Health education for patients undergoing myocardial revascularization: comic book validation

Educação em saúde para pacientes submetidos à revascularização miocárdica: validação de história em quadrinhos

Educación en salud para pacientes sometidos a revascularización miocárdica: validación de historieta

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Abstract

Objective: To develop and analyze the evidence of content validity of a comic book-type educational technology for patients undergoing Coronary Artery Bypass Graft surgery (CABG).

Methods: Validation study conducted in three steps. The first consisted of assessing the information needs of patients undergoing CABG; the second was the development of a comic book-type educational technology script; and the third, was the analysis of the evidence of content validity of this script performed by six experts. It was considered valid when a Content Validity Index above 80% was obtained. Subsequently, the comic book was designed by an illustrator.

Results: In the first step, ten patients reported needing information about food, alcohol consumption, anxiety and stress control, pain control, surgical wound care, smoking, physical activity, sexual intercourse, returning to work and clearance to travel and drive. Based on these data, a fictitious history of a patient undergoing coronary artery bypass graft surgery was developed from a literature review, with the respective instructions given by the nurse. This comic book script was evaluated by the experts, reaching adequate agreement after the second round. After validation, the comic book was designed by the illustrator and analyzed by the experts.

Conclusion: The educational technology of the comic book-type reached adequate evidence of content validity by the experts, and can be used as one of the strategies in guidance of hospital discharge.

Resumo

Objetivo: Desenvolver e analisar as evidências de validade de conteúdo de uma tecnologia educacional do tipo história em quadrinhos (HQ) para pacientes submetidos à Cirurgia de Revascularização do Miocárdio (CRM).

Métodos: Estudo de validação realizado em três etapas. A primeira consistiu na avaliação das necessidades de informações dos pacientes submetidos à CRM; a segunda foi o desenvolvimento de um roteiro para a tecnologia educacional do tipo HQ; e a terceira, a análise das evidências de validade de conteúdo desse roteiro, realizada por seis especialistas, sendo considerado válido quando obtido um Índice de Validade de Conteúdo superior a 80%, sendo, posteriormente, elaborada a HQ por um ilustrador.

Resultados: Na primeira etapa, 10 pacientes relataram terem necessidades de informações sobre alimentação, consumo de bebidas alcoólicas, controle da ansiedade e do estresse, controle da dor, cuidados com a ferida operatória, tabagismo, atividade física, relação sexual, retorno ao trabalho, liberação para viagens e direção de automóveis. Com base nesses dados, elaborou-se, a partir de revisão de literatura, a história fictícia de um paciente submetido à cirurgia de revascularização do miocárdio, com as respectivas orientações realizadas pela enfermeira. Esse roteiro da HQ foi avaliado pelos especialistas alcançando adequada concordância após a segunda rodada. Após validação, a HQ foi elaborada pelo ilustrador e analisada pelos especialistas.

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Conflicts of interest: article extracted from the final academic paper titled: Development and Validation of a Hospital Discharge Manual for patients undergoing Myocardial Revascularization at Escola Paulista de Enfermagem, Universidade Federal de São Paulo in 2020. Although Lopes JL is Associate Editor of Acta Paulista de Enfermagem, she did not participate in the peer review process.

Conclusão: A tecnologia educacional do tipo HQ atingiu adequadas evidências de validade de conteúdo pelos especialistas, podendo ser utilizada como uma das estratégias na orientação da alta hospitalar.

Resumen

Objetivo: Desarrollar y analizar las evidencias de validez de contenido de una tecnología educativa del tipo historieta para pacientes sometidos a cirugía de revascularización del miocardio (CRM).

Métodos: Estudio de validación realizado en tres etapas. La primera consistió en la evaluación de las necesidades de información de los pacientes sometidos a CRM; la segunda fue el desarrollo de un guion para la tecnología educativa del tipo historieta, y la tercera fue el análisis de las evidencias de validez de contenido de ese guion, realizada por seis especialistas, donde fue considerado válido un Índice de Validez de Contenido superior al 80 %, y luego un ilustrador elaboró la historieta.

