

Self-care knowledge and activities of people with diabetes mellitus submitted to telephone support*

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ABSTRACT

A quasi-experimental study that analyzed diabetes knowledge and self-care activities of people with diabetes mellitus and, their relationships with sociodemographic variables and glucose control after participating in a telephone support program. Forty-eight people constituted the sample, and they were interviewed using the tools Diabetes Knowledge Questionnaire and the Brazilian version of the Summary of Diabetes Self-Care Activities Questionnaire. We used descriptive analysis, with the Chi-Square and Fisher's Exact tests. We verified good knowledge before and after the intervention and, the relationship of this variable with the glycated hemoglobin post-intervention. Self-care activities presenting higher means were eating, glucose monitoring, feet care and, use of medications. The findings can be useful for educational interventions, and telephonic support has been shown as a tool that can help health teams in the attention to the person with diabetes mellitus.

Descriptors: Diabetes Mellitus; Telephone; Knowledge; Self Care.

INTRODUCTION

According to the World Health Organization – WHO⁽¹⁾, non-communicable diseases (NCD) are the leading causes of global mortality. Within them, diabetes mellitus (DM) is noted. In 2014, the International Diabetes Federation showed that 387 million people presented DM, with projections of 592 million people in 2035⁽²⁻³⁾.

DM care requires clinical accompaniment using the DM classification, detection of complications, revision of previous

treatments and previous diagnosed risk factors, therapeutic plan development, besides continuous care. Users should be attended by integrated multi-professional teams focused on stimulating self-care. Treatment goals should be individualized and diverse strategies that should be conducted to reach positive results⁽⁴⁾.

From this perspective, information and communication technologies offer high potential resources for education and support for people with chronic diseases, which can improve self-care⁽⁵⁾. To use the telephone as an intervention strategy has benefits characterized by the fast speed of access between the user and the professional, less waiting time for consultation, reduced cost and time for transportation, increased frequency of contacts and, return to consultations⁽⁶⁾.

Thus, telephone support appears as a potential tool for diabetes education providing resources for increasing knowledge and self-care, as it offers personalized information to individuals considering the real world conditions. It also propitiates training and motivation to develop activities related to DM management over time⁽⁷⁾.

Thus, the present study analyzed diabetes knowledge and self-care activities of people with diabetes mellitus type 2 submitted to telephone support and their relationship with sociodemographic variables, fasting glucose and glycated hemoglobin (HbA1c). We expect this work to provide resources for clinical and educational practices of multi-professional teams, including the nurse, guaranteeing continuity of health actions and long-term DM care.

METHODS

We conducted a quasi-experimental study. Forty-eight people with type 2 DM constituted our convenience sample, they participated in the Telephone support for diabetes mellitus monitoring, called ATEMDIMEL, created in 2013⁽⁸⁾. The inclusion criterion was not to have taken part in the educational program. We excluded those who did not complete or partially completed assessment instruments.

The educational program was conducted by telephone contact, after planning the calls with the patient. Calls were guided by a previously built manual, addressing themes related to non-drug treatment (eating and physical activity), drug treatment and, DM general concepts (chronic and acute complications, alert signals, within others). There was a total of 16 weekly calls, lasting 20 minutes each, and the telephone support lasted four months. Trained nurses conducted calls and guidance.

We collected data from sociodemographic and clinical variables using a tool previously built by the researchers. We conducted the blood for laboratory exams before and after the intervention. To assess DM knowledge and self-care activities, we used the Diabetes Knowledge Questionnaire – DKN-A and the *Atividades de Autocuidado com Diabetes* –QAD, respectively. Both were translated, adapted and validated for the Brazilian reality⁽⁹⁻¹¹⁾.

The DKN-A is a self-reported instrument with 15 items related to DM knowledge. It is divided into five dimensions: basic physiology, hypoglycemia, food groups and its substitutions, DM management during intercurrentence of another disease and, principals for primary disease care. The measure is given by a 0 to 15

points scale, where each item measured as (1) for the correct answer and (0) for the incorrect⁽⁹⁾. For our study, we opted for a score equal or higher than eight to reflect diabetes knowledge.

