

Efficacy of an educative intervention on knowledge related to cardiovascular diseases among men

Efetividade da intervenção educativa no conhecimento de homens relacionado às doenças cardiovasculares

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Descritores

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Abstract

Objective: Compare the knowledge about risk factors for cardiovascular diseases before and after an educative intervention involving male metal workers.

Methods: Intervention study involving 135 metal workers between 18 and 70 years of age. The knowledge on cardiovascular diseases was determined by means of the Heart Disease Fact Questionnaire (HDFQ-2). Student's t-test for independent samples was used and Mann-Whitney's test for intergroup comparisons, and Student's t-test for dependent samples and Wilcoxon's test for the paired assessment.

Results: In the intervention group as well as in the control group, a statistically significant increase by 1.4 points was found in the mean knowledge between baseline and follow-up.

Conclusion: The educative intervention, undertaken in group, at the workplace and at lunchtime, was a possible and effective strategy to increase men's knowledge on risk actors for cardiovascular conditions.

Resumo

Objetivo: Comparar o conhecimento sobre fatores de risco para doenças cardiovasculares antes e após intervenção educativa realizada com homens metalúrgicos.

Métodos: Estudo de intervenção, realizado com 135 metalúrgicos, com idades entre 18 e 70 anos. O conhecimento sobre doenças cardiovasculares foi determinado pelo questionário *Heart Disease Fact Questionnaire* (HDFQ-2). Foram utilizados testes *t* de Student para amostras independentes e de *Mann-Whitney*, na comparação entre grupos, e testes *t* de *Student* para amostras dependentes e de *Wilcoxon*, na avaliação pareada.

Resultados: Tanto no grupo intervenção quanto no controle houve aumento estatisticamente significativo de 1,4 pontos na média do conhecimento entre o momento de base e o de seguimento.

Conclusão: A intervenção educativa, realizada em grupo, no local de trabalho e em horário de almoço, mostrou-se uma estratégia possível e eficaz para aumentar o conhecimento de homens sobre fatores de risco para doenças cardiovasculares.

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Introduction

Cardiovascular diseases (CVD) still prevail as the main cause of death and disability in Brazil and around the world. According to the World Health Organization (WHO), in 2008, 17.3 million people died due to this group of diseases. Estimates appoint that these data will increase to 23.3 million in 2030.⁽¹⁾ Therefore, health promotion and CVD prevention actions are fundamental for the sake of modifications in this epidemiological profile.

Among these actions, activities aimed at increasing the population's knowledge on risk factors for chronic conditions stand out,^(2,3) as this empowers them for lifestyle changes⁽⁴⁾ and, consequently, can be useful to improve the quality of life, avoid the emergence of a problem and influence the search for treatment when the disease has already established.⁽³⁾

In this context, the work environment can serve as a favorable scenario for health promotion, because it constitutes a privileged space for health promotion in the 21st century, since it directly influences the workers' physical, mental, economic and social wellbeing and, consequently, the health of their families, community and society as a whole.⁽⁶⁾

Educative and intervention actions in the work environment have demonstrated promising results, particularly regarding the modifiable risk factors of CVD, such as lack of physical exercise, smoking, hypertension, dyslipidemia, inappropriate diet, hyperglycemia and high stress.⁽⁷⁾ Thus, the occupational health professionals and owners of large companies in the territory of their health services should be trained for health promotion in the work environment,⁽⁸⁾ considering that this place offers an ideal scenario and infrastructure to support these activities, which target a large public at the same time.⁽⁶⁾

Finally, it should be highlighted that, in the specific case of the male public, the strategy of undertaking health promotion in the work environment is relevant because many men allege that the opening hours of the health services coincide with their work hours, impeding their search for care.^(9,10)

Thus, in view of the importance of health education for male workers at the place of work, the objective in this study was to compare the knowledge about risk factors for cardiovascular diseases before and after an educational intervention involving male metal workers.

Methods

A randomized and controlled before-and-after intervention study was undertaken, involving 135 workers from a metal industry located in Maringá (PR), a State in the South of Brazil.

The population consisted of male workers in the iron and steel sector. The inclusion criteria were: working in the company when the data collection started and being 18 years of age or older. The exclusion criteria were: being on leave and/or holiday and not having participated in at least 80% of the educative activities or in the assessment at the end of the educative intervention.