Resultados: En la primera etapa, 10 pacientes mencionaron la necesidad de obtener información sobre alimentación, consumo de bebidas alcohólicas, control de la ansiedad y del estrés, control del dolor, cuidados de la herida quirúrgica, tabaquismo, actividad física, relación sexual, vuelta al trabajo, autorización para viajar y para conducir vehículos. Con base en estos datos y a partir de la revisión de literatura, se elaboró la historia ficticia de un paciente sometido a una cirugía de revascularización del miocardio, con las respectivas orientaciones realizadas por una enfermera. El guion de la historieta fue evaluado por los especialistas y obtuvo una concordancia adecuada luego de la segunda ronda. Después de la validación, el ilustrador elaboró la historieta y los especialistas la analizaron.

Conclusión: La tecnología educativa de tipo historieta alcanzó evidencias de validez de contenido adecuadas por los especialistas y puede ser utilizada como una de las estrategias para la orientación en el alta hospitalaria.

Introduction

Cardiovascular diseases (CVD) are the main causes of hospitalization and death worldwide. According to the Pan American Health Organization (PAHO) and the World Health Organization (WHO), these diseases are responsible for 80% of deaths in developing countries, such as Brazil.[1]

Among these diseases, coronary artery disease (CAD) has a multifactorial cause[2] and is characterized by the obstruction of coronary arteries due to the formation of atherosclerotic plaques that narrow and reduce coronary blood flow.[2] Acute coronary syndrome (ACS) is the acute manifestation of CAD, accounting for 30% of cardiovascular deaths, and is mainly due to rupture of the vulnerable plaque or the superficial erosion of the endothelium, causing thrombus formation, platelet activation and aggregation.[3] The treatment of this disease may include drug therapy, percutaneous coronary intervention or surgical treatment.[2-5]

Surgical treatment, called coronary artery bypass graft surgery (CABG), is performed in patients with severe obstructive coronary injuries, that is, in those with three or more coronary vessels with obstruction above 70%, stenosis in the left main coronary artery or even stenosis of one or two proximal vessels.[6]

The aim of rehabilitation after CABG is to allow a return to productive life as soon as possible, in addition to restoring their best physiological and social condition. Adherence to a healthy diet associated with the incorporation of a regular practice of physical activity, cessation of smoking and alcoholism, control of anxiety and stress and adherence to drug therapy are the pillars of secondary prevention programs for this population.[7] In addition to changing these habits, there are guidelines regarding care for the surgical wound, pain control and return to usual activities, such as driving, sexual activity and work activities.

It is the role of health professionals, especially nurses, to guide patients and their families on essential practices of postsurgical self-care, mainly because some people may consider the absence of symptoms as a meaning of cure, causing the return to unhealthy lifestyle habits prior to surgery and discontinuation of medications.[2,5,7,8]

Health education is an intervention characterized as a guided and planned process to encourage self-care and disease self-control. In the current perspective, health education is focused on health promotion[9] with the development of individuals' critical awareness and the intention of involving them in decisions about their own health, thereby increasing the effectiveness of the necessary personal changes. Such changes contribute to a better quality of life for patients.[7]

The educational process uses different types of technologies, ranging from light to hard.[10] Discharge planning can be performed verbally, in writing or both and, in most cases, written guidance is provided through manuals or explanatory leaflets.[9]

According to studies, performing the educational process in writing considerably increases the accuracy and rigor of remembering important details related to the disease and its treatment.[11] Another study showed that leaflets delivered as a form of patient education are shown to be viable, useful and preferred by most general practitioners.[12]

The use of narratives containing photos, illustrations and visual displays for communication in health, such as comic books, have benefits mainly in complex communications. Comic books containing health content usually present some type of health problem as a central plot and describe the way of managing this condition and the experiences of certain groups in the context of health and illness.[13]

This type of educational technology allows the exchange of individual and collective experiences, as well as an individual reading of experiences and a reflection about daily practices.[14] In this sense, empowerment and greater knowledge constitute an important factor for self-care and health management. Therefore, educational technology of the comic book-type has the potential to guide patients in the promotion of adequate care and assist nurses in intervention strategies for care transition.

Currently, in national and international literature, there are some comic books with a focus on health, such as Florence Nightingale in times of a pandemic, which is a comic book created with three fictional characters addressing the prevention measures against COVID-19[15] and the comic book on the story of nurses during the pandemic, released by Marvel.[16] However, to the best of the authors' knowledge, no type of comic book educational technology for patients undergoing CABG has been found, which justifies the importance of this study.

