Original Article

doi: https://doi.org/10.1590/1983-1447.2024.20230186.en

Learning needs and the orientation received by patients in the preoperative period of myocardial revascularization

Necessidades de aprendizagem e orientações recebidas por pacientes no pré-operatório de revascularização do miocárdio

Necesidades de aprendizaje y orientación que reciben los pacientes en el preoperatorio de revascularización miocárdica.

Alcides Viana de Lima Neto[a,b]
Vivianne Lima de Melo[a]
Isabelle Pereira da Silva[a]
Silvia Kalyma Paiva Lucena[a]
Breno Wagner Araújo Cosme da Silva[a]
Julliana Fernandes de Sena[a]
Isabelle Katherinne Fernandes Costa[a]

How to cite this article:
Lima Neto AV, Melo VL, Silva IP, Lucena SKP, Silva BWAC, Sena JF, Costa IKF. Learning needs and the orientation received by patients in the preoperative period of myocardial revascularization. Rev Gaúcha Enferm. 2024;45:e20230186. doi: https://doi.org/10.1590/1983-1447.2024.20230186.en

ABSTRACT

Objective: To identify the learning needs and the orientations received by patients in the preoperative period of coronary artery bypass surgery (CABG).

Method: Descriptive study, with a qualitative approach. Data collection took place from January to April 2021, through interviews carried out with 13 pre-operative patients admitted to the cardiovascular unit of a university hospital in Northeastern Brazil. The data was analyzed using descriptive statistics and the content of the interviews was processed in the software *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires*. Next, an analysis of textual and similarity classes was carried out.

Results: The learning needs that were analyzed were divided in five classes: events that precede the surgery in the hospital; instructions received about the surgery; sites and recovery time after surgery; general questions about the surgery and content for the educational resource. Patients reported needs related to the process of disease, surgical procedures, and care before and after surgery. With regard to orientation, 53.85% reported not having received any.

Final considerations: The study identified that patients seldom received orientation. They need education on topics related to the process of the illness, the heart, surgical procedures, exams, care environments, risks, benefits, results, and changes in lifestyle to maintain health and quality of life.

Descriptors: Myocardial revascularization. Patient education as topic. Nursing.

RESUMO

Objetivo: Identificar as necessidades de aprendizagem e orientações recebidas por pacientes no pré-operatório de revascularização do miocárdio.

Método: Estudo descritivo, com abordagem qualitativa. A coleta de dados ocorreu de janeiro a abril de 2021, por meio de entrevistas realizadas com 13 pacientes em pré-operatório internados na unidade cardiovascular de um hospital universitário no Nordeste brasileiro. Os dados foram analisados por meio de estatística descritiva e o conteúdo das entrevistas foi tratado no software Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires. A seguir procedeu-se uma análise das classes textuais e de similitude.

Resultados: As necessidades de aprendizagem analisadas originaram cinco classes: eventos que antecedem a cirurgia no hospital; orientações recebidas sobre a cirurgia; locais e tempo de recuperação após a cirurgia; dúvidas gerais sobre a cirurgia e conteúdos para o recurso educacional. Os pacientes relataram necessidades relacionadas processo de adoecimento, procedimento cirúrgico e cuidados antes e após a cirurgia. Com relação às orientações,53,85% informaram não ter recebido.

Considerações finais: O estudo identificou incipiência nas orientações recebidas pelos pacientes e como necessidades de aprendizagem temas relacionados ao processo de adoecimento, o coração, procedimento cirúrgico, exames, ambientes de cuidados, riscos, benefícios, resultados e as mudanças no estilo de vida para a manutenção da saúde e qualidade de vida.

Descritores: Revascularização miocárdica. Educação do paciente como assunto. Enfermagem.

RESUMEN

Objetivo: Identificar las necesidades de aprendizaje y las orientaciones que reciben los pacientes en el preoperatorio de revascularización miocárdica.

Método: Estudio descriptivo con enfoque cualitativo. La recolección de datos se realizó de enero a abril de 2021, mediante entrevistas a 13 pacientes preoperatorios ingresados en la unidad cardiovascular de un hospital universitario del Nordeste de Brasil. Los datos fueron analizados mediante estadística descriptiva y el contenido de las entrevistas fue procesado en el software R *Interface pour les Analyses Multidimensionnelles de Textes et de Questionnaires*. A continuación, se realizó un análisis de clases textuales y de similitud.

Resultados: Las necesidades de aprendizaje analizadas originaron cinco clases: eventos que preceden a la cirugía en el hospital; instrucciones recibidas sobre la cirugía; sitios y tiempo de recuperación después de la cirugía; Preguntas generales sobre la cirugía, y contenido del recurso educativo. Los pacientes informaron necesidades relacionadas con el proceso de la enfermedad, el procedimiento quirúrgico y los cuidados antes y después de la cirugía. En cuanto a las guías, el 53,85% refirió no haberlas recibido.