The QAD is a Brazilian version of the Summary of Diabetes Self-Care Activities Questionnaire (SDSCA). It was developed to assess adherence to self-care activities in diabetics systematically. It contains seven dimensions and 15 assessment items for diabetes self-care activities. It includes general diet (two items), specific diet (three items), physical activity (two items), glucose monitoring (two items), feet care (three items), use of medication (three items, used in accordance with the drug scheme) and, three items to assess smoking, totaling 17 items⁽¹¹⁾. It is characterized in days per week when the person presents determined behavior, with the score varying in each item from zero to seven, where zero is the least desirable situation and seven, the most favorable. The smoking assessment is coded considering the proportion of smokers, the average of consumed cigarettes and when was the last time the person smoked. In our study, we characterized as good self-care behavior the value of five or more days of activity, according to the criterion used in other studies^(10,21).

We applied the instruments at the beginning and the end of the telephone support. Our study had access to a database after the author's authorization, and we guaranteed the secrecy of information. We collected data from November of 2014 to February of 2015.

For data analysis, we built a database in the Microsoft Excel program. Data entry was performed in duplicity and posteriorly validated with the intention to control possible information errors. We coded and categorized the variables to facilitate analysis and results' comprehension. We used the programs SPSS version 22 and R version 3.1.2 for data analyses. To analyze relationships of telephone support, knowledge and self-care activities, we crossed the knowledge scores, dimensions of self-care activities ("general diet", "specific diet", "physical activity", "glycemic monitoring", "feet care" and "use of medications"), with sociodemographic variables, fasting glucose and HbA1c. We classified the best knowledge as scores higher or equal to eight and the worse as scores lower than this value. Self-care activities, classified according to average days when it was performed, and the best self-care considered when the average days was equal or higher than five, and the worse self-care when the mean was lower than five days. In cases where at least one of the variables had a value less than five, we used Person's Chi-Square test and the Fisher's Exact test. We conducted these crossings separately per time. The null hypothesis for the tests was that there is no association between variables. The significance level adopted in all tests was 5% ($p \leq 0.05$).

The Ethics and Research Human Beings Committee from the Nursing University of Ribeirão Preto – USP approved the study (Protocol number: 324.098/2013) and the Municipal Health Secretary of Ribeirão Preto authorized it.

RESULTS

Of the 48 investigated people, females were predominant (52.1%), age varied from 47 to 87 years with a mean of 63.9 years, and 58.3% were younger than 65 years. Regarding marital status, most were married

(64.6%). About education, 41.7% of participants had 5 to 8 years of schooling, with an average of seven years. Regarding their occupation, 60.4% of participants were retired.

Referring to clinical variables, we noted that the most cited time since diagnosis was 11 to 20 years (37.5%), and the most used DM treatment was insulin (97.9%), followed by oral antidiabetic (66.7%). Among comorbidities, 75% of the sample had hypertension and, 39.6% had dyslipidemia. Fasting glucose was increased in 54.1% of participants and, the HbA1c was altered in 77.1%, before the intervention. After the intervention, 52.1% presented adequate fasting glucose, and 85.4% had altered HbA1c.

We present in Table 1 the results referred to DM knowledge assessment according to DKN-A.

Table 1: Knowledge about diabetes mellitus of participants before and after the intervention. Ribeirão Preto, SP, Brazil, 2016.

Diabetes knowledge -DKN-A	Before		After	
	n	%	n	%
Lower than 8	6	12.6	8	16.7
Equal or higher than 8	42	87.4	40	83.3

The relationship between knowledge and sociodemographic variables, fasting glucose and glycated hemoglobin before intervention did not show statistical significance. After the intervention, there was a statistical significance between knowledge and HbA1c ($p=0.03$).

We present the assessment results of self-care activities according to QAD in Table 2.

Table 2: Self-care activities of diabetic participants before and after the intervention, according to QAD. Ribeirão Preto, SP, Brazil, 2016.