The objective of this study was to develop and analyze the evidence of content validity of a comic book-type educational technology for patients undergoing coronary artery bypass graft surgery.

Methods

This is a validation study of a comic book-type educational technology for patients undergoing CABG. This study was performed in three steps. In the first step, the information needs of patients undergoing CABG after hospital discharge were evaluated; the second was the development of the comic book-type educational technology script; and the third step was the analysis of evidence of content validity of the comic book and the development of the comic book.

Step 1 - Assessment of information needs

In the first step, ten adult patients without cognitive impairment who underwent CABG were interviewed. These patients were hospitalized in a Surgical Cardiology unit of a large University Hospital in the city of São Paulo. They were invited to participate in the study by one of the researchers and upon agreeing, they signed the Informed Consent form. At this point, the sample was of convenience. The guiding question of this interview was: what information regarding the disease and treatment would you like to receive for your self-care at home after coronary artery bypass graft surgery?

After data collection, the themes were grouped by two researchers of this study and a descriptive statistical analysis containing the absolute and relative frequency of terms was performed.

Step 2 - Development of the script of the comic book educational technology

A narrative literature review was performed in Medline, Lilacs, BDENF, IBECS and PubMed databases to identify the guidelines to be given to these patients based on information needs that emerged in the first step. As a search filter, review studies, systematic reviews and guidelines of the previous five years were chosen, without using controlled descriptors. The search strategy used was the inclusion of information needs found in the first step using the Boolean operator OR between the terms AND (guidance OR care OR conduct OR treatment) AND (myocardial revascularization). Data related to care of patients undergoing CABG were extracted for each information need that emerged in the first step. After this review, a storyboard-type comic book script was prepared, containing the characters' lines as well as the pictures to be designed by the illustrator.

Step 3 - Analysis of evidence of content validity of the script and development of the comic book

Three cardiology specialist nurses, a cardiologist, a physiotherapist and a psychologist, who represent 100% of professionals invited for the study, analyzed the evidence of content validity of the comic book script. Based on criteria adapted from Guimarães et al., experts should be classified at least as master for participation in the study. The specific Cardiovascular area was considered. For Guimarães et al.,[17] those with a score between 6 and 20 points are considered master experts. The invitation to participate in the study was sent to experts by e-mail. If they agreed, a Google Forms® link containing the informed consent, the demographic and professional characterization form and the comic book script was sent. The demographic variables evaluated were sex and age; and professional variables were length of clinical experience in the Cardiovascular area (in years), teaching experience in the Cardiovascular area (in years), articles published in the Cardiovascular area in leading scientific journals, participation in a research group in the Cardiovascular area, doctorate/master's degree in the Cardiovascular area and residency/specialization in the Cardiovascular area. The experts evaluated the comic book script in terms of usefulness/relevance (if the topic was relevant and served the proposed purpose), clarity (if the topic was explained clearly, simply and unequivocally), simplicity (if a single idea was expressed), vocabulary (if the words chosen were correct without generating ambiguity), the sequence of speeches (if the sequence of speeches is shown in a coherent way) and the relationship of pictures with the text. A Likert scale from 1 to 4 was used (1. totally disagree, 2. partially disagree, 3. partially agree and 4. totally agree). Descriptive statistical analysis of demographic and professional characterization data was performed. Mean and standard deviation were calculated for quantitative variables and absolute and relative frequency for qualitative variables. For the analysis of evidence of content validity of each topic of the script, the Content Validity Index - CVI was calculated (number of experts who assigned scores 3 and 4 divided by the total number of responses). Topics with a CVI greater than 0.80 were considered adequate. When the minimum CVI was not reached, the content was rewritten according to suggestions and forwarded to experts for a new analysis until the recommended CVI was obtained. After the experts agreed, the comic was developed by an illustrator based on the previously validated script. Pictures were made manually on an electronic whiteboard. Simple line drawings were used that were later edited in Adobe Photoshop® and Adobe Flash®. Neutral colors were chosen to characterize the hospital environment and avoid making reading tiresome. After its development, the comic was sent to experts again for analysis of the pictures, color and font size.