Consideraciones finales: El estudio identificó que pacientes no recibieron orientación en la mayoría de los casos. Sus necesidades de aprendizaje fueron temas relacionados al proceso de enfermedad, el corazón, procedimientos quirúrgicos, exámenes, ambientes de atención, riesgos, beneficios, resultados, y cambios en el estilo de vida para mantener la salud y la calidad de vida.

Descriptores: Revascularización miocárdica. Educación del paciente como asunto. Enfermería.

[a] Universidade Federal do Rio Grande do Norte (UFRN). Programa de Pós-Graduação em Enfermagem. Natal, Rio Grande do Norte, Brasil.

[b] Universidade Federal do Rio Grande do Norte (UFRN). Faculdade de Ciências da Saúde do Trairi. Santa Cruz, Rio Grande do Norte, Brasil.

INTRODUCTION

Cardiovascular diseases (CVD) are chronic, non-communicable diseases. This group of diseases includes coronary artery disease (CAD), which is atherosclerotic in its etiology and inflammatory in nature [1,2]. The World Health Organization stated that heart diseases have been the main cause of death in the world for the last 20 years, going from 2 million more deaths in 2000 to almost 9 million in 2019[3]. In Brazil and in other countries, these diseases have a role in decreasing quality of life and are an important cause of hospitalizations[4].

In cases of CAD, the rupture of an atheromatous plaque may lead to the thrombotic occlusion of the coronary artery. Options to treat this condition include the use of medication and coronary angioplasty, with the implantation of one or more stents. These are tube-like devices made of an expansible mesh that keeps the arteries open[5].

Coronary artery bypass graft (CABG), also known as coronary artery bypass surgery, is the most recommended intervention in some cases[6]. It is a large, complex procedure, with risks and the potential for complications after it is done[7]. As a result, it can make the individual feel lonely, helpless, and fearful of death. These feelings can trigger physiological changes, increasing surgical risk[4]. Therefore, the multiprofessional team must provide appropriate guidance to the patient.

It is well known that many patients do not learn adequately about the surgery, due to the excess information they receive in a short period of time, language they cannot understand, or even lack of guidance from the health team. With that, patients often seek other ways to learn, often learning from inconsistent Internet content or lay information from close ones, which can make anxiety worse and reflect on their clinical state. Thus, the health team must know the main needs and provide clear, objective education to these patients, using strategies and resources that are adequate to the learning needs of the public[4].

Health education is one of the main pillars of care. This is especially true for the nursing team that works during the perioperative period, attempting to communicate adequately and promote changes in the patient, emphasizing autonomy and self-care. Understanding expectations and desires, making communication easier, and promoting educational interventions are essential for this process[8]. Furthermore, this guidance can help achieving better clinical outcomes, with less complications and shorter stays[9].

When implementing perioperative education, health workers can use resources that are helpful in this process, such as booklets, folders, videos, guided visits to the surgical center and intensive care units, in addition to verbal guidance to the patient and/or their family[10–12]. However, it is worth noting that the planning of these strategies should take place according to the demands of patients, presented in their individual needs[13].

It is essential to know the main learning needs of preoperative CABG patients, in order to help produce audiovisual educational resources, such as applications, videos, and booklets, and to guide the improvement of preoperative orientations provided by health professionals. Considering the above, this study was guided by the following research question: What are the learning needs and guidance received by patients who will undergo CABG surgeries? Thus, we aimed to identify learning needs and the guidance received by patients in the preoperative stage of coronary artery bypass grafts.

METHOD

Descriptive, qualitative study, elaborated in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ)[14]. It was conducted in a public, tertiary, large-sized hospital, providing general and specialized care. It is a reference in cardiology and located in Rio Grande do Norte, in the northeast of Brazil.

Participant recruitment and data collection took place from January to April 2021. The sample includes patients diagnosed with CAD and a recommendation for CABG. They were selected via convenience sampling. Inclusion criteria were: being 18 years old or older; receiving preoperative care due to a first recommendation for CABG surgery; having a level of conscience and clinical and cognitive conditions that allow participating in a semistructured interview (as evaluated using the records of the most recent medical or nursing developments, and at the time of data collection, through the clinical evaluation of a trained nurse). The exclusion criteria comprehended participants who did not finish the interview. It is noteworthy that, during the study, 13 potential participants that fit these criteria were admitted into the service. All of them accepted contributing voluntarily to the research. As a result, there was no sample loss.

