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EFFECTS OF SELF-CARE SUPPORTED BY NURSES IN MEN WITH TYPE 2 DIABETES *MELLITUS*

EFEITOS DO AUTOCUIDADO APOIADO POR ENFERMEIROS EM HOMENS COM DIABETES *MELLITUS* TIPO 2

EFECTOS DEL AUTOCUIDADO APOYADO POR ENFERMERAS EN HOMBRES CON DIABETES *MELLITUS* TIPO 2

Guilherme Oliveira de Arruda[1]
Sonia Silva Marcon[2]
Hellen Emília Peruzzo Aveiro[3]
Maria do Carmo Fernandez Lourenço Haddad[4]
Luciana Puchalski Kalinke[5]
Gleiciane da Silva Fonseca[6]
Afonso de Arruda Martinhago[7]

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Objective: to evaluate the effects of supported self-care developed by nurses on knowledge related to disease, self-care, psychological adjustment and self-efficacy of men with type 2 Diabetes Mellitus. Method: randomized clinical trial (REBEC: RBR-46zk89; ClinicalTrials: NCT02974413), which involved ten clusters, 73 men aged 40 to 70 years, with Type 2 Diabetes Mellitus, distributed in the Intervention (n=30) and Control (n=43) groups. Intervention performed individually or in groups. Generalized Estimator equations were used for intra- and intergroup comparisons. Results: statistically significant effect was only observed in relation to increased knowledge about the disease (p<0.001), especially in individual participation (p=0.005). Regarding the type of participation, in a non-significant way, better psychological adjustment and self-care for the participants of the group intervention. Conclusion: the self-care supported by nurses improved the knowledge of men with type 2 Diabetes Mellitus and, in a non-significant way, promoted psychological adjustment and self-care in-group participation.

Descriptors: Men's health. Diabetes Mellitus. Self-care. Primary Health Care. Nursing.

Objetivo: avaliar os efeitos do autocuidado apoiado desenvolvido por enfermeiros sobre o conhecimento referente à doença, autocuidado, ajustamento psicológico e autoeficácia de homens com Diabetes Mellitus tipo 2. Método: ensaio clínico randomizado (REBEC: RBR-46zk89; ClinicalTrials: NCT02974413), que envolveu dez clusters, 73 homens de 40 a 70 anos, com Diabetes Mellitus tipo 2, distribuídos nos Grupos Intervenção (n=30) e Controle (n=43). Intervenção realizada individualmente ou em grupo. Utilizaram-se Equações de Estimações Generalizadas para comparações intra e intergrupos. Resultados: efeito estatisticamente significante só foi observado em relação ao aumento do conhecimento sobre a doença (p<0,001), especialmente na participação individual (p=0,005). Referente

[1] Nurse. PhD in Nursing. Professor at the Universidade Federal do Mato Grosso do Sul. Coxim, Mato Grosso do Sul, Brazil. enfgoa@gmail.com. https://orcid.org/0000-0003-1690-4808.
[2] Nurse. PhD in Nursing Philosophy. Head Professor at the Universidade Estadual de Maringá. Maringá, Paraná, Brazil. https://orcid.org/0000-0002-6607-362X.
[3] PhD in Nursing. Professor at the Universidade Estadual do Paraná. Paranavaí, Paraná, Brazil. https://orcid.org/0000-0002-0786-0447.
[4] Nurse. PhD in Nursing. Senior Professor at the Universidade Estadual de Londrina. Londrina, Paraná, Brazil. https://orcid.org/0000-0001-7564-8563.
[5] Nurse. PhD in Health Sciences. Professor at the Universidade Federal do Paraná. Curitiba, Paraná, Brazil. https://orcid.org/0000-00034868-8193.
[6] Nurse. Specialist in Child and Adolescent Healthcare. Universidade Federal do Mato Grosso do Sul. Campo Grande, Mato Grosso do Sul, Brazil. https://orcid.org/0000-0001-7450-1375.
[7] Medical Student. Universidad Sudamericana. Salto del Guairá, Paraguay. https://orcid.org/0000-0003-2628-9511.

ao tipo de participação, evidenciou-se, de forma não significante, melhor ajustamento psicológico e autocuidado para os participantes da intervenção em grupo. Conclusão: o autocuidado apoiado por enfermeiro melhorou o conhecimento de homens com Diabetes Mellitus tipo 2 e, de forma não significante, promoveu ajustamento psicológico e autocuidado na participação em grupo.

