

Nursing consultation and control of cardiovascular risk factors in patients with acute coronary syndrome

Consulta de enfermagem e controlo de fatores de risco cardiovasculares na pessoa após síndrome coronária aguda

Consulta de enfermería y control de factores de riesgo cardiovasculares en pacientes después de un síndrome coronario agudo

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Abstract

Background: Cardiovascular disease (CVD) is the leading cause of mortality in Portugal and is thus a priority area of intervention. Even after a coronary event, many patients maintain cardiovascular risk (CVR) behaviors. For this reason, the nursing intervention is essential to control CVR behaviors through the teaching of healthy lifestyles and adherence to the therapeutic regimen.

Objectives: To analyze the influence of a structured teaching program on body mass index (BMI), waist circumference (WC), blood pressure (BP), capillary blood glucose (BCG), total cholesterol (TC), and the patient's understanding of their medical condition.

Methodology: A quantitative, longitudinal, randomized, experimental study was conducted with a before-and-after design and a control group.

Results: The CVD secondary prevention program reduced the BMI, the WC, and improved the patient's understanding of their medical condition.

Conclusion: The implementation of a structured teaching program for patients with acute coronary syndrome (ACS) is a good methodology to improve the control of CVR factors.

Keywords: nursing; cardiovascular diseases; health literacy

Resumo

Enquadramento: A doença cardiovascular (DCV) é a mais importante causa de mortalidade em Portugal, sendo por isso uma área de intervenção prioritária. Mesmo após um evento coronário, muitos doentes mantêm comportamentos de risco cardiovascular (RCV). Desta forma, é pertinente o acompanhamento de enfermagem no controlo dos comportamentos de RCV, através do ensino de estilos de vida saudáveis e a adesão ao regime terapêutico.

Objetivos: Analisar a influência de um programa de ensino estruturado sobre o índice de massa corporal (IMC), perímetro abdominal (PA), tensão arterial (TA), glicemia capilar (GiC), colesterol total (CT) e literacia sobre a sua situação clínica.

Metodologia: Estudo quantitativo, longitudinal, randomizado, do tipo experimental, antes e após, com grupo de controlo.

Resultados: O programa de prevenção secundária da DCV contribuiu para a redução do IMC, do PA e para a melhoria da compreensão do paciente sobre a sua situação clínica.

Conclusão: A implementação de um programa estruturado de ensino em doentes pós síndrome coronária aguda (SCA), constitui-se uma boa metodologia na melhoria do controlo dos fatores de risco cardiovasculares.

Palavras-chave: enfermagem; doenças cardiovasculares; literacia em saúde

Resumen

Marco contextual: Las enfermedades cardiovasculares (ECV) son la principal causa de mortalidad en Portugal y, por lo tanto, suponen un área de intervención prioritaria. Incluso después de un problema coronario, muchos pacientes mantienen comportamientos de riesgo cardiovascular (RCV). Por ello, en el control de los comportamientos de RCV es necesario el acompañamiento de enfermería, a través de la enseñanza de estilos de vida saludables y la adhesión al régimen terapéutico.

Objetivos: Analizar la influencia de un programa de enseñanza estructurado en torno al índice de masa corporal (IMC), el perímetro abdominal (PA), la presión arterial (TA), la glucemia capilar (GiC), el colesterol total (CT) y la alfabetización sobre su situación clínica.

Metodología: Estudio cuantitativo, longitudinal, aleatorizado, de tipo experimental, antes y después, con un grupo testigo.

Resultados: El programa de prevención secundaria de la ECV contribuyó a la reducción del IMC, del PA y a la mejora de la comprensión del paciente de su condición médica.

Conclusión: La aplicación de un programa estructurado de enseñanza en pacientes después de haber sufrido un síndrome coronario agudo (SCA) constituye una buena metodología en la mejora del control de los factores de riesgo cardiovasculares.

Palabras clave: enfermería; enfermedades cardiovasculares; alfabetización en salud

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Introduction

Cardiovascular disease (CVD) is the leading cause of mortality in Portugal and is characterized by its association with lifestyle factors. There is an enormous potential for nurses to intervene in this area as agents who promote healthy lifestyles. Even after the CVD has progressed, it is still imperative to control the risk factors and therapeutic adherence because evidence has shown that patients do not often adhere to treatment and maintain risky behaviors.