Initially, the researchers elaborated a semistructured instrument for data collection. It was formed by a questionnaire to characterize the participants according to their sociodemographic and disease characteristics, and included opened and closed questions, including: sex, age, color, educational level, diagnosis, and secondary diagnoses/comorbidities.

The instrument also included the script of a semistructured interview, with items to identify the learning needs of

participants and the guidance they received regarding the CABG surgery at the hospital. The script was composed of the following questions: "1. Have you ever received educational guidance about the surgery you will undergo in this hospital? If so, which professional or professionals provided this guidance? 2. Do you have any questions about the surgery you will undergo? If so, which? In your opinion, a resource with guidance on your surgery for patients like yourself should present what topics and content?

At first, after a patient accepted participating in the research, a semistructured interview was applied to them. It was conducted in-person by a previously trained nurse, and associated with the research project? Participants signed a consent to have their voice and interview recorded, which was conducted in the ward they were in, if the place was adequate (absence of noise and other people). When this was not possible, the patient was sent to a room on the same floor, which had been adapted to this type of research. When the semistructured interview was concluded, questionnaire data was filled in with a consultation to electronic and printed records, to complete the study protocol with pertinent information. It stands out that one person selected participated in a pilot to test the data collection instrument.

The variables from the questionnaire were tabulated in the software Microsoft Excel®, version 2007. Then, we carried out a statistic and descriptive analysis, presenting absolute and relative frequencies.

Regarding the content of semistructured interviews, it was transcribed by researchers in the software Microsoft Word®, version 2007, and later exported into the text editor Open Office® 4.1.3. Then, the text went through an adaptation, to structure its corpus for treatment in the software *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRAMUTEQ), version 07 alpha 2 2020, according to the Portuguese tutorial of the software. The Iramuteq was chosen as it is an open source, free software, which started to be used in Brazil in 2013 for the treatment of qualitative data in the field of health[15].

We also used a descending hierarchical classification (DHC) in the same software. This tool groups words and stratifies the text segments analyzed into classes, whose name is given according to the significance of the words identified[15]. The result of each class presents the percentage of the vocabulary that class represents, the four words with chi-squared (X^2) of 3.84 or higher, and their respective percentages (%). As a way to summarize the materials, we also carried out a similarity analysis. It visually represents, using the sizes of the words and the thickness of the lines that connect them, how relevant certain aspects of the investigated object are[15].

The text corpus had more than 2472 words, in 374 forms. The mean occurrence of expressions (number of words divided by the number of forms) was 6.61 words per form. 71 text segments were analyzed using the DHC, with a retention of 78.87% of the corpus (the minimum criteria of this type of analysis is 75%).

The research was in accordance with the provisions of Resolution No. 466/2012 of the National Health Council (CNS) [16]. This research was submitted to the appreciation of the Research Ethics Committee of the Universidade Federal do Rio Grande do Norte in December 2020. It was approved, receiving the Certificate of Submission for Ethical Appreciation (CAAE) No. 39198020.0.0000.5537 and Opinion No.4,437,457. All participants received explanations about the topic, and signed a consent form authorizing their participation in the research. To guarantee their anonymity, the statements extracts were identified using the letter "P", for participant, followed by a number indicating the order in which the interview was carried out.

RESULTS

During data collection, 13 patients with recommended CABG surgery were admitted into the hospital that was the setting of the research. They all participated in the interviews, which lasted a total of 130 minutes. Regarding sex, 9 (69.23%) were men and 4 (30.77%) were women. The predominant age group was from 56 to 71 years old (8; 61.54%). Concerning the secondary diagnoses/comorbidities, the most common were: systemic arterial hypertension (SAH) (9; 69.23%), smoking (7; 53.85%), and diabetes mellitus (DM) (4; 30.77%). Concerning the secondary diagnoses/comorbidities, the most common were: systemic arterial hypertension (SAH) (9; 69.23%), smoking (7; 53.85%), and diabetes mellitus (DM) (4; 30.77%). Coronary artery obstruction was commonly identified (8; 61.54%).

With regard to CABG orientation, seven participants (53.85%) reported not having received any until the day of data collection. Among those who did, six (46.15%) emphasized that it was given by one or more professionals, namely: physician (5; 83.33%), nurse (3; 50.00%), nursing technician (1; 16.67%), and physical therapist (1; 16.67%). Moreover, most (11; 84.62%) mentioned having doubts about the procedure they would undergo.

Regarding learning needs, the analysis carried out led to three groups, subdivided into five classes. Figure 1 shows the

four words with chi-square (X^2) equal to or greater than 3.84, as well as their respective percentages (%) in the 5 classes originated by CHD.