Self-care activities - QAD	Before	After
	(Mean and SD)*	(Mean and SD)*
General diet		
1. To follow a healthy diet	4.9 (2.5)	5.5 (2.0)
2. To follow a diet guidance	3.3 (3.2)	4.0 (3.0)
Specific diet		
3. Fruits and/or vegetable	4.8 (2.7)	5.0 (2.6)
4. Red meat and/or whole milk	2.7 (2.4)	3.8 (2.7)
5. Sweets	5.3 (1.9)	5.8 (1.6)
Physical activity		
6. To be physically active for 30 minutes	1.7 (2.3)	1.8 (2.1)
7. To perform specific physical exercise	0.7 (1.6)	0.9 (1.5)
Glucose monitoring		
8. To assess blood sugar	5.0 (2.6)	5.4 (2.3)
9. To assess blood sugar as recommended	3.7 (3.1)	4.2 (3.0)
Care with feet		
10. To examine the feet	3.7 (3.0)	5.0 (2.9)
11. To examine inside the shoes	4.4 (3.1)	5.2 (2.9)
12. To dry between the toes	5.5 (2.8)	5.6 (2.7)
Use of medications		
13. To take diabetic medications	6.5 (1.5)	6.5 (1.4)
14. Insulin as recommended	6.7 (1.0)	6.5 (1.4)
15. To take pills for diabetes	5.6 (2.6)	5.6 (2.7)

* SD = standard deviation.

QAD items to assess smoking showed that only three participants were smokers, consuming 1.2 cigarettes/day.

The analysis of relationships between domains of self-care activities, with sociodemographic variables, fasting glucose and HbA1c showed that before intervention, there was a statistical significance for “general diet” and education ($p=0.05$), “specific diet” and fasting glucose ($p=0.05$), and “physical activity” and education ($p=0.03$). After, there was statistical significance for “physical activity” and education ($p=0.03$), “glucose monitoring” and marital status ($p=0.04$) and, “use of medications” and HbA1c ($p=0.01$).

DISCUSSION

About the DM knowledge assessment, the present study identified most participants showing good knowledge, even if there was a discrete knowledge decrease after telephone support (87.4% of people before and 83.3% of people after).

Studies using this communication option intended to help assistance of DM care have been explored in scientific investigations. However, few studies are using this strategy and that assessed DM knowledge, using the DKN-A or other assessment instruments. However, a study that assessed knowledge using the DKN-A, besides other DM care variables, comparing two types of intervention, being one individual and using telephone assistance, and the other conducted in a group, identified that most participants from both groups had satisfactory scores for DM knowledge. Also, there was an increase in the knowledge level after the studied period⁽¹²⁾.

Regarding the results referring to DM knowledge assessed by DKN-A, a study that analyzed this variable after educational interventions observed results similar to ours, although the study did not use telephone support, that is, users had good knowledge even if they have not modified their behaviors to cope with the disease⁽¹³⁾. However, different results were found in a study conducted with diabetic patients attended in a primary health care service in the inner state of São Paulo, once most participants reached scores equal or lower than eight⁽¹⁴⁾.

We also identified studies not using the DKN-A as an instrument, that assessed knowledge using other questionnaires. These showed poor^(15,16) knowledge, as well as, adequate⁽¹⁷⁾.

When comparing studies using DKN-A and others built and validated by the authors, it is possible to infer that despite the DKN-A being an adequate instrument to assess DM knowledge, questions of difficult comprehension remain. Besides, it would be interesting to update it considering the new recommendations referring to DM diagnosis, control, and monitoring. Still, it is valid to study DM knowledge, as it collaborates to the disease self-care process.

In this perspective, when assessing self-care activities after the QAD, we identified that before telephone support, questions having means of five or more days, characterizing self-care, were related to “assess blood sugar”, “to dry between the toes”, “to take diabetic medication”, “to use insulin as recommended” and “to take pills for diabetes”. After the intervention, besides these questions, the items

“to follow a healthy diet”, “fruits and vegetables consumption”, “to examine the feet” and “to examine inside the shoes” also presented better self-care. The items which did not reach adequate self-care means before or after the intervention were related to the “physical activity” domain. The item “sweets consumption” presented a five-day average, which suggests a bad DM habit.

About the smoking assessment in the studied population, results showed that only three people were smokers. Within those, the mean consumption of cigarettes before and after the intervention was 1.2 cigarettes/day.

Studies that used telephone support and assessed self-care of DM people have been explored in the literature. Thus, a study using telephone support to interview people with bad DM control that assessed self-care activities through the QAD, identified good adherence to self-care in regards to using medication and eating habits and, inadequate adherence to physical activity, corroborating with our findings. On the other hand, the authors verified low adherence to glucose monitoring⁽¹⁸⁾.

