necessary information about T2D, and given to the population as way to always have a reliable source of information at their disposal.

Further studies could be performed in order to associate knowledge of T2D and what implication does it have on the development of the disease and its complications.

Other countries could also participate in studies around this thematic for a better understanding and compression of the best ways increase awareness in the general population.

Conclusion

The use of the DKT, allowed to perceive that the level of awareness was not optimal.

No significant evidence was found for diabetes control and performance on the test, still some discrepancy between insulin treated patients and non-insulin treated was found, the first group having a higher mean of number of right answers (13,25±3,52) compared to the second (8,32±2,43).

Older people were less informed and scored worse in the DKT.

Better socioeconomics was associated to better knowledge and results.

Acknowledgments

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