Class 1 corresponds to 23.21% of the corpus, one of the highest percentages of vocabulary. It allowed the identification of the events that preceded surgery in the hospital. The words "being", "explaining", "come by", and "coming", led to the emergence of the idea that CABG surgery required some action on the part of the professionals, so the patients were adequately prepared for the procedure in the hospital.

These actions include the need for the multiprofessional team to provide clear explanations about the entire patient care process, which was not always reported by study participants, as mentioned below.

> *They only talked to my son, that I'll be discharged tomorrow, I'll leave, then they will schedule this surgery a few months from now and I will come back here to do it.* (P6)

> *I got no explanation about anything here yet. I've been here for days and all I do is eat, sleep, and take medicine. The doctor hasn't come by. No one said anything. They need to explain better.* (P11)

Furthermore, some events, such as exams, are part of the preoperative routine in the hospital and help show the patient that they are prepared. Depending on the follow up, the individual can even feel safer and more comfortable with the care received in the service. The following statements show these aspects:

> *They asked for all blood tests again. I've been waiting for a long time. The doctor has to operate fast because we can't wait anymore.* (P7)

> *I found out today that I'm about to have this surgery. I checked myself in, had a catheterization, spent a few days doing tests. I know my clinical status is ok, I mean, from the checkups. Since I got here, I haven't felt the pain I was feeling anymore, that chest pain.* (P9)

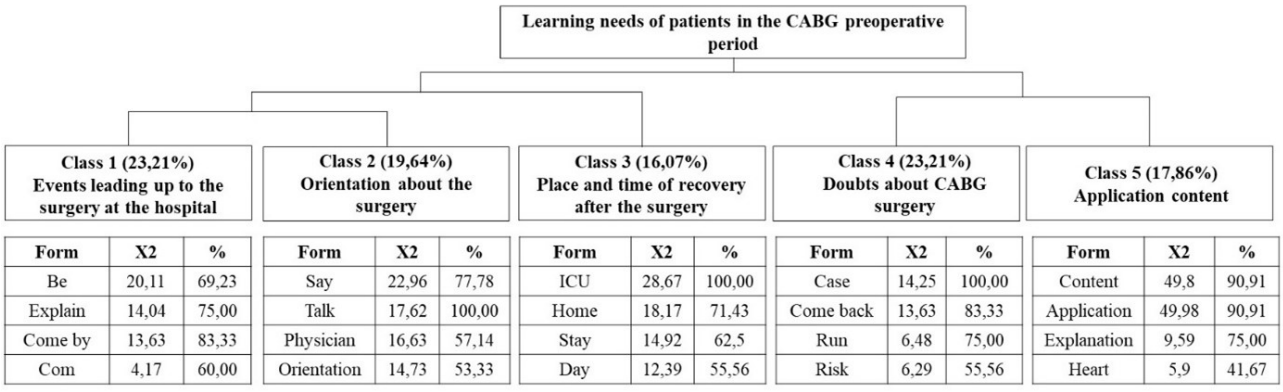
Class 2 represents the guidance the patients received about surgery. It is formed by 19.64% of the terms analyzed. The words highlighted were: say, talk, doctor, and orientation. It shows that most patients who received orientations, got them from physicians, in conversation, as the statements below indicate:

> *The orientation about the surgery was an explanation from the doctors saying it'll be a surgery, that it's very dangerous but that I'll feel nothing.* (P10)

> *There was a conversation about the surgery with the doctors. They came here and said how the surgery would be, its risks, they told it like this: it's better to do it than not to do it.* (P13)

On the other hand, some participants informed they did not get sufficient information to guarantee a good understanding of CABG. However, there were still some doubts in the preoperative context, and the need to understand better the process was reiterated, as below:

> *The orientation for surgery should talk about how it is, the team should com, the surgeon, so they could say it, that's it, the drug is not working anymore, you have to do surgery, which will not harm you, so you can have more years to live. We need to understand these things.* (P9)



Form	X2	%
Be	20,11	69,23
Explain	14,04	75,00
Come by	13,63	83,33
Com	4,17	60,00

Form	X2	%
Say	22,96	77,78
Talk	17,62	100,00
Physician	16,63	57,14
Orientation	14,73	53,33

Form	X2	%
ICU	28,67	100,00
Home	18,17	71,43
Stay	14,92	62,5
Day	12,39	55,56

Form	X2	%
Case	14,25	100,00
Come back	13,63	83,33
Run	6,48	75,00
Risk	6,29	55,56

Form	X2	%
Content	49,8	90,91
Application	49,98	90,91
Explanation	9,59	75,00
Heart	5,9	41,67

Figure 1 – Dendrogram of the text corpus.
Source: Research data, 2021.