In Portugal, research in this area is scarce, so more scientific evidence is required on the nurses' intervention in CVD secondary prevention.

Thus, this study was conducted with the purpose of analyzing the influence of a structured teaching program on body mass index (BMI), waist circumference (WC), blood pressure (BP), capillary blood glucose (CBG), total cholesterol (TC), and patient's understanding of their medical condition.

Background

Two strategies are used in CVD prevention: the population strategy and the high-risk strategy. The population strategy aims at reducing the CVD incidence through lifestyle and environmental changes targeted at the general population, such as banning smoking in enclosed places and reducing the salt content in food. This strategy can bring large benefits to the population, although it offers little to the individual (European Society of Cardiology [ESC], 2012). In the high-risk approach, preventive measures are aimed at reducing risk factor levels in those at the highest risk, either individuals without CVD at the upper part of the total cardiovascular risk distribution or those with established CVD (ESC, 2012). To obtain the maximum preventive effect, the ideal would be to combine both strategies.

According to the same author, and based on the results of several clinical trials, reductions in major risk factors (smoking, high blood pressure [HBP] and cholesterol) accounted for more than half of the decrease in coronary heart disease deaths. However, adherence to

long medication regimens or harmful behavior change (to follow a diet or quit smoking) is low. In addition, the patient's understanding of their own medical condition is essential, with a low health literacy being a risk factor for several behavior-associated diseases, such as obesity, diabetes *mellitus*, CVD, and cancer. Adequate levels of health literacy lead to improved quality of life and health and, consequently, lower morbidity and mortality (Santos et al., 2010). Thus, the patient's understanding of their own medical situation is an important factor in the adherence to the therapeutic regimen, as it will motivate the patient towards the decision-making process and finding strategies to reduce the cardiovascular risk (Santos & José, 2011).

Hypotheses

Patients with post-acute coronary syndrome (ACS) who follow a structured teaching program for secondary CVD prevention have lower BMI and WC values, controlled BP, CBG, TC levels, and increased understanding of their own medical situation.

Methodology

A quantitative, longitudinal, randomized, experimental study was conducted with a before-and-after design and a control group.

In 2013, there were 185 admissions with the admission diagnosis of ACS to a Cardiac Intensive Care Unit (CICU) in the central region of Portugal.

The following inclusion criteria were applied: being admitted to a CICU with an ACS diagnosis in 2013; living in the municipalities of Coimbra or Figueira da Foz; being over 18 years of age; and knowing how to read and write. The simple random sampling method was used and the random calculation tools of the *random.org* website were used to distribute the participants into groups.

Thirteen patients were included in the experimental group (EG) and 11 in the control group (CG).

The sample was small due to the difficulty in contacting the patients (unassigned phone

number and death), their refusal to participate in the study, and the withdrawal of three patients from the EG during the follow-up period.

The patient's understanding of their own medical situation was assessed using the Batala Test (Calixto et al., 2013), which assessed patient's knowledge about HBP. A set of 21 true/false questions were designed by the researcher to assess the patient's knowledge of atherosclerotic CVD (based on the literature and validated by experts).

Patients in the EG were offered a monthly nursing consultation for 6 months with three evaluation moments (at the beginning of the study, after 3 and 6 months).

In the first consultation, patients are provided with information leaflets about the cardiovascular risk (CVR) factors and their knowledge deficits about their CVR factors, adherence to the therapeutic regimen, and their medical situation are assessed. Based on the deficits identified in this first consultation, the following consultations consisted of establishing, together with the patient, a plan of action and specific targets to be achieved until the next consultation. BP, heart rate, WC, BMI, and CBG were assessed at each consultation and TC every 3 months.

Patients in the CG completed an initial questionnaire and were reassessed after 6 months. BP, heart rate, WC, BMI, CBG, and TC were assessed at both moments.

BP, WC, and BMI were measured in compliance with the recommendations of the Directorate-General for Health (Direção-Geral da Saúde [DGS], 2013a).

All nursing consultations took place at a time and place chosen by the participants between 29 July 2014 and 2 February 2015.

With regard to inferential statistics, parametric tests (student's *t*-test for independent samples) were used whenever assumptions for its use were met (normal distribution and homogeneity), and non-parametric tests (Chi-square test, Mann-Whitney *U* test, and Friedman test) were used whenever the level of measurement and/or normal distribution was not met. In all cases, the critical significance value was set at $p < 0.05$.