According to company data, 230 male workers were active at the company. Based on this figure, a stratified sample (n=135) was calculated, divided between an intervention group (n=6) and a control group (n=68), considering an estimation error with 1% reliability and 95% sample precision, with an expected prevalence of 50%.

The data were collected between November 2013 and June 2014, divided in three phases (Phases I, II and III).

In Phase I, the 230 workers were interviewed to identify their knowledge on cardiovascular diseases, using a semistructured sociodemographic questionnaire and the Heart Disease Fact Questionnaire (HDFQ-2), developed in the United States.⁽¹¹⁾ This questionnaire consists of 25 questions with three alternative answers: "true", "false" and "I don't know". A score was attributed to each correct answer and zero to incorrect answers, with total scores ranging from zero to 25 points.

The answer "I don't know" was considered wrong.⁽¹¹⁾ After the translation of the HDFQ-2 by

three experts, the word “gardening” was replaced by “housework”, considering that gardening is rarely a physical exercise in the Brazilian population. Thus, the reliability of the questionnaire was tested using Cronbach’s alpha (0.74)

The knowledge was calculated as a continuous variable, using the total score of each individual.

In Phase II, a random sample of 135 participants was obtained among the 230 metal workers. This sample was randomized for the intervention and control groups through random drawing, being 67 allocated to the intervention group and 68 to the control group. The workers from the intervention group were invited to participate in a health education program and, after they had accepted to participate, they were also subdivided using random drawing into four subgroups, so that the small number of participants in each group would guarantee that all individuals were considered at the same time during the activities.⁽¹²⁾

The health education program was developed in the form of operative groups,⁽¹³⁾ which are characterized by the conversation wheel, the interaction among its members, the commitment to the group, the establishment of bonding and of tasks for the members to perform, as well as the mutual experience exchange. This activity model favors the participants’ engagement and, consequently, the practice of healthy habits.⁽¹⁴⁾

The theoretical framework adopted to discuss the themes was supported self-care, more specifically the premises of levels 1 and 2, which incorporate the health promotion interventions related to changes in the behaviors and lifestyles of the Care Model for Chronic Conditions in Primary Health Care.⁽¹⁵⁾

The themes discussed during the meetings were determined in advance and in group between the mediating nurse and the participants during the first meeting and, for the following meetings, during the conversation wheels. They included topics like arterial hypertension, diabetes mellitus, cerebrovascular accident, stroke, prostate cancer, healthy eating, physical exercise, posture at work, cholesterol,

smoking and alcohol consumption, overweight and obesity. Different health professionals were invited to contribute to the health education actions: nutritionists, physiotherapists, physician, physical educator and nurses.

The groups met weekly for three months on fixed weekdays and times. Each meeting took 50 minutes and, to facilitate the workers’ participation, the meetings were held soon after lunchtime, during the rest period, in a room the company made available. These meetings took the form of dialogued lectures as well as conversation wheels and dynamics especially prepared for each theme/encounter. Before starting the discussion of the theme programmed, among the participants, the knowledge and experience concerning the theme were verified, within a perspective based on Paulo Freire’s pedagogy of autonomy, in which the student’s background knowledge is valued, to the detriment of education solely based on scientific contents.⁽¹⁶⁾

The researcher conducted, mediated and recorded the meetings with the help of a nurse who participated as an observer, registering non-verbal behaviors during the meetings, besides helping to check blood pressure, capillary glucose and weight before the start of the group activity. At the end of each meeting, the group of participants set tasks and/or targets to be achieved during the week together with the researcher, by some specific individuals or by the entire group. During the next week, before starting to discuss the programmed theme, a conversation wheel was held to exchange experiences on the tasks set during the previous meeting, when each participant presented his difficulties and conquests, providing feedback on the learning/knowledge gained.

Also regarding the conduction of the educative activity, it should be informed that the same professionals participated in the meeting during the four intervention groups, and were surprised by the direction the activity took in each group. That was so because, despite having a basic script related to their activity area and in line with the themes of interest initially established by the

four group participants' expectations, the general and individual interests that emerged during the activity were always valued. It should also be highlighted that the participants demonstrated interest in the group meetings, as they normally arrived before the scheduled time and, in addition, they commonly brought their own and even their wives' doubts to the meeting, concerning how to prepare certain foods to make them healthier for example. Another example of this interest was one participant's presence during a medical leave because of a forearm fracture.

The 68 workers in the control group did not receive any orientation on risk factors for cardiovascular diseases in the baseline of the study. Nevertheless, blood pressure and capillary glucose verification were offered upon the metal worker's request. In addition, educative activities were guaranteed to all workers after the end of the data collection.