Descritores: Saúde do homem. Diabetes Mellitus. Autocuidado. Atenção Primária à Saúde. Enfermagem.

Objetivo: evaluar los efectos del autocuidado apoyado desarrollado por las enfermeras sobre el conocimiento relacionado con la enfermedad, el autocuidado, el ajuste psicológico y la autoeficacia de los hombres con Diabetes Mellitus tipo 2. Método: ensayo clínico aleatorizado (REBEC: RBR-46zk89; ClinicalTrials: NCT02974413), que involucró a diez clusters, 73 hombres de 40 a 70 años, con Diabetes Mellitus Tipo 2, distribuidos en los grupos de Intervención (n=30) y Control (n=43). Intervención realizada individualmente o en grupos. Se utilizaron ecuaciones de estimación generalizada para las comparaciones intra e intergrupales. Resultados: sólo se observó efecto estadísticamente significativo en relación con un mayor conocimiento sobre la enfermedad (p<0,001), especialmente en la participación individual (p=0,005). En cuanto al tipo de participación, se evidenció, de manera no significativa, un mejor ajuste psicológico y autocuidado para los participantes de la intervención grupal. Conclusión: el autocuidado apoyado por enfermeras mejoró el conocimiento de los hombres con Diabetes Mellitus tipo 2 y, de manera no significativa, promovió el ajuste psicológico y el autocuidado en la participación grupal.

Descriptores: Salud de los Hombres. Diabetes Mellitus. Autocuidado. Atención Primaria de Salud. Enfermería.

Introduction

The number of cases of Diabetes *Mellitus* (DM) increases considerably worldwide. It is estimated that, by 2035, over 590 million people will live with this chronic condition[1]. In order to facilitate the spontaneous involvement of people with decision-making, it is suggested the development of an education that favors empowerment for self-care in DM[2]. Supported Self-Care (SS) stands out, which can be defined as the application of articulated actions that promote self-management in health. The SS is perfectly applicable to people living with DM and can be organized based on the management method of the "5 Bases": Evaluation, Counseling, Agreement, Assistance and Monitoring[3].

For the organization and operationalization of mental processes of behavioral change, and the establishment of goals for diabetes control, it is proposed that the Protocol of Behavior Change be implemented aligned with the phases of the SS. The protocol consists of five stages: exploration of the problem, clarification of feelings and meanings, definition of goals, commitment to action and evaluation of experience and self-care plan[4].

Although there are already studies conducted in Brazil, proposing educational interventions for the care of people with diabetes, few evaluate those interventions in Primary Health Care (PHC)[5]. This scarcity is even greater in relation to studies conducted specifically with men. The male population is vulnerable from an epidemiological and sociocultural point of view, since men, in general, have high rates of behaviors harmful to health[6]. It has also been identified that men diagnosed with diabetes have less access to healthy behaviors, have less food control and do not perform routine laboratory tests[7].

An intervention study showed that, in addition to men and women using different coping strategies, men more frequently adhere to physical activity, but lack guidance on diet, while women are more inclined to adjust their diet[8]. In this sense, it is important to highlight that the representations of dominant masculinity mark the thinking and making of man and reinforce attributes such as strength, fearlessness and invulnerability. This, in turn, they are distanced from possibilities of self-care and closer to risk behaviors, which can impair their health status[9]. Men also tend not to value health behaviors or even the presence of risk factors for cardiovascular diseases, as found in a study conducted with metallurgical workers[10].

However, nurses who work in the scope of PHC can interfere in this reality by helping men to approach health services and also to develop greater self-sufficiency in the management of their health conditions[11]. In this direction, in a study conducted in the United States, men themselves indicated the need for educational programs on lifestyle focused on diabetes care[12]. Moreover, positive, although discrete, effects of self-care supported by nurses on health behavior and anthropometric measurements of men with diabetes have already been observed[13]. However, there is a gap in the literature and in care practice, regarding strategies directed at men who present chronic conditions and effects on other outcomes.

In view of the gender differences in health care and representations of masculinities that can make health vulnerable to men with DM2, there is a need to investigate strategies that contribute to the self-care of this population group. Therefore, the question is: What are the effects of a SS-based intervention by nurses, together with adult men with DM2 under PHC? The objective was to evaluate the effects of SS developed by nurses on knowledge related to disease, self-care, psychological adjustment and self-efficacy of men with DM2.

Method

Randomized cluster trial, controlled, parallel and unblinded, with CONSORT reference application. Conducted between April 2016 and July 2018 in a municipality in the northwest state of Paraná, Southern Brazil.