They only said I'll get a bypass. The doctor talked to my son and to me and explained it. (P12)

Regarding Class 3 – places and time of recovery after surgery, corresponds to 16.07% of the words analyzed. The terms that stood out were: ICU, home, stay, and day. In this class, some doubts of the participants stood out, including where they would stay after the procedure, and how long they would take to recovery.

Regarding the ICU, some participants showed concern about the environment and the need to stay there to receive postoperative care. They also mentioned the need to go home after a proper recovery. This reiterates the importance of providing orientation on patient care topics before, during, and after the surgical intervention. Below, some important excerpts are highlighted:

How long will I be in the ICU? If all is well in the ICU, when can I come to the nursing ward? How many days I'll have to wait before going home? After surgery, how is it going to be at home? (P11)

You only go to the ICU with those devices after surgery? Do we must always go to the ICU? Is it one day in the ICU? (P9)

Class 4 discusses doubts about the CABG surgery. It has the second highest percentage of vocabulary analyzed (23.21%), and the words that stood out were: case, go back, and risk. In this class, participants stated they did not understand some of the many types of care they were getting, such as medications, the possibility of being cured by the surgery, preoperative tests, and recovery. Furthermore, they had no knowledge about the surgical procedure itself:

My questions are about medication use, if I'll stop using it, if the surgery will heal me, how the surgery is, and whether I'll be fine afterwards. (P1)

I'd like to know about my case and the recovery time, after the surgery, what is the procedure for me to recover better. Proportionally, from the people who undergo the surgery, how many come back with the same problem? (P3)

My doubts are about why the surgery was recommended, if its unavoidable, about the tests I'm doing and the drugs I'm taking. (P8)

How complex is the surgery? I have doubts about recovery, how the surgery is, and how long it takes. Do you take the blood from the heart, how is it? You put the blood in a machine? You take the heart from its place? (P12)

They also showed concern about the risks, since this is a large, complex procedure that must be executed with the utmost caution. That became clear in some interviews, as the excerpts below show:

I am really afraid of a risky surgery. (P2)

My doubts about the surgery would be about its risks, if I can hemorrhage and die. (P3)

In this case, I need to know of the risks, how the surgery goes, if I'll have a normal life after the surgery, the risks. (P13)

With this in mind, participants suggested some important topics and content to form an auxiliary resource for preoperative education (a mobile phone application, developed from this research). This content, represented by 17.86% of the corpus, formed class 5. Its most common words were: content, application, explanation, and heart. Thus, the main topics were related to the heart, the surgical procedure, diet, and recovery, as below:

The content is my heart, the diet, what is best for me and the surgery. (P1)

It must have explanations about the surgery and recovery in the post-operative. (P4)

The content is an image, the drawing of a heart, for example, the heart and an explanation about how it will be done. (P6)

It would be interesting for it to have the illustration of a heart, and addressed how necessary the surgery is. (P8)

It could be inferred that any resource to aid in the education of the patient before CABG should have content about several topics. These include knowledge about the heart, the care provided, and the routine that involve the context of the patient in the preoperative period, in addition to information on the surgical procedure itself and any important aspects of the postoperative period.

The similitude analysis presented in Figure 2 is a synthesis of the 5 classes, constructed using the text corpus. In it, the word "surgery" is the main axis of the topic. It is connected to the term "doubt" by a thicker line, which represents a strong link between the words. This allowed understanding that the participants had many doubts about undergoing the CABG, requiring the team to act by providing them with better orientation and explanations.

Other words that stood out included heart, orientation, stay, doctor, life, examination, explanation, recovery, and