In the final phase, after the end of the intervention period, the HDFQ-2 was again applied to verify the efficacy of the health education program for knowledge on risk factors of cardiovascular diseases. Thus, the outcome variable in this study was the knowledge the participant had gained after the intervention in comparison with his background knowledge.

The data were typed through double entry in Microsoft Excel® 2010 worksheets and later analyzed in statistical software R, version 3.0.1⁽¹⁷⁾

The descriptive and normality analysis of the data was undertaken based on the Shapiro-Wilk test. When the normality parameters were satisfactory, the analysis was based on Student's t-test for two dependent samples, comparing two means (before and after) of the same group, and Student's t-test for two independent samples when comparing the means for two different groups at baseline and follow-up. When the distribution of the variables was asymmetrical, Wilcoxon's test was used in the paired assessment and Mann-Whitney's test in the independent assessment. The proportions were compared using Pearson's chi-square tests. Significance was set at 5% for all tests.

The study was registered in Brazil under the Platform Presentation of Certificate number to Ethics Assessment (CAEE) 25517913.9.0000.0104.

Results

Sixty-seven metal workers started the intervention, but only 35 (52.2%) concluded it, as 14 workers did not participate in at least 80% of the weekly meetings in educative group activities or did not participate in the final assessment, and 18 left the organization before the end of the intervention period. Among the 68 men included in the control group, 37 (54.4%) participated in the second assessment, as six workers refused to answer the questionnaire again and 25 left the company (Figure 1).

In general, the study participants' mean age was 40.3 years (standard deviation ± 12.3). The majority was mulatto/black (62.5%), lived with a partner (76.4%) and had eight or more years of education (61.1%). The mean knowledge on risk factors for cardiovascular diseases was 16.6 points (data not included). These characteristics, according to the group the participants were allocated to, are displayed in table 1. No statistically significant differences were found between the groups, guaranteeing their comparability.

In table 2, the comparison between the participants' knowledge levels on risk factors for cardiovascular diseases is presented according to the group they were allocated to (before (time 1) and after (time 2) the intervention). As observed, in both groups, a statistically significant increase ($p < 0.05$) by 1.4 points was found in the mean HDFQ score at time 2. A similar result was found for the median, which increased significantly in the intervention group ($p = 0.028$) as well as in the control group ($p = 0.008$).

Additional analysis showed that, although the median of the control group (2 points) increased more than in the intervention group (1 point)