The project was sent to the Research Ethics Committee of the Institution for consideration and approved under number 3,317,766 (Certificate of Presentation of Ethical Appreciation: 04656818.7.0000.5505). The experts who agreed to participate in the study formalized their consent by signing the Informed Consent form.

Results

Ten patients undergoing CABG were interviewed in the first step of this study and 11 information needs were identified (Table 1).

Table 1. Information needs after hospital discharge of patients undergoing CABG (n=10)

Information need	n(%)
Pain control	10(100)
Physical effort	10(100)
Smoking	8(80)
Diet	8(80)
Surgical wound care	7(70)
Consumption of alcoholic beverages	6(60)
Return to work	6(60)
Sexual intercourse	5(50)
Anxiety and stress management	3(30)
Exercise and physical activity	3(30)
Clearance to travel and drive	1(10)

After the first step, the comic book script was developed based on a narrative review of the literature and the information needs identified in the first step, plus the concept of acute myocardial infarction (AMI), risk factors for the development of

AMI, concept of CABG and medications used by this population. The story developed was centered on three main characters (Mr. Antônio, the character representing the patient, Mr. Antônio's wife and Nurse Júlia). The comic book started with a demonstration of the patient's previous lifestyle and the consequent hospitalization for CAD, as shown in figure 1.

After hospitalization, the story continues to tell the indication of coronary angiography and the subsequent need for CABG. During the entire hospitalization, the nurse carries out educational interventions regarding the explanation of CAD, the principles of CABG, the importance of medication adherence and lifestyle modification for the promotion of cardiovascular health, as well as specific guidelines regarding sexual activity, pharmacological and nonpharmacological management of pain control, time to return to work and safe return to travel and driving a car (Figure 2).

After development of the script, it was submitted to content validity analysis. All six health profes-