The ethical principles inherent to scientific research were met and the project was approved by the Ethics Committee for Health of the hospital unit where the patients were being followed up. Participants gave their informed consent after being informed about the study's objectives and methodology, the risks and benefits of their participation, and the right to withdraw from the study at any time.

Results

With regard to sociodemographic characteristics, both groups were homogenous: in the CG, 72.73% were men and 27.27% were women and, in the EG, 69.23% were men and 30.77% were women. The characteristics of atherosclerotic CVD account for the higher number of men in the sample. The mean age was 68.08 years (± 11.74) in the EG and 67.55 years (± 10.24) in the CG. Most patients were married/cohabiting (63.64% in the CG; 61.54% in the EG) and lived with relatives (72.73% in the CG; 76.92% in the EG). They had a low education level (45.45% in the CG and 46.15% in the EG had completed up to the 1st cycle of basic education) and most of them were retired (72.73% in the CG; 61.55% in the EG; Table 1).

Table 1

Absolute and percentage distribution of the sociodemographic characteristics of the sample (N = 24)

Sociodemographic characteristics	Control Group		Experimental Group		Total <i>n</i>
	<i>N</i>	%	<i>N</i>	%	
Gender					
Male	8	72.73	9	69.23	17
Female	3	27.27	4	30.77	7
Total	11	100.00	13	100.00	24

Marital Status					
Single	2	18.18	1	7.69	3
Married/Cohabiting	7	63.64	8	61.54	15
Divorced/Separated	---	---	3	23.08	3
Widowed	2	18.18	1	7.69	3
Total	11	100.00	13	100.00	24
Lives...					
Alone	3	27.27	3	23.08	6
With family	8	72.73	10	76.92	18
Total	11	100.00	13	100.00	24
Residence					
Rural	3	27.27	10	76.92	13
Urban	8	72.73	3	23.08	11
Total	11	100.00	13	100.00	24
Municipality of residence					
Figueira da Foz	7	63.64	9	69.23	16
Coimbra	4	36.36	4	30.77	8
Total	11	100.00	13	100.00	24
Education					
Knows how to read and write	3	27.27	2	15.38	5
1 st cycle of basic education	2	18.18	4	30.77	6
2 nd cycle of basic education	1	9.09	---	---	1
3 rd cycle of basic education	---	---	1	7.69	1
Secondary education	4	36.37	3	23.08	7
Higher education	1	9.09	3	23.08	4
Total	11	100.00	13	100.00	24
Professional Situation					
Self-employed	---	---	2	15.38	2
Employed	2	18.18	2	15.38	4
Retired	8	72.73	8	61.55	16
Unemployed	1	9.09	1	7.69	2
Total	11	100.00	13	100.00	24

Despite the sociodemographic homogeneity between the groups, the same homogeneity was not found in the clinical characteristics. According to Table 2, there is a high prevalence of CVR factors such as HBP (92.31% in the EG; 81.81% in the CG), dyslipid-

emia (84.62% in the EG; 81.81% in the CG), diabetes (46.15% in the EG; 27.27% in the CG), overweight (69.23% in the EG; 90.90% in the CG), family history (38.46% in the EG; 54.55% in the CG), and smoking (15.38% in the EG).

Table 2

Absolute and percentage distribution of the clinical characteristics of the sample (N = 24)

Cardiovascular risk factors	Experimental Group (n = 13)		Control Group (n = 11)		Total n
	N	%	N	%	
HBP	12	92.31	9	81.81	21
Dyslipidemia	11	84.62	9	81.81	20
Diabetes	6	46.15	3	27.27	9
Overweight	9	69.23	10	90.90	19
Family history	5	38.46	6	54.55	11
Smoker					
No	11	84.62	11	100.00	22
Yes	2	15.38	---	--	2
Total	13	100.00	11	100.00	24

At the first assessment moment, 50% of the participants in both groups did exercise. After 6 months, the exercise habits were similar in the CG, but improved significantly in the EG, particularly between the first and the second assessment moment (3 months later). While the BMI of patients in the CG increased from 30.15 kg/m² (\pm 5.36 kg/m²) to 30.82 kg/m² (\pm 5.54 kg/m²), corresponding to Class I obesity, it decreased in patients in the EG from 26.73 kg/m² (\pm 3.22) to 26.36 kg/m² (\pm 3.26), corresponding to pre-obesity. A statistically significant difference was found between groups at the first ($t = -1.93$; $p = 0.034$) and third ($t = -2.45$; $p = 0.012$) assessment moments, as shown in Table 3.