Inclusion criteria were: being male, having a medical diagnosis of DM2, age between 40 and 70 years and being registered in the *Estratégia Saúde da Família* (ESF) teams under study. Exclusion criteria were: having target organ lesions or comorbidities/complications resulting from diabetes (hemodialysis treatment, amaurosis, disabling sequelae of cerebrovascular accident/heart failure and psychic disorders that compromised participation in the study). The following discontinuity criteria were considered: death, change to an area without coverage of the ESF or another municipality, a serious health problem that made it impossible to take part in the study and the desire to interrupt participation.

To calculate the sample size, the significance level of 5% (α=0.05) and test power of 80% (β=0.20) were chosen, with a confidence level of 95%, the minimum detectable difference value (1.0% of the glycated hemoglobin value) and the standard deviation of the mean glycated hemoglobin of 2.0%. Thus, the minimum sample size of 128 men was estimated.

The recruitment of the participants was carried out through previous contacts with the ESF teams, with the subsequent distribution of invitation letters, elaborated by the researchers, identified in a personalized way with the men's names, and delivered to community health agents. Meetings were scheduled and held at the Basic Health Units (BHU), between April 2016 and January 2017, to raise awareness and invite the men.

The phase of cluster-stratified randomization was carried out under the support of a statistician. Each of the 10 BHU where the men were invited was defined by cluster. The BHU to be allocated in the CG and IG were determined using the multivariate statistical technique called Cluster Analysis, taking as reference the means of standard deviation of hemoglobin glycated by BHU. Thus, the BHU were agglomerated according to the similarity of the glycated hemoglobin values, in order to achieve the homogenization of the groups, with allocation of five BHU in each group. Cluster randomization was chosen to avoid contamination bias among the sample groups.

During the awareness meetings, topics related to self-care were discussed, such as: importance of self-care, healthy eating, physical activity, use of medications, glycemic monitoring, problem solving, reduction of risks of acute and chronic complications and psychosocial aspects. Those who agreed to participate in the study applied the data collection instruments and measured blood pressure and anthropometric measurements (weight, height, waist circumference and body

fat percentage). Thus, the SS Assessment stage was performed, with the collection of initial data (application of instruments on knowledge, psychological adjustment, self-efficacy and self-care) and beginning of counseling. The researchers involved in the measurement were previously trained.

The men allocated in the Intervention Group (IG) were contacted and a second meeting was scheduled, individual or group, to continue the intervention guided by the SS[4] and the Behavior Change Protocol. Between the first and second meetings, individualized telephone contacts were made (at least two), in order to promote the maintenance of the bond, to answer doubts about the research and some theme addressed in the initial meeting and the scheduling of the next meeting. Thus, the follow-up stage began, which was part of the SS and was implemented in a cross-sectional way until the end of the follow-up.

The focus of the second meeting was on healthy eating habits, but doubts about other topics related to diabetes, identified in the Evaluation, were clarified and contextualized with men's daily lives, so that they could consider them as possible fields of action in self-care. Therefore, the SS Counseling stage has been advanced. This second meeting was held in individual and group modalities, according to men's possibilities.

Also in this meeting, the stages of Agreement and Assistance of the SS were operationalized, through the application of the Protocol of Behavior Change, focusing on the construction stage of the Intelligent Care Plan and the establishment of self-care goals. The men were contacted by phone and invited to participate in the groups. Five meetings were held (one by BHU) between May and June 2017, and an interactive work was carried out, generating discussions and exposure of personal experiences. Questions of the Protocol of Behavior Change were triggered to promote possibilities of self-care actions.

To identify such actions, questions were asked, such as: What is your greatest difficulty in taking care of your health? How do you feel about this situation of having to take care of your health? What do you want to do to improve your health? How can you change anything in your life to feel better? What do you think can hinder the achievement of your goal? Is there anyone who can help you reach your goal?

The men who could not participate in the groups in the BHU were visited at home, where individual meetings were held for the intervention, between October 2017 and February 2018. It is noteworthy that 18 men participated in the group meetings and another 18 participated in the individual meetings. The third individual meeting had actions that were part of the Follow-up stage, reevaluating doubts and the survey of difficulties in the implementation of the care plan, followed by the collection of final and return data on results of measures and examinations.

The individuals who composed the Control Group (CG) participated in the initial meeting and received guidance, at the end of the follow-up, about the knowledge about diabetes and the results of laboratory tests and anthropometric measurements.