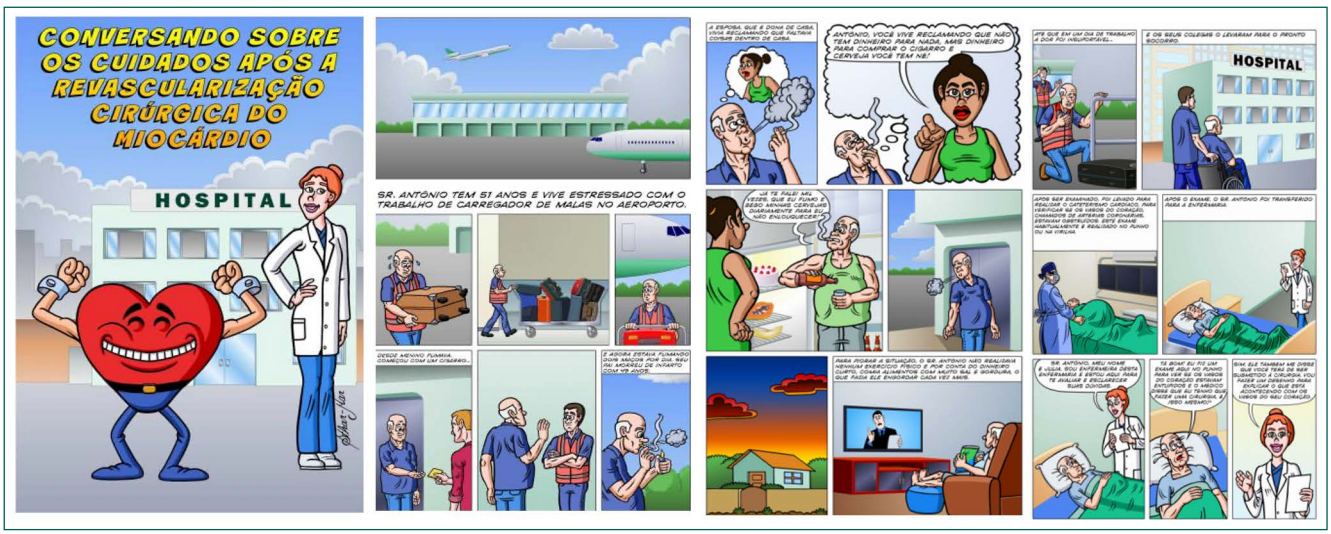

Figure 1. Example of the comic book-type educational technology created

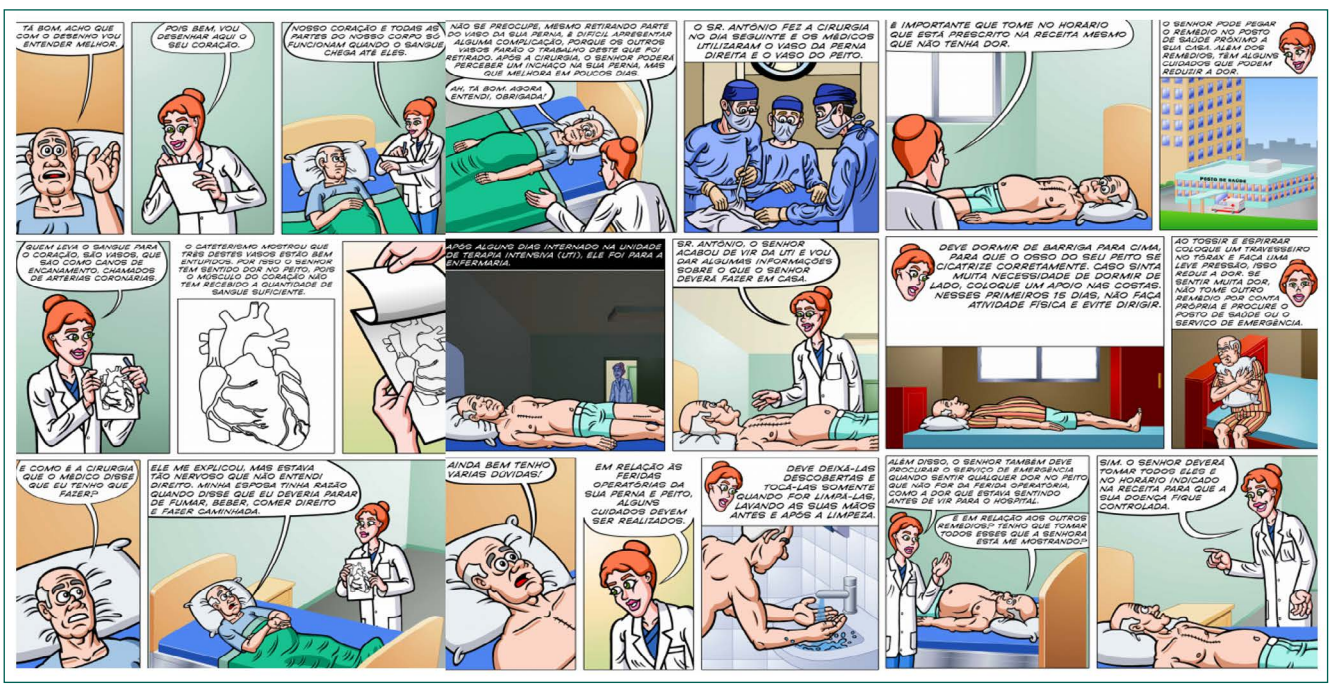

Figure 2. Example of the comic book-type educational technology created

Table 2. Content Validity Index among judges in the second round

Topic of the manual	Usefulness and relevance	Clarity	Simplicity	Vocabulary	Sequence
Acute myocardial infarction concept	1	1	1	1	1
Risk factors and symptoms of the disease	1	1	1	1	1
Myocardial revascularization concept	0.83	0.83	1	1	1
Surgical wound care	1	0.83	1	1	1
Pain control	1	1	1	1	1
Medications used	1	1	1	1	1
Daily routines: return to work	1	1	1	1	1
Daily routines: physical exertion	1	1	1	1	1
Daily routines: sexual intercourse	1	1	1	1	1
Daily routines: travelling and returning to driving	1	1	1	1	83.3
Changing habits: exercise and physical activity	1	1	1	1	1
Changing habits: diet	1	1	1	1	1
Changing habits: smoking	1	1	1	1	1
Changing habits: consumption of alcoholic beverages	1	1	1	1	1
Changing habits: anxiety and stress management	1	1	0.83	1	1