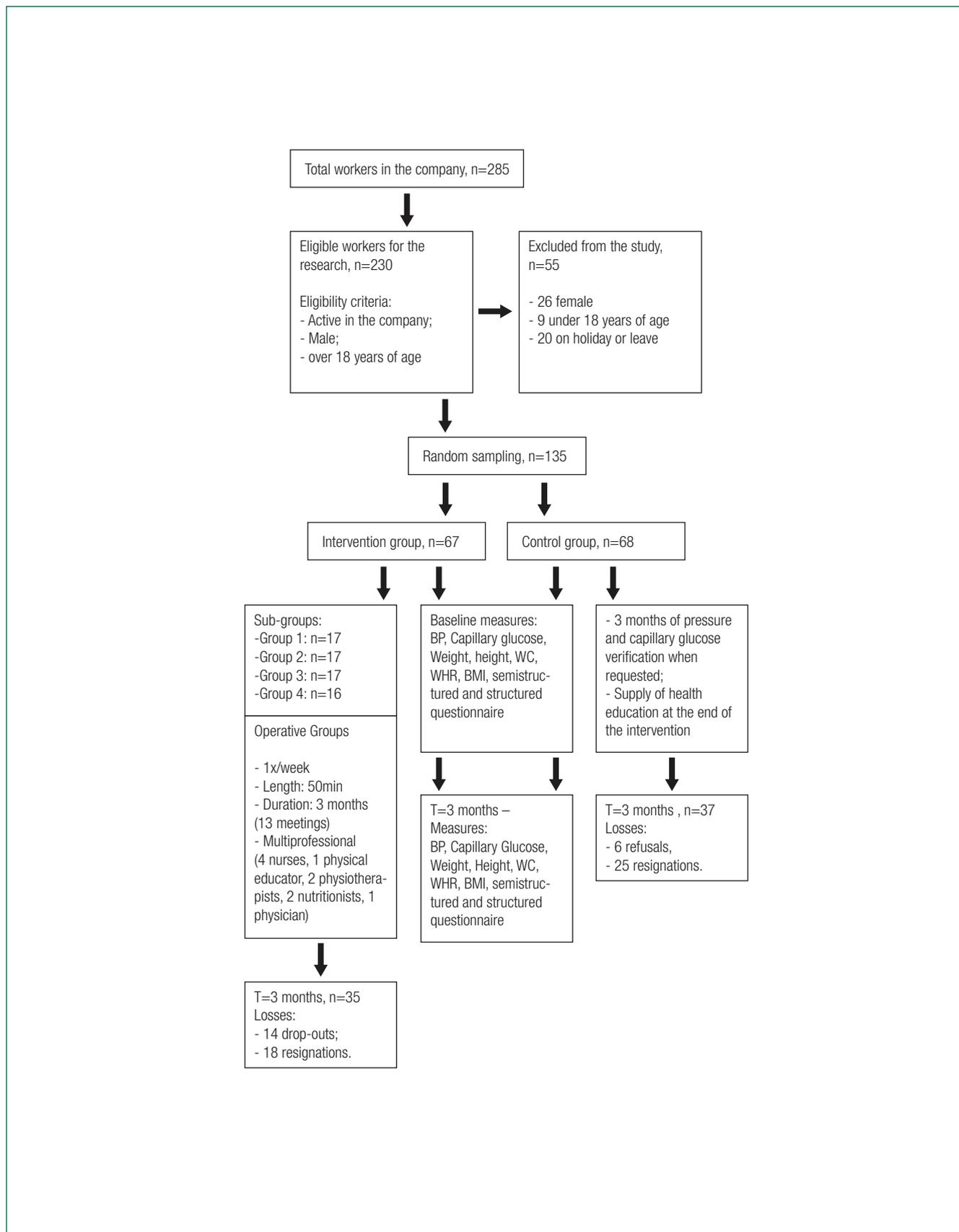


Figure 1. Flow chart of the study; BP - Blood pressure; WC - Waist circumference; WHR - Waist-hip ratio; BMI: Body Mass Index; T - Time

Table 1. Participants' general characteristics and baseline knowledge level on risk factors for cardiovascular diseases according to allocation group

Characteristics	Intervention group (n = 35)			Control group (n = 37)			p-value
	Mean	SD	Median	Mean	SD	Median	
HDFQ score (points)	17.2	2.9	18	16.1	3.3	16	0.135*
Age (years)	41.5	12.2	40	39.1	12.5	39	0.447*
Skin color - n(%)							0.361†
Mulatto/black		20(57.1)			25(67.6)		
White		15(42.9)			12(32.4)		
Marital status - n(%)							0.483*
No partner		7(20)			10(27)		
With partner		28(80)			27(73)		
Education - n(%)							0.436*
< 8 years		12(34.3)			16(43.2)		
≥ 8 years		23(65.7)			21(56.8)		

*Student's t-test for independent samples; †Pearson's chi-square test; SD-standard deviation; HDFQ-Heart Disease Fact Questionnaire

Table 2. Comparison between participants' knowledge on risk factors for cardiovascular diseases according to allocation group before (time 1) and after (time 2) the intervention

Statistic parameters	Group Intervention (n=35)			p-value	Group Control (n=37)			p-value
	HDFQ score time 2	HDFQ score time 1	Difference		HDFQ score time 2	HDFQ score time 1	Difference	
Mean	18.6	17.2	1.4	0.020*	17.5	16.1	1.4	0.006*
SD	3.2	2.9	3.5		3.6	3.3	2.9	
Median	19	18	1	0.028†	18	16	2	0.008†
Minimum	6	12	-6		9	8	1	
Maximum	23	22	1		23	23	0	

*Student's t-test for paired samples; †Wilcoxon Test; SD - standard deviation; HDFQ - Heart Disease Fact Questionnaire

mathematically, this difference was not statistically significant ($p=0.131$) for the Mann-Whitney test, data not included).

Discussion

Among the limitations in this research, the possibility of information exchange between the participants in the two groups is highlighted, as the participants shared common spaces, such as the lunchroom and the leisure area, working at the same company, although in different sectors. This can easily happen with educational interventions in the work environment, as the participants naturally share/disseminate information with other colleagues, which can threaten the internal validity of results.¹⁸⁾ In addition, this

type of situation is unwanted to assess an intervention, as it reduces the differences observed between the intervention and control groups.¹⁹⁾ Nevertheless, from a Public Health perspective, the fact that the control group benefited from the intervention due to the information exchange is something positive, as these participants also increased their knowledge about the risk factors for CVD, enhancing the prevention of these outcomes.