With regard to WC, it gradually decreased in both groups during the three assessment moments. A statistically significant difference was found in WC values between the groups ($t = -2.05$; $p = 0.027$) at the third assessment moment, with the EG showing lower WC mean values ($\bar{x} = 94.38 \pm 10.28$) than the CG ($\bar{x} = 104.09 \pm 12.93$).

To complement the analysis of the evolution of the WC values in each group throughout the assessment moments, it should be noted that a strong statistically significant reduction was found in the EG ($p < 0,001$) and that the slight reduction in WC in the CG between the first and the third assessment moment was not statistically significant ($p = 0.970$). At the first assessment moment, 53.85% ($N = 7$) of EG patients did not have their BP controlled, decreasing to 15.38% ($N = 2$) at the second moment and increasing again to 30.77% ($N = 4$) at the third assessment moment, without statistical significance. No changes were found in the CG.

With regard to TC, the number of patients in the EG patients with high TC decreased from the first to the second assessment moment (30.77% to 23.08%) and significantly increased from the second to the third assessment moment (38.46%). At the first assessment moment, four EG patients had high TC, five had borderline high TC, and four desirable TC. At the third assessment moment, the number of patients with desirable TC decreased and the number of patients with borderline high and high TC increased, but without statistical significance. The number of patients with high TC in the CG also increased significantly from the first to the third assessment moment (18.18% to 36.36%). At the first assessment moment, there were two CG patients with high TC, four with borderline high TC, and five with desirable TC. At the third assessment moment, the number of patients with desirable TC decreased and the number of patients with borderline high and high TC increased.

With regard to CBG, the number of patients with uncontrolled CBG in the EG increased from the first to the second assessment moment (46.15% to 53.85%) and decreased to 38.46% at the third assessment moment. In the CG, the number of patients with uncontrolled CBG increased from the first to the third assessment moment (36.36% to 63.64%), without statistical significance between the groups at any of these moments. It should be noted that there were more diabetic patients in the EG (EG: 6; CG: 3). With regard to the patient's understanding of their own medical condition, the analysis of the distribution of the answers to the true/false

questions showed a higher prevalence of wrong answers in both groups, at the three assessment moments, to the questions: “With regard to salt, the optimal amount is 20g per day” and “Sedentarism is being very thirsty.” (NT, very thirsty is *ter muita sede* in Portuguese). At the third assessment moment, the CG answered wrongly to more questions than the EG, with a statistically significant difference between groups ($z = -2.51$; $p = 0.006$). At the first assessment moment, of the 21 true/false questions, EG patients answered wrongly to an average of 4.46 (± 5.3) questions; an average of 1.69 (± 0.95) questions at the second moment; and an average of 1 (± 0.82) at the third moment. This analysis shows a positive evolution in the answers (mean rank = 13.65 to 9.27). In the CG, patients answered wrongly to 2.82 (± 2.36) questions at the first moment and to 2.45 (± 1.51) questions at the third moment, showing a positive evolution, although less significant than in the EG (mean rank = 11.14 to 16.32).

The analysis of the groups’ individual evolution showed a significant decrease in the number of

wrong answers in the EG ($\chi^2 = 17.59$; $p < 0.001$) from the first moment ($Md = 3$) to the second and third moments ($Md = 2$; $Md = 1$). In the CG, and despite the increase in the number of wrong answers from the first ($Md = 2$) to the third assessment moment ($Md = 3$), no statistical significance ($z = -0.57$; $p = 0.569$) was found. Therefore, the program implemented in the EG seems to have had a positive impact.

The assessment of the knowledge on HBP, using the Batalla test, showed that, at the first assessment moment, both groups had insufficient knowledge (69.23% in the EG; 54.55% in the CG), but that it was acceptable for 30.77% of patients in the EG and 45.45% in the CG. Throughout the 6-month program, the number of patients with an acceptable level of knowledge increased significantly in the EG (69.23% at the second moment and 84.62% at the third moment). In the CG, the HBP level of knowledge between assessments remained the same.

The analysis of the results obtained using the Batalla test showed no statistical significance difference between groups ($p = 0.055$).