sionals invited as judges participated in the analysis of evidence of content validity. Their mean age was 36.5+6.8 years and 66.7% were female. Regarding clinical experience in the Cardiovascular area, an average of 9.83+7.42 years was identified and half of professionals had average teaching experience of 11+7.78 years in the area. It was observed that 66.7% had articles published in leading scientific journals and all had specialization; five in Cardiology (83.3%) and one in Health Psychology (16.6%). One had a master degree, one had a PhD, and one was a PhD student. In the first evaluation round, alterations were suggested in 34 out of the 40 sentences of the comic book script, obtaining a CVI below 0.80. Topics were adjusted as suggested and submitted again for evaluation in a second round. Table 2 presents the degree of agreement for each topic in the second round. In this round, there were suggestions regarding subject verb agreement, not content. Thus, the comic book script was considered as having adequate evidence of validity by the experts.

After validation of the script, the comic book was designed by the illustrator of the institution and sent to the same experts for evaluation of pictures and font size. Small adjustments were requested in relation to the pictures (positioning of the surgical incision, physical characteristic of the main character and removal of the cigarette being thrown in the trash). After adjustments, the experts were consulted again and agreed with the changes made by the illustrator. The comic book-type technology can be viewed in full as supplemental material.

Discussion

Instructional materials are very important for patient health education and effective if read and understood.[18] These materials facilitate the orientation of the multidisciplinary team and standardize the information through an easy and accessible language for a better understanding of patients,[19] avoiding access to inappropriate sources of information.[20]

Comic books have been used to communicate accurate and relevant information over many decades.[21] In recent years, a growing body of research has demonstrated the effectiveness of comic books as a patient education tool.[13,22] These studies highlight that visual comprehension is intuitive in a way that verbal comprehension may not be, and the combination of images and texts improves individuals' comprehension, as it activates different areas of the brain.[13,22] Furthermore, such a combination may help to improve health literacy, as action sequences can be represented visually and otherwise could take many paragraphs of written text to explain equivalent contents in detail.[22]

In order to facilitate the reading and understanding of the technology developed and validated here, the comic book text was prepared in simple and colloquial language without technical terms. To arouse the interest of reading and assist in understanding the message and appropriation of information described, illustrations designed by an illustrator and consistent with the text were used.

The comic book script was validated after two rounds by six health professionals and all were categorized as master experts in an analysis of the degree of expertise.[17] One of the most important steps in content validation studies is the judicious establishment of the panel of judges and these criteria may be based on professional/academic qualifications, clinical experience, experience in teaching and in content analysis studies.[23] In this study, one of the most important criteria established was clinical experience with patients undergoing CABG, which provided a greater degree of detail in evaluations of the content.

The number of judges who participated in the validation process of this study was also appropriate, since the publication on the analysis of evidence of content validity highlights that between five and 10 judges are necessary when an agreement level higher than 0.75 is accepted.[23]

In the first round of content validity analysis of the comic book script, experts suggested changes to some topics. In the topic "concept of acute myocardial infarction", its definition and indication for coronary angiography and CABG were included. Two experts suggested including the femoral route, in addition to the radial artery as the puncture site for the coronary angiography. However, this suggestion was not accepted as the European and American guidelines on ACS emphasize that the radial artery as a route of access in these procedures is the most indicated, has lower prevalence of complications, shorter bed rest and consequently, lower hospital costs.[2-4]

With regard to cardiovascular risk factors, the main diseases that increase the chance of developing obstructive atherosclerotic plaques were included, such as diabetes mellitus, dyslipidemia, systemic arterial hypertension and the contribution of the family genetic profile. The importance of incorporating a healthy lifestyle into daily life with a focus on preventing atherosclerotic progression was also included in this topic. The practice of physical activity, a cardioprotective diet and smoking cessation are known to be essential for nonpharmacological treatment of CAD.[7]

Information on typical and atypical symptoms of this disease was included,[3] since these are extremely important for self-care and secondary prevention. Self-management of symptoms leads to better disease control and early search for health services,[24] thereby reducing complications and case severity.

Other suggestions included were the main arterial and venous grafts used in CABG, the location of the surgical incision and the possibility of the development of edema in the limb where saphenectomy was performed. Excision of the saphenous vein can cause lymphatic trauma and consequently, edema.[25] Knowledge of possible symptoms that may be related to a particular surgery minimizes anxiety and stress and unnecessary searches for medical care.