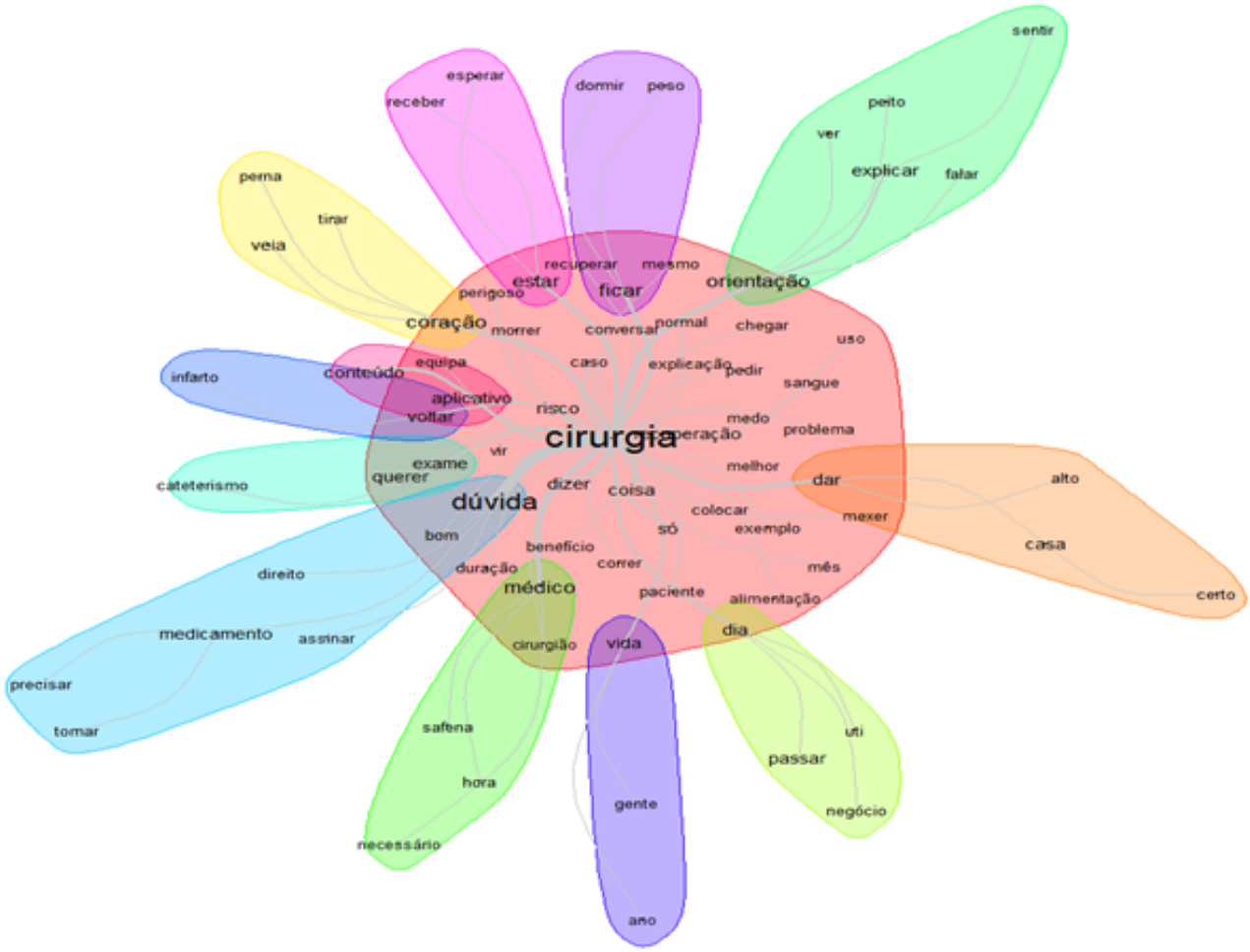


Figure 2 – Similitude analysis of the text corpus.
Source: Research data, 2021.

want. Therefore, the physician must, as they recommend this surgery, actively participate in the entire preoperative care with the rest of the team. This includes educating the patient about the heart, the risks and benefits of the treatment, exams, recovery, and other important topics. These can contribute to the interventions to have satisfactory results.

DISCUSSION

Regarding participant characterization, most were men, 56 years old or older. Regarding clinical indexes, SAH and smoking were the most common. This data is in accordance with a study from Singapore that compared mortality results in patients with acute myocardial infarction in patients with or without standard modifiable cardiovascular risk factors. Said study presented a similar participant profile, showing SAH and smoking as risk factors in two of the groups studied[17].

In this study, we found that most of the sample interviewed was yet to receive orientation regarding the surgical procedure at the time they entered in the study. This should be highlighted, since robust evidence shows that, when educational activities are implemented before CABG in the hospitals, they lead to countless benefits[18,19].

The participants who received orientations mentioned physicians and nurses as the main responsible for these strategies. This corroborates a randomized clinical trial conducted with 100 patients in Hong Kong, to evaluate the effect of an educational intervention carried out in the preoperative period. This investigation showed improvement in the level of satisfaction of patients who received guidance elaborated by physicians and nurses[12]. It is noteworthy that other members of the multiprofessional team must also participate, since the specific knowledge of each profession is complementary, helping achieve better clinical results[20].

Regarding educational strategies and the learning needs of the patients before the CABG procedure, the statements of the participants reiterated that they received no orientation from the health professionals. However, as mentioned by studies cited above, the importance of this type of activity is substantial[12,18,19].

Participants emphasized important events that precede the surgery and are necessary for all stages planned to take place. They include preoperative exams, such as coronary angiography, also known as cardiac catheterization, depending on the recommendation and individual needs. This can cause anxiety and anguish in the patients, generating expectations to undergo the procedure. Each service has a specific preoperative routine, which may be established in a protocol and needs to be adapted to the needs of each patient[4].