Table 3

Summary statistics and results of the application of statistical tests on the evolution of the groups throughout the teaching program

Indicators	1 st assessment (0 months)		3 rd assessment (6 months)	Im- prove- ment	Statistical significance			
					EG	CG	Between groups	
							1 st assessment	3 rd assessment
BMI (\bar{x})	EG	26.73 kg/m ²	26.36 kg/m ²	Yes	$\chi^2_F = 7.57$	$t = -2.30$	$t = -1.93$	$t = -2.45$
	CG	30.15 kg/m ²	30.82 kg/m ²	No	$p = 0.023$	$p = 0.044$	$p = 0.034$	$p = 0.012$
WC (\bar{x})	EG	102.31 cm	94.38 cm	Yes	$\chi^2_F = 24.53$	$t = 0.04$	$t = -0.40$	$t = -2.05$
	CG	104.14 cm	104.09 cm	Yes	$p < 0.001$	$p = 0.970$	$p = 0.345$	$p = 0.027$
Controlled BP (%)	EG	46.15%	69.23%	Yes	---	---	$\chi^2_{C(1)} = 0.00$	$\chi^2_{(1)} = 1.39$
	CG	45.45%	45.45%	No	---	---	$p = 1.000$	$p = 0.408$
TC (\bar{x})	EG	165.54 mg/dl	178.08 mg/ dl	No	---	---	$\chi^2_{(2)} = 0.73$	$\chi^2_{(2)} = 0.02$
	CG	167.36 mg/dl	173.27 mg/ dl	No	---	---	$p = 0.872$	$p = 1.000$
CBC (\bar{x})	EG	138.92 mg/dl	127.23 mg/ dl	Yes	---	---	$\chi^2_{(1)} = 0.24$	$\chi^2_{(1)} = 0.67$
	CG	123.82 mg/dl	172.91 mg/ dl	No	---	---	$p = 0.697$	$p = 0.413$
T/F (\bar{x})	EG	4.46 wrong	1.00 wrong	Yes	$\chi^2_F = 17.59$	$z = -0.57$	$z = -0.88$	$z = -2.51$
	CG	2.82 wrong	2.45 wrong	Yes	$p < 0.001$	$p = 0.569$	$p = 0.189$	$p = 0.006$
Batalla (%)	EG	30.77% acceptable	84.62% acceptable	Yes	---	---	$\chi^2_{(1)} = 0.55$	$\chi^2_{(1)} = 4.11$
	CG	45.45% acceptable	45.45% acceptable	No	---	---	$p = 0.675$	$p = 0.055$

A WC larger than 94 cm in men and 80 cm in women contributes to an increased risk of metabolic and cardiovascular complications. This risk increases when the WC is larger than 102 cm in men and 88 cm in women (DGS, 2013a).

With regard to the CVR associated with WC, at the first assessment moment, 30.77% of EG patients had an increased CVR and 69.23% had a very increased CVR. In the CG, 18.18% had no CVR associated with WC, 18.18% had an increased CVR, but more than half (63.64%) had a very increased CVR.

At the third assessment moment, 30.77% of EG patients did not increase their CVR associated with WC, but 30.77% of patients had an increased risk and 38.46% had a very increased risk. In the CG, 9.09% did not increase their CVR associated with WC, but 36.36% of patients had an increased risk and 54.55% had a very increased risk.

The Systematic Coronary Risk Evaluation

(SCORE) risk index estimates the ten-year risk of fatal cardiovascular disease based on gender, age, smoking habits, systolic BP, and TC levels. Patients with a SCORE $\geq 10\%$ are classified as *very high risk*; SCORE $\geq 5\%$ and $< 10\%$ as *high risk*, SCORE $\geq 1\%$ and $< 5\%$ as *moderate risk*, and SCORE $< 1\%$ as *low risk* (DGS, 2015).

At the first assessment moment, the EG had a mean SCORE risk index of 5.54% (*high risk*), which decreased to 4.54% (*moderate risk*) in the second assessment and slightly increased to 4.85% (*moderate risk*) in the third assessment. This increase in the third assessment moment is associated with the increase in TC levels (Table 4).

In the CG, the mean SCORE risk index at the first moment was 4.64% (*moderate risk*), which increased to 6.09% (*high risk*) in the third assessment. In this case, the increase is associated with the increase in systolic BP and TC levels.