The initial data were collected by the main researcher and two more assistant researchers, through the application of data collection instruments and measurement verification. The final data were collected by pairs of researchers who did not participate in the intervention or in the collection of the initial data. The primary outcomes were listed for the present study: knowledge about diabetes, self-care, attitudes towards the disease (psychological adjustment) and self-efficacy in diabetes. To measure these outcomes, the following instruments were applied: Diabetes Knowledge Questionnaire (DKN-A), Self-Care Activities Questionnaire with Diabetes (AQD), Diabetes Attitudes Questionnaire (ATT-19)[14] and Diabetes Self-Efficacy Scale – Short Version (DSS-SV)[15].

Pearson's Chi-square test was used to compare the same variables for different groups. To compare the scores related to knowledge, self-care, attitudes and self-efficacy (dependent variables), we chose to use models of Generalized Estimation Equations (GEE). For this, the type of

linear response (identity binding function), the estimator of the robust covariance matrix and an unstructured work correlation matrix were adopted. Pair-to-pair comparisons with Bonferroni adjustment were used. The Group (Intervention and Control) and the Moment of Observation (1st and 2nd moments of observation) were applied as independent variables for the analysis of the main effects (effect of an independent variable on the dependent) and the interaction effects (combined effect of the two independent variables on the dependent variable). The type of participation in the intervention (individual or group) was also adopted as a covariate to analyze the possible differences attributed to this variable. Mean, standard error, mean difference and 95% confidence interval were estimated. The pre-fixed significance level was 5% and p-value for GEE analysis was obtained by Wald chi-square.

The research project was evaluated and approved by the Permanent Human Research Ethics Committee of the State University of Maringá and the registered intervention protocol (REBEC: RBR-46zk89; ClinicalTrials: NCT02974413).

Results

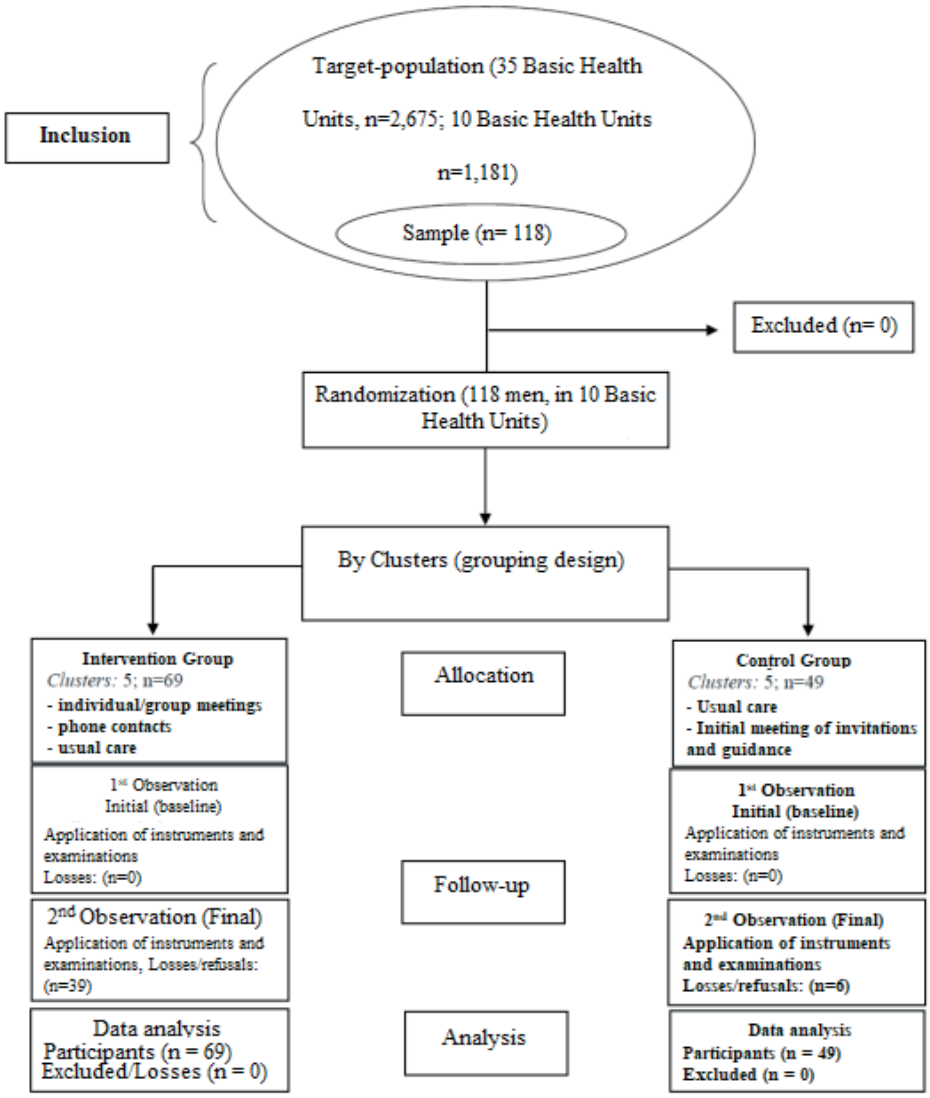
Of the 39 participants from the IG and were discontinued from the study, 20 left before the intervention properly: 7 of them were not located through the contact informed at the time of the invitation, 6 gave up due to self-declared disinterest, 2 for death, 2 for having suffered cerebrovascular accident and 3 for other reasons (initiation of treatment for cancer, change of city and participation in another clinical study). Of the 19 men who were discontinued between the first and second meeting of the intervention: 10 gave up for different reasons, 3 were not found by the informed contacts, 2 moved from the municipality, 2 suffered vascular events (infarction and initiation of hemodialysis treatment), 1 due to death (infarction) and 1 was not found at home for the intervention meeting.