Guidance provided by the physician also took place, as highlighted by the participants. Nonetheless, a previous study cited the need to have different professionals implement preoperative educational models that consider the different aspects that involve the patient and go beyond their biological needs. They need to be given strength and be prepared psychologically. This can have a positive effect on postoperative events, such as complications, depressive symptoms, hospitalization times, and even mortality[10].

Although some participants did not receive the proper information, it is paramount to discuss all aspects that involve the preoperative period by providing clear orientation, using adequate, understandable language. It is also essential to optimize the time the patient waits before undergoing the intervention[4].

The ICU is also the ward where the patient must go for recovery. However, there are expectations associated with it, and lack of knowledge about the place, including the time that must be spent there and which devices will be used. Thus, a literature review highlighted that this environment is often feared by patients. This is a result of factors such as pain, lack of privacy, physical limitations, intense lighting, noise, limitation in communications, idle time, distance from relatives and loved ones, in addition to the invasive devices necessary for the treatment[21].

Going home and adapting to the new context was also a topic that stood out. The hospital discharge, then, becomes relevant, and needs to be understood as a complex process of care transfer. It is an important process which must be planned by all professionals who make follow ups in the hospital, so it is safe[22]. For that, all guidance necessary for patient care and self-care must be provided, since these actions are essential for recovering and maintaining quality of life.

Certain doubts about the surgery were put forth. As a result, it becomes clear that CABG was the second most representative term of all in the corpus. This shows that the context of the patient before the procedure is permeated by several questions, such as medication use, exams undergone, and recovery itself.

These questions are important and must be addressed by the orientations when preparing the patient for CABG. This corroborates a study from Iran which aimed to investigate the effects of preoperative peer education in patients, focusing on post-surgery adherence to medication and lifestyle changes. This investigation discussed topics such as the nature of CAD, treatment, care with operating wounds, and necessary changes in lifestyle, such as the adequate use of prescribed medication, level of physical activity, diet, weight control, and smoking cessation[23].

Participants reported concerns about the risks surrounding CABG. Although it is often performed in countries like the United States with improved results and lower death rates, some risks and complications still exist. The include post-operative stroke, delirium, pulmonary complications such as pleural effusion, atelectasis, infections and kidney injury, all with variable incidences[24].

The idea that this is a large, complex procedure must be reiterated, and the patient must understand these factors. These may be negative circumstances, but they can actually take place[24]. This is why it is so important to get informed consent, based on all orientation received from health workers.

Regarding the content suggested by participants to form an educational resource, in the form of a mobile application, it is noteworthy that literature supports digital education, which, according to some studies, has been increasingly used throughout the last decade, with the help of mobile devices, in several fields[25,26]. This fact became even more relevant due to the popularization of the use of tools such as cell phones[25]. In the field of health, especially in cardiology, applications can be used in the context of patient education, before the CABG surgery. Nonetheless, for this to happen, they must be developed with topics and content that can address patient learning needs, including a variety of topics.

Among the topics that can be included in an educational application, we can mention the heart and its functioning, the surgical procedure, the diet, and recovery, as this investigation has shown. Additionally, other studies mention the invasive devices used during the procedure; the environment where care takes place – hospitalization units, surgical center, intensive care units; perioperative examinations; recovery; the care provided to the patient; the experience of pain; and important life habits to maintain one's health status and quality of life after the surgery[23,27,28].

Therefore, the topics described above helped to structure the content of the prototype of a mobile application, called Orienta RVM®. This is a resource with reliable content, which has been validated by judges and specialists, who recommend its use in patient education before CABG[29].

The results also showed that this setting is permeated by doubts, requiring the implementation of many learning strategies for the patients who will undergo CABG, as their statements have shown. To do so, the care team must understand these needs and plan/implement activities of education in health, improving the knowledge of the individual who will undergo the intervention.

One of the limitations of this study is related to difficulties recruiting individuals, which prevented us from forming a larger sample, despite this being a qualitative study. This took place as the setting investigated went through adaptations during the COVID-19 pandemic. This led to a significant reduction in the number of elective CABG and emergency surgeries being carried out. Therefore, further studies should be carried out that address different settings with a higher number of patients, in order to confirm the results found here or contribute with additional data.

FINAL CONSIDERATIONS

This study allowed identifying the learning needs of patients before the CABG. They were related with the disease process, the heart, the surgical procedure, exams, care environments, risks, benefits, results, and changes in lifestyle to maintain health and quality of life.

In addition to the needs of the patients, we found that the health team scarcely provided them with orientation. In this regard, individuals who experienced this context were found to have several doubts about the aspects involved in performing the surgery.