Table 4

Measures of central tendency and dispersion concerning the evolution of the SCORE index in both groups (N = 24)

SCORE Index	Experimental Group (n = 13)					Control Group (n = 11)				
	\bar{x}	Md	SD	Min.	Max.	\bar{x}	Md	SD	Min.	Max.
1 st assessment	5.54	6.00	2.93	1	10	4.64	6.00	2.66	1	8
2 nd assessment	4.54	4.00	2.30	1	10	---	---	---	---	---
3 rd assessment	4.85	4.00	3.24	1	14	6.09	5.00	3.73	2	15

Note. SD = Standard deviation.

Discussion

The sample is composed mostly of men, with a mean age of 67.83 years (± 10.85). These results are consistent with atherosclerotic CVD, which affects mostly men and whose incidence increases with age (Ijzelenberg et al., 2012).

Most participants are married/cohabiting and living with family, which is in line with the results found in other studies (Eshah, 2013; Ijzelenberg et al., 2012). Nearly half of the sample (45.45% in the CG and 46.15% in the EG) did not complete the 1st cycle of basic education. This is a slightly higher level than the one mentioned in the National Health Plan 2012-2016, according to which 44%

of the Portuguese population did not complete the 1st cycle of basic education (DGS, 2013b).

With regard to the BMI, at the first assessment moment, only 30.77% of EG patients and 9.09% of CG patients had a normal weight.

About half of the participants (53.85% in the EG and 54.55% in the CG) were former smokers, which is a similar results to that found by Eshah (2013).

As regards physical exercise, 53.85% of EG patients and 45.45% of CG patients did not exercise before starting the teaching program. It should be noted that, despite the groups' sociodemographic homogeneity, the same homogeneity was not found in terms of be-

havioral aspects/clinical indicators, namely in relation to BMI, diabetes, and physical activity, which is a limitation of this study.

With regard to CVR assessment, an improvement was observed in the EG: from an initial mean of 5.54% (high CVR) to a mean of 4.85% (moderate CVR) at the 6-month follow-up. In the CG, the CVR increased from the first (4.64% - moderate CVR) to the third assessment moment (6.09% - high CVR). These EG results are consistent with those found in the literature, namely in the study by Jorstad et al. (2013). In this multicenter, randomized clinical trial carried out in the Netherlands on secondary prevention of CVR after an ACS, the intervention (EG) consisted of outpatient nursing consultations. The results showed a relative risk reduction in the EG when compared to the CG, which highlight the importance of CVD secondary prevention, so often neglected and understudied.

The results showed that the follow-up of patients (EG) through nursing consultations once a month for 6 months contributed to reducing BMI and WC. These results are in line with those found in a study conducted in Australia where patients being followed-up in an education program had reduced their BMI (Leemrijse, van Dijk, Jorstad, Peters, & Veenhof, 2012).

In the Netherlands, Ijzelenberg et al. (2012) also conducted a randomized controlled trial where they followed-up patients with CVD with the purpose of reducing CVR factors associated with lifestyles. The authors concluded that patients being followed-up for 6 months significantly reduced their weight, BMI, and WC. In another study conducted in the Netherlands, Jorstad et al. (2013) observed that, after a 12-month follow-up with nursing consultations, patients had gradually reduced their weight, BMI, and WC. Kim, Lee, Kim, Kang, and Ahn (2014) conducted a quasi-experimental study in Korea, which consisted of using a structured education program to follow-up patients (EG). In the initial session, each patient received education, demonstration, and counseling and, later on, follow-up phone calls providing psychological support and motivation for behavioral changes. Results showed a reduction in the

BMI and WC of EG patients.

In this study, the reduction in the BMI and WC, in addition to its positive effect in terms of weight, may have contributed to the reduction of other CVR factors under analysis, such as TC, CBG, and BP. To corroborate this idea, Neiberg et al. (2012) conducted a randomized clinical trial where they developed a weight loss intervention for overweight or obese patients with type 2 diabetes. Results showed that participants with greater weight loss significantly improved their glycated hemoglobin, HDL-cholesterol, systolic BP, and triglycerides.

No statistically significant differences were found between groups in relation to BP, CBP, and TC, which is probably due to the clinical differences between groups, especially regarding high BP and diabetes, together with the small sample size. However, although the EG showed a tendency for greater control of BP and CBG after 6 months of follow-up, in the CG, the tendency is to maintain the initial values.