In the IG, there were no differences regarding baseline data for sociodemographic, behavioral and clinical variables among men who completed the study, according to the type of participation in the intervention (individual or group). There were also no significant differences in baseline between IG and CG. However, it is noteworthy that the mean family income (IG=2.709 x CG=2.903), the reference to the health insurance (IG=40.0% x CG=44.2%), to the practice of physical activity (IG=46.7% x CG=58.1%) and psychological adjustment levels (IG=49.6 x CG=53.6) and self-efficacy (IG=3.7 x GC=3.8) were slightly higher in CG, who also had lower levels of glycated hemoglobin (IG=8.9% x GC=8.1%).

In the IG, a higher mean time of diagnosis (IG=12.0 x CG=10.5) and higher frequencies of smoking (IG=10.0% x CG=7.0%), use of alcohol drinks (IG=46.7% x CG=3 4.9%), brain problems (IG=23.3% x CG=9.3%), ophthalmologic (IG=80.0% x GC=62.8%) and healing (IG=16.7% x CG=16.3%). The frequency of satisfactory knowledge in the 2nd moment of observation was higher in IG than in the CG (93.3% > 63.4%). Moreover, the satisfactory degree of knowledge increased in the IG after the application of the intervention, from 55.1% to 93.3%.

Flowchart 1 shows the progress of the Clusters and study participants.

Flowchart 1 – Randomized clinical trial, according to CONSORT 2010



Source: Created by the authors.

The results of the main effects test, with the variables group and moment of observation, and the interaction between these variables, indicated effects on knowledge (group: p=0.048; moment of observation: p=0.006; and group/moment of observation interaction: p=0.003), psychological adjustment (moment of observation: p=0.001); and self-efficacy (group: p=0.022); and moment of observation: p=0.002). The estimated means, standard errors and 95% CI for IG and CG in the two observation moments are presented in Table 1 and represent the interaction between these two factors for each of the outcomes studied.

Table 1 – Estimates of means of knowledge, self-care, psychological adjustment and self-efficacy by groups of men with type II Diabetes Mellitus and time of observation. Maringá, Paraná, Brazil – 2018. (N=73)

(continued)

Group	Observation	Mean	Standard Error	95% Confidence Interval	
				Lower	Upper
Knowledge					

Table 1 – Estimates of means of knowledge, self-care, psychological adjustment and self-efficacy by groups of men with type II Diabetes Mellitus and time of observation. Maringá, Paraná, Brazil – 2018. (N=73)

(conclusion)

Group	Observation	Mean	Standard Error	95% Confidence Interval	
				Lower	Upper
Intervention	1st moment	8.39	0.30	7.79	8,99
	2nd moment	10.32	0.36	9.62	11,03
Control	1st moment	8.59	0.39	7.82	9,36
	2nd moment	8.52	0.42	7.69	9,35
Self-care					
Intervention	1st moment	3.80	0.13	3.54	4,05
	2nd moment	3.92	0.16	3.61	4,23
Control	1st moment	3.69	0.15	3.39	3,99
	2nd moment	3.73	0.16	3.41	4,04
Psychological Adjustment					
Intervention	1st moment	52.93	1.29	50.40	55,45
	2nd moment	49.43	1.63	46.23	52,63
Control	1st moment	54.83	1.73	51.43	58,24
	2nd moment	49.64	1.12	47.44	51,83
Self-efficacy					
Intervention	1st moment	3.64	0.06	3.52	3,76
	2nd moment	3.78	0.07	3.64	3,91
Control	1st moment	3.75	0.08	3.59	3,90
	2nd moment	3.98	0.04	3.90	4,06

Source: Created by the authors.