A study conducted in Jordan aimed to assess the impact of a pharmaceutical assistance program in the clinical profile and self-care behaviors of people with type 2 DM using the QAD as an assessment instrument. Besides using the telephone support as an intervention during the patient’s education process, they were consonant with the actual for items involving eating domains and glucose monitoring. Differently, they identified better means for items of the physical activity, and the majority of the population smoked⁽¹⁹⁾.

Another study designed to use telephone support and the QAD to assess self-care activities within other DM control variables of individuals in a medical center in Chicago – the USA, mixed accompaniments by calls and text messages. They found that after applying the QAD, there were improvements in all self-care domains, suggesting the telephone support helping behavioral changes in the studied population⁽²⁰⁾.

Within the studies not using telephone support but assessing self-care activities in DM people through the QAD, those were consonant with the present study, in the measure that they reported most participants eating sweets many times per week, not properly performing physical activity, but they used DM medication correctly in most days. Also, the minority were smokers. In disagreement, the authors found that most participants did not follow the diet correctly, did not monitored the glucose and their feet⁽²¹⁾.

Another study assessing self-care activities of DM people in a primary health care service using the QAD identified results similar to ours about following a healthy diet, consumption of vegetables/fruits, physical activity, care with the feet, use of medications and smoking. It was only discrepant for glucose monitoring items⁽²²⁾.

Analyses for relationships between DM knowledge, sociodemographic variables, fasting glucose and HbA1c showed statistical significance between knowledge and HbA1c post-intervention. This fact can be possibly explained by population characteristics about disease time, that is, more than ten years of DM evolution. The knowledge and time of disease can be relevant factors for adherence to treatment, in what is assumed that the most knowledge and longer time of DM evolution, the better its control will be. Therefore, in the present study, even with the population achieving good knowledge scores and having extended DM

time, the DM control was poor, as the HbA1c altered before and after the telephone support, and the hyperglycemia before the telephone support.

The results about the relationship between self-care activities and sociodemographic variables, HbA1c and fasting glucose were statistically significant between the domains “general diet” and education, “specific diet” and fasting glucose and, “physical activity” and education, before the intervention. After, we obtained results statistically significant between the domains “physical activity” and education, “glucose monitoring” and marital status and, “use of medications” and HbA1c.

These results show that participants with good DM knowledge do not show good DM control, once HbA1c values were altered. About self-care activities, there was an improvement in few domains after the intervention, especially in what refers to diet, glucose monitoring and feet care. Still, the HbA1c levels remained altered. In this sense, besides the behavior change, we did not verify proper DM control.

Considering the exposed, the identification of knowledge and self-care of DM people can contribute to the assessment of proposed intervention strategies. The present study identified improvements after the telephone support, even if there were no positive changes seen in the glycemetic profile. Still, we were able to verify that telephone support has been becoming an essential tool to accompany DM people, once it approximates patients to health services.

The study has few limitations, especially about the short intervention time and the sample size. Additionally, we verified that during the study, the DKN-A is difficult to comprehend, and the questions need updating. On the other hand, the QAD was an innovative instrument and adequate to assess self-care activities; and it was easy to comprehend the population's behaviors habits fully. Still, the telephone support was seen as valuable, once it was possible to identify the needs of the studied population, which can provide resources for new proposals, with the formulation of more accurate strategies that can improve difficulties faced by DM people.

CONCLUSION

This investigation verified that most of the studied population presented good DM knowledge before and after the telephone support. However, it did not result in significant changes in DM knowledge, once the sample had good knowledge level of the disease since the beginning of the study. However, even with adequate knowledge, the glycemetic profile of participants was abnormal, especially about HbA1c levels. About self-care, improvements related to domains as diet, glucose monitoring and, care with feet were identified; therefore, they were not compatible with the glycemetic profile shown, once HbA1c values were also abnormal.

Regardless of not verifying improvements in the glycemetic profile, the findings show that the telephone support can be a good option to accompany and to monitor DM people, increasingly approximating service users and health teams. In this sense, studies with larger sample sizes and longitudinal, assessing the knowledge and self-care activities with DM people are needed to better identify the telephone effect as an

interventional strategy.

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