Other limitations are some factors inherent in this type of study, such as the length of the intervention for example, as three months may not have sufficient for the workers to be able to translate information into knowledge learned; the short interval between the intervention and the assessment of its impact; the low generalizability of this kind of study results, with esti-

mates that are only valid for the population actually studied and, finally, the losses related to the initial and final number of participants in the two groups, due to not only drop-outs, but also workers who left the company, which may have influenced the results somehow.

Despite the limitations, it should be highlighted that this was a controlled and randomized intervention, that is, ranking higher on the scientific evidence scale, and its results appointed a significant increase ($p < 0.05$) by 1.4 points in the mean knowledge on cardiovascular diseases among metal workers between time 1 (baseline) and time 2 (follow-up). This signals promising perspectives for nursing professionals to reach this specific kind of population.

In that sense, this study presents fundamental information to plan health actions focused on man's health, as they appoint knowledge that is to be considered when addressing male cardiovascular health needs. In addition, it is highlighted that knowledge on the disease is one of the pillars for the development of self-care actions in cardiovascular diseases. Despite the influence of beliefs and values, improving the population's knowledge seems to be fundamental to strengthen their capacity and confidence to develop self-care actions, contributing to improve the disease management and prevention.

A quasi-experimental study in the job context in Italy, involving a predominantly male population, aimed at reducing the cardiovascular risk through educative intervention, found that even 12 months after the end of the intervention, its effect on the reduction of the cardiovascular risk were still observed.⁽¹⁸⁾ Studies that assessed the knowledge on the cardiovascular risk using different types of questionnaires^(20,21) and with interventions that took between six⁽²⁰⁾ and 12⁽²¹⁾ months found a significant increase in the mean knowledge scores. Also, a study in the United States, involving 2,787 participants, showed that the educative intervention can be effective to change knowledge on cardiovascular diseases, even when undertaken for only three months, and that the benefit for knowledge can last beyond 12 month after its end.⁽²²⁾

The interest in research involving workers, aiming to help them improve the health condition and efficiency at work has increased especially in groups from the private sector,⁽¹⁸⁾ and the educative intervention has been appointed as a feasible alternative in the work environment. Hence, the importance of this type of study is highlighted, as the concept of health promotion in the workplace is increasingly gaining relevance, to the extent that both public and private organizations acknowledge that success in the job market can only be achieved with a healthy, qualified and motivated workforce.⁽⁶⁾

Despite the increased interest in this kind of studies, however, not many reports are found in the literature because, when the studies are developed in the work environment, they can be impaired by the existence of a research bias, which interferes in the internal validity of its results.⁽¹⁸⁾ It is highlighted that, like in this study, the possibility of information exchange between the groups is a very frequent bias when the study is developed in industrial companies/services.⁽¹⁹⁾

Independently of whether information was exchanged between the groups, another aspect that should be considered in the comparison of the results with other studies is the difference between the populations, as this study only involved men, while most other studies, mainly international research, which have identified a significant increase in knowledge on risk factors for cardiovascular diseases, were developed with female populations^(2,24) or populations with a large share of female participants.^(21,24)

Despite acknowledging the efficacy of the educative intervention based on the increased knowledge score in both groups, it is important to emphasize that knowledge alone may not be sufficient to change health behaviors, especially among male individuals, as studies show that women are more prone to behavioral changes.^(2,24) Thus, assessing and also stimulating knowledge in these populations may be the most efficient forms of developing culturally appropriate messages to encourage and/or pro-

mote acceptance of simpler behavioral changes, besides setting the first step towards a healthier life.⁽²⁴⁾ Assessing the baseline knowledge as part of an educative intervention and health promotion during the intervention can make this kind of programs relevant.

Conclusion

The educative intervention in group, at the workplace and during lunchtime, showed to be feasible and effective strategy to increase men's knowledge on risk factors for cardiovascular diseases.

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Collaborations

Ganassin GS and Silva EM contributed to the conception of the project, execution of the research, writing of the paper and final approval of the version for publication. Pimenta AM and Marcon SS collaborated with the conception of the project, relevant critical review of the intellectual content, development of the research and interpretation of the data.

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