Table 2 established the observation moment as a milestone to compare IG and CG in relation to outcomes of interest. The results showed that there was no significant difference between the groups at the first moment of observation for any of the outcomes. On the other hand, in the 2nd moment, there was a significant difference in relation to knowledge (higher for IG) and self-efficacy (higher for CG).

Table 2 – Peer comparisons between groups of men with type II Diabetes Mellitus fixing the observation time for knowledge, self-care, psychological adjustment and self-efficacy. Maringá, Paraná, Brazil – 2018. (N=73)

Observation moment	Groups		Mean difference (1)	95% Confidence Interval		p-value(2)
				Lower	Upper	
Knowledge						
1st moment	Intervention	Control	- 0.20	- 1.17	0,77	0,688
2nd moment	Intervention	Control	1.80	0.71	2,89	0,001
Self-care						
1st moment	Intervention	Control	0.11	- 0.29	0,50	0,597
2nd moment	Intervention	Control	0.19	- 0.25	0,64	0,391
Psychological Adjustment						
1st moment	Intervention	Control	- 1.90	- 6.15	2,33	0,378
2nd moment	Intervention	Control	- 0.20	- 4.08	3,67	0,918
Self-efficacy						
1st moment	Intervention	Control	- 0.10	- 0.29	0,09	0,303
2nd moment	Intervention	Control	- 0.20	- 0.36	- 0,04	0,011

Source: Created by the authors.

(1) The sign of the mean difference corresponds to the subtraction: mean of the intervention group - mean of the control group.

(2) Bonferroni post-hoc test.

When the type of Group was fixed, to analyze the significant mean differences between observation moments (Table 3), it was found that, for the IG, the mean knowledge score was higher in the 2nd moment; for the CG, the mean psychological adjustment score was lower and the self-efficacy score was higher in the 2nd moment.

Table 3 – Pair comparisons between observation times, fixing the group of men with type II Diabetes *Mellitus* for knowledge, self-care, psychological adjustment and self-efficacy. Maringá, Paraná, Brazil – 2018. (N=73)

Group	Observation moment		Mean difference(1)	95% Confidence Interval		p-value(2)
				Lower	Upper	
Knowledge						
Intervention	1st moment	2nd moment	1.93	- 2.70	- 1.17	<0.001
Control	1st moment	2nd moment	- 0.07	- 1.02	1.15	0.905
Self-care						
Intervention	1st moment	2nd moment	0.12	- 0.27	0.52	0.542
Control	1st moment	2nd moment	0.04	- 0.33	0.40	0.842
Psychological Adjustment						
Intervention	1st moment	2nd moment	- 3.49	- 7.32	0.34	0.074
Control	1st moment	2nd moment	- 5.19	- 8.68	- 1.71	0.003
Self-efficacy						
Intervention	1st moment	2nd moment	0.13	- 0.03	0.30	0.119
Control	1st moment	2nd moment	0.23	0.07	0.40	0.005

Source: Created by the authors.

(1) The sign of the mean difference corresponds to the subtraction: mean of the intervention group - mean of the control group.
(2) Bonferroni post-hoc test.

Data referring only to IG participants were analyzed, stratification of this analysis according to the type of participation in the intervention (individual and group). For those who participated in the intervention individually, the means for the knowledge score about diabetes were different between the 1st and 2nd moment. The results also show that the mean scores of self-care and psychological adjustment were different between the types of participation in the intervention, in the 2nd moment of observation (see legend of Table 4).

Table 4 – Synthesis of pairwise comparisons between observation times and type of intervention (covariate) with men with type II Diabetes Mellitus for knowledge, self-care, psychological adjustment and self-efficacy. Maringá, Paraná, Brazil – 2018. (N=30)

Type of Intervention	Observation moment		Mean difference (1)	p-value(5)
	1st moment	2nd moment		
Knowledge				
Individual	9.09(2)	10.68(3)	1.59	0,005
Group	9.18(2)	10.28(3)	1.10	0,109
Self-care				
Individual	3.75(2)	3.58(4)	- 0.16	0,575
Group	3.69(2)	4.28(4)	0.59	0,099
Psychological adjustment				
Individual	48.31(2)	45.81(4)	- 2.50	0,450
Group	51.14(2)	51.92(4)	0.78	0,789
Self-efficacy				
Individual	3.78(2)	3.78(3)	0.00	0,993
Group	3.80(2)	3.81(3)	0.01	0,954

Source: Created by the authors.