In the "care for the surgical wound" topic, the substitution of words for a better understanding of the lay population was suggested, as well as the inclusion of the use of neutral pH soap to clean the surgical wound during bathing, an orientation also identified in another study in which a guidance manual for patients undergoing CABG was developed.[26] Neutral soap has a low level of cytotoxicity, not interfering with the healing process.

Another suggestion on the topic of wound care was to include guidance on avoiding prolonged sun exposure, as this could lead to melanocyte aggression, causing scarring skin dysfunctions, changes in the healing process and formation of fibroproliferative scars.[27]

In the "pain control" topic, the change of terms for a better understanding of patients was suggested. In addition, the insertion of information that patients should avoid strenuous physical activities and extreme movements of the shoulders until complete sternal healing for pain reduction was proposed,[28] as well as the importance of maintaining support if patients want to sleep on their side.[26] These guidelines should be given to these patients to avoid excessive movement of the sternum, which can lead to greater pain intensity and alteration in the bone consolidation process.

As for "air travel and returning to driving", the inclusion of elastic stockings was suggested, especially on the leg from where the saphenous vein was

removed. The application of adequate compression facilitates venous return, improves lymphatic drainage, and increases the speed and volume of blood flow, thereby preventing the worsening of edema. The suggestion to avoid crossing the legs to facilitate venous return and reduce the intensity of edema was also included.[25]

In the "drugs used" topic, the inclusion of some adverse effects related to medications used in this population, especially dizziness and drowsiness was suggested, as well as guidelines on how to proceed in the presence of these symptoms. This information is extremely relevant, since one of the reasons for non-adherence to pharmacological treatment is the presence of adverse drug-related effects.[29] By knowing how to proceed with these possible side effects, individuals maintain their treatment.[26]

With regard to "sexual activity", adding other drugs than sildenafil used to control sexual impotence as contraindications for patients who use nitrates was suggested. However, we maintained the orientation that any medication used must have the prior consent and guidance of the physician.

When evaluating the "exercise and physical activity" topic, experts suggested including information that the practice of physical exercises should be allowed by the health team, which normally occurs after six to eight weeks if there are no significant changes in the test of effort. This time for the safe practice of physical activity is related to the consolidation of the sternum, partial healing of operative wounds and also to the functional capacity in the late postoperative period.

In the "food" topic, the suggestion was to add bread to the list of foods that should be ingested in smaller amounts, since high carbohydrate intake increases blood glucose that promotes an increase in insulinemia, which, in turn activates transcription factors that promote the synthesis of fatty acids and triglycerides, in addition to increasing inflammation and cardiovascular risk.[7]

Regarding the "consumption of alcoholic beverages" topic, many professionals mentioned the inexistence of safe doses of consumption and suggested that the orientation to be offered is the complete abstention from alcohol, especially after hospital discharge. A study demonstrates the harmful effects of alcohol in relation to the effectiveness of drugs in cardiodepression and in the increase of glycemic levels.[7]

Finally, in "anxiety and stress control", the suggestion was to insert information about free support services with several nonpharmacological interventions that can be used to reduce these feelings, and that even though certain emotions are natural to human beings, it is important to develop ways to deal with such a situation.[7]

Based on the results of this study, the development and validation of other educational materials that offer guidance to health professionals, improve health literacy and consequently, adherence to treatment, become important. The material developed and validated here still needs to be evaluated by the target population regarding understanding and the clarity of pictures.

Conclusion

The comic book-type technology on the care of patients undergoing myocardial revascularization was developed and validated by experts. The application of this material in clinical practice may be useful to optimize hospital discharge planning by the multidisciplinary team, in addition to assisting patients and family in home care. Future studies will be conducted to validate the appearance of comic books by patients undergoing CABG, and the effectiveness of this educational material in improving self-care and knowledge of these patients and in reducing postoperative complications.

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Collaborations

Queiroz SS, Russomanno LL, Santos VB and Lopes JL contributed to the study design, analysis and interpretation of data, article writing, relevant critical review of the intellectual content and approval of the final version to be published.

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