With regard to TC, the values in the EG increased in the third assessment moment, which can be explained by the seasonality of data collection, as this assessment occurred 1 month after the Christmas and New Year festivities, a time when patients themselves reported having overeaten. However, Ijzelenberg et al. (2012) also found no statistically significant differences between groups in BP, TC, and glycated hemoglobin at the 3- and 6-month follow-ups.

In the reviewed literature, the results on BP and TC control are not consensual. Some studies found significant differences in TC, as it is the case of Leemrijse et al. (2012) who reported a TC reduction in the group of followed-up patients. Jorstad et al. (2013) also found that, after a 12-month follow-up, more patients in the EG had controlled systolic BP than those in the CG. In the same study, while the mean levels of systolic BP remained the same over time in the EG, they increased in the CG.

If the sample size was larger and the follow-up period was extended beyond 6 months, more significant results could have been obtained. A statistically significant increase was found in the EG concerning the patient's under-

standing of their medical condition over the 6-month follow-up, as well as when comparing the evolution of both groups. In the Batalla test, a positive evolution was found in the EG, but without statistical significance in the literacy levels, although at the threshold of significance.

As in other studies, this study showed that improved literacy has positive effects in controlling CVR factors such as obesity, WC, BP, and CBG.

Although the optimal combination of interventions remains undetermined in terms of content, form, frequency, and duration, it is known that a more intensive intervention, with more frequent consultations, contributes to controlling risk factors (ESC, 2012).

The majority of the reviewed studies do not describe their intervention program, thus it is impossible to compare them with the program used in this study.

In the United States, DeVon, Rankin, Paul, and Ochs (2010) conducted a randomized clinical trial, with a pre/posttest design, involving patients hospitalized for coronary angioplasty. In their study, the CG received usual care and the EG, in addition to usual care, viewed the 21-slide *Know & GO* presentation (addressing symptoms, CVR factors, and warning symptoms) at baseline and 2 and 4 months after discharge. The program was safe, feasible, and effective in increasing patient's knowledge of ACS symptoms, risk factors, and warning symptoms, thus the authors could conclude that knowledge is the first step toward improved early care-seeking behaviors.

Jorstad et al. (2013) also showed that a CVD secondary prevention program, with nursing follow-ups for 6 months, could reduce the CVR, even after 12 months. In this study, as in Jorstad et al. (2013), followed-up patients accepted the follow-up very well, showing willingness and interest in complying with the program. They reported feeling reassured and confident with the possibility to clarify their doubts. Eshah (2013), when referring to several studies, mentioned that health education contributes to changing health behaviors and improving patients' knowledge.

This study had consistent results because literacy improvement can have contributed to

improve patients' lifestyles and, as a result, improve the BMI and WC levels. In addition, Cao, Davidson, and DiGiacomo (2009), in an analysis of several studies, reported that the lack of access to nursing care is an important predictor of a low level of knowledge about CVD. They also reported no negative outcomes from nursing consultations, rather the existence of scientific evidence on their impact on patients' improved clinical outcomes. This reinforces the idea that nurses have the necessary knowledge, skills, and competencies to effectively participate in the patient follow-up process and to empower the patient for decision-making.

Conclusion

These results suggest that the implemented CVD secondary prevention program contributed to reducing BMI and WC and improving the patient's understanding of their medical condition.

Although no statistically significant differences were found, in the EG, the number of patients with controlled BP increased and the number of patients with controlled CBG increased or remained the same. On the other hand, in the CG, the number of patients with uncontrolled CBG increased. Nevertheless, the implemented program had no positive impact on TC levels.

Therefore, it can be concluded that it is possible to obtain health gains through nursing interventions and that the implementation of a structured teaching program for patients with ACS is a good method for improving BMI, WC, and the patient's understanding of their medical condition, leading to the prevention of new cardiovascular events and a reduction in the number of readmissions.

The standardization of health education within the nursing teams providing care to patients with ACS is essential and should be done through the elaboration of protocols that include the topics to be addressed in the preparation for discharge, the implementation of nursing consultations in hospital settings, and their maintenance even after clinical discharge. Moreover, the family/caregiver should be included in the consul-

tations as they are the patient's main support after discharge. However, the best intervention format remains to be determined, one that would allow for a sustained reduction in CVR factors. Therefore, further studies should be conducted on this topic.

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