(1) The sign of the mean difference corresponds to the subtraction: average at the 2nd moment - average at the 1st moment.
(2) Equal means of Intervention Types in the 1st moment (p>0.05).
(3) Equal means of Intervention Types in the 2nd moment (p>0.05).
(4) Different means of the Types of Intervention in the 2nd moment (p<0.05).
(5) Bonferroni post-hoc test.

The results of individual and group participation in the intervention were also compared with the results of the CG and it was identified that only in the 2nd moment of observation there were differences. Both the results of individual participation and group participation were different from the control in relation to knowledge.

Discussion

The interaction between the groups and the two distinct moments of observation showed a significant change in the average score of knowledge about diabetes for men in the IG, signaling the increase in the levels of knowledge of men who participated in the SS intervention. It was also found that the discontinuity of the intervention could imply stagnation or decrease in knowledge levels, which occurred in the CG.

This result corroborates the fact that the interventions led to improved knowledge, which proved essential, considering the chronicity of the condition and the need to develop skills. A study conducted with 52 people of both sexes, with a mean age of 63.8 years, showed an increase in satisfactory levels of knowledge from 51.9% to 65.4% after the intervention conducted by an endocrinologist[16], a smaller increase, therefore, than that observed in the intervention conducted by nurses in the present study.

An intervention performed during six months, consisting of three nursing consultations and monthly telephone contacts used the SS. The 134 people with participating DM showed significant improvement over the average score of knowledge about the disease, which went from 6.0 to 9.0[3].

Interventions performed with men can produce good results, as shown in a study with men metallurgical workers, aged between 18 and 70 years, performed in the workplace for three months, in which an increase of 1.4 in the knowledge scale on cardiovascular diseases was observed[17]. The increase was slightly higher than that observed in the present study (1.1 point). It is believed that, in the present study, the increase was not higher because the participants already had, at the initial moment, a knowledge considered satisfactory.

It is important to reinforce that knowledge alone may not be sufficient to cause effective changes in self-care. This points to the need for interventions that consider gender specificities in their approaches. On self-care, the mean initial score of the men in the study was already higher than that observed in other clinical trials[2-3].

Interventions performed during 6 or 12 months presented, respectively, increments of the order of 0.7[3] to 0.9 days[2] in the average number of days of self-care practice, which leads to the inference that, in general, the men participating in the present study did not benefit significantly in this item. This, possibly, is due to the short time of contact with the nursing professional, because some users still hesitated to recognize their responsibility for self-care, so that having someone who could support them would be important[3].

However, with regard to men, nurses face several difficulties to implement strategies that are related to the care of male health needs, especially to make them sensitive about the importance of their role in self-care management. These difficulties permeate, in large part, the challenges imposed by conceptions of masculinity that modulate the behavior of this social group[18]. However, it is necessary that nurses persist in performing self-care support interventions for men with diabetes, especially from an interprofessional and collaborative perspective, because, when they participate in interventions of this nature, benefits are identified, such as reduction of cardiometabolic risk factors[19].

No benefits were observed after the intervention. However, a study conducted in Nigeria showed that good knowledge about the disease and treatment, especially about the importance of physical activity, could favor glycemic control, even in the case of people with a negative attitude towards exercise[20].

Good results on attitudes related to the disease were pointed out in a study conducted with 238 individuals of both sexes, and a significant increase in the overall scores related to attitudes in the experimental group was observed[2]. The low frequency of contact of the researcher with the men participating in the present study may have limited the advances in psychological adjustment, to the point of interfering in the participants' attitudes towards the disease. That is, despite the improvements observed in relation to knowledge, in case of consolidated changes in attitudes, it would be essential to have more encounters between them and the nurse.

Regarding self-efficacy, a randomized clinical trial conducted in Southeastern Brazil stands out, with 183 people with DM2 (IG=72), in which improvement in empowerment scores was observed[21]. It is important to consider the perception of the person about their self-efficacy, because it reflects their beliefs about their own abilities and potentialities for the production of their performance. People with a high perception of self-efficacy consider tasks that require a lot of effort not as threats or something to be avoided, but as challenges that motivate them.

However, as the participating men did not develop, with the intervention, significantly positive attitudes towards the disease, the final perception that they had of their abilities to act in the face of the change in their health status was involved by a negative bias. Thus, the action/action of these men was limited, although they already had a good level of knowledge or expressed acquisition of new knowledge throughout the study. This, in turn, reflected in the few advances observed in relation to self-care activities/actions.

In the case of this research, slight differences in socioeconomic, behavioral and clinical variables, although not significant could represent clinical relevance. Moreover, they pointed to a more unfavorable situation of the men who participated in the IG, which could determine difficulties in obtaining knowledge, critical judgment and decision-making for self-care.

Men sometimes present emotional difficulties (fear, restlessness, anger and sadness) that reflect a situation of affront to a masculinity that distances them from self-care in diabetes. Socially, care is linked to the female universe and, therefore, men belatedly resort to behavior change or the search for professional care in PHC services[9]. As part of this scenario, they may encounter episodes of acute ness of their condition, which leads them to seek emergency services[22]. It is important to highlight the importance of nurses understanding the aspects that are related to the sociocultural construction of men with diabetes and that affect health care[23].

In view of the results observed both in individual and group participation, it is reinforced that the intervention caused effects on knowledge, when compared to the men participating in the CG, regardless of the type of participation. However, in the second moment of observation, a significant difference was identified with higher scores in self-care and psychological adjustment for men with group participation.

In this sense, it is observed that group intervention can potentiate changes in men's habits, mainly because the support relationship established in the group acts as a motivating element for the implementation of self-care in chronic conditions, according to an educational intervention study with metallurgists on risk factors for cardiovascular diseases[10]. Therefore, it is important that other studies with larger sample sizes and with longer follow-up time and frequency be developed, since interventions with gender-specific programming may result in findings contributing to clinical practice[24].

The limitations of the study highlight the characteristics of the target population, characterized by a high rate of absence and refusals to participate; considerable rate of losses during the follow-up, due to disinterest, and

failures in the intervention protocol, as a greater number of meetings and a continuous telephone follow-up were foreseen. These limitations can also be related to men's behavior in relation to their health of distancing themselves from professional interventions, which reinforces the importance of considering the gender variable in the planning of nursing care aimed at self-management in diabetes[25].

It is worth mentioning that the type of data analysis employed and the care in analyzing possible differences in the data regarding the type of participation in the intervention were configured in timely measures for the control of biases related to selection and losses in the follow-up, producing results that allowed identifying effects that, in fact, can be attributed to SS.

The present study contributes to the nursing area, because it presents results of the evaluation of an SS intervention directed exclusively at men with DM2, implemented by a nurse and under randomization and control conditions expected for the clinical trial. It evidences, at the same time, the potential of SS and the challenge of implementing interventions with the male population, because there are different ways of coping, influenced by gender aspects. It reinforces the need for future studies to minimize possible difficulties in the intervention process, which express additional results and add to the present study the foundation of timely public actions for the health of men in chronic condition.

Conclusion

The intervention based on SS, conducted by nurses, produced positive and significant effects on the level of knowledge of men about diabetes, especially in individual participation.

On the type of participation, the men of the intervention group presented better psychological adjustment and self-care than those of the individual intervention. It is worth noting, therefore, that different results can be found, according to the modality of participation in the SS. At the end of the follow-up, the psychological adjustment of the CG decreased significantly, suggesting that the absence of intervention may be negative for men's attitude towards diabetes. In the comparison between the initial and final moments, no significant effects were observed for the mean scores of self-care, psychological adjustment and self-efficacy.

Collaborations:

1 – conception, design, analysis and interpretation of data: Guilherme Oliveira de Arruda, Sonia Silva Marcon and Maria do Carmo Fernandez Lourenço Haddad;

2 – writing of the article and relevant critical review of the intellectual content: Guilherme Oliveira de Arruda, Sonia Silva Marcon, Hellen Emília Peruzzo Aveiro, Maria do Carmo Fernandez Lourenço Haddad, Luciana Puchalski Kalinke, Gleiciane da Silva Fonseca and Afonso de Arruda Martinhago;

3 – final approval of the version to be published: Guilherme Oliveira de Arruda, Sonia Silva Marcon, Hellen Emília Peruzzo Aveiro, Maria do Carmo Fernandez Lourenço Haddad, Luciana Puchalski Kalinke, Gleiciane da Silva Fonseca and Afonso de Arruda Martinhago.

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