We also found that, from the perspective of the patients, the physician is the professional that serves as a reference in the preoperative period. On the other hand, the need to involve other professionals stands out, since complete care involves many different types of knowledge. Among these professionals, the nurse stands out, since, as they are in contact with all patients during work shifts at the hospital, they must assume the role of health educator, leading strategies to promote perioperative orientations.

REFERENCES

1. World Health Organization [Internet]. Cardiovascular diseases (CVDs). Geneva: WHO; 2021 [cited 2023 Sep 10]. Available from: https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)
2. Malakar AK, Choudhury D, Halder B, Paul P, Uddin A, Chakraborty S. A review on coronary artery disease, its risk factors, and therapeutics. J Cell Physiol. 2019;234(10):16812-23. doi: https://doi.org/10.1002/jcp.28350
3. Organização Mundial de Saúde [Internet]. OMS revela principais causas de morte e incapacidade em todo o mundo entre 2000 e 2019. Brasília, DF: OMS; 2020 [cited 2023 Sep 10]. Available from:: https://www.paho.org/pt/noticias/9-12-2020-oms-revela-principais-causas-morte-e-incapacidade-em-todo-mundo-entre-2000-e
4. Knihs NS, Valmorbida AP, Lanzoni GMM, Roza BA, Ghellere A. Caminho percorrido até a cirurgia cardíaca: necessidades e expectativas no pré-operatório. Av Enferm. 2017;35(1):30-41. doi: https://doi.org/10.15446/av.enferm.v35n1.60753
5. Ramachandra CJA, Hernandez-Resendiz S, Crespo-Avilan GE, Lin YH, Hausenloy DJ. Mitochondria in acute myocardial infarction and cardioprotection. EBioMedicine. 2020;57:e102884. doi: https://doi.org/10.1016/j.ebiom.2020.102884
6. Bianco V, Kilic A, Gleason TG, Aranda-Michel E, Wang Y, Navid F, et al. Timing of coronary artery bypass grafting after acute myocardial infarction may not influence mortality and readmissions. J Thorac Cardiovasc Sur. 2021;161(6):2056-64.e4. doi: https://doi.org/10.1016/j.jtcvs.2019.11.061
7. Bsharat R, Karadag M. The impact of patient education on quality of life of patients undergoing Coronary Artery Bypass Grafting (CABG) in the West Bank of Palestine. EC Nurs Healthc. 2019 [cited 2023 Sep 12];1(2):11-23. Available from: https://www.ecronicon.com/ecnh/pdf/ECNH-01-00009.pdf
8. Chandrababu R, Nayak BS, Pai VB, N R, George LS, Devi ES, et al. Effects of foot massage and patient education in patients undergoing coronary artery bypass graft surgery: a randomized controlled trial. Complement Ther Clin Pract. 2020;40:e101215. doi: https://doi.org/10.1016/j.ctcp.2020.101215
9. Santana VM, Gomes TN, Maranhão TSPA, Silva SP, Vieira VBC, Ribeiro RM, et al. Educação em saúde para pacientes no perioperatório de cirurgia cardiovascular: relato de experiência. Braz J Health Rev. 2021;4(2):5559-71. doi: https://doi.org/10.34119/bjhrv4n2-124
10. Salzmann S, Salzmann-Djufri M, Wilhelm M, Euteneuer F. Psychological preparation for cardiac surgery. Curr Cardiol Rep. 2020;22(12):1-10. doi: https://doi.org/10.1007/s11886-020-01424-9
11. Araújo NM, Oliveira ES, Silva BVS, Melo EBB, Dantas RAN, Dantas DV. Recurso audiovisual na educação em pré-operatório de cirurgia cardíaca: revisão de escopo. Texto Contexto Enferm. 2022;31:e20210334. doi: https://doi.org/10.1590/1980-265X-TCE-2021-0334
12. Lai VKW, Ho KM, Wong WT, Leung P, Gomersall CD, Underwood MJ, et al. Effect of preoperative education and ICU tour on patient and family satisfaction and anxiety in the intensive care unit after elective cardiac surgery: a randomised controlled trial. BMJ Qual Saf. 2021;30(3):228-35. doi: https://doi.org/10.1136/bmjqs-2019-010667
13. Böck A, Nietsche EA, Terra MG, Cassenote LG, Wild CF, Salbego C. Ações educativas desenvolvidas no período perioperatório em um hospital universitário: percepção de pacientes cirúrgicos. Rev Enferm UFSM. 2019;9(e28):1-20. doi: https://doi.org/10.5902/2179769234760
14. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349-57. doi: https://doi.org/10.1093/intqhc/mzm042
15. Souza MAR, Wall ML, Thuler ACM, Lowen IMV, Peres AM. O uso do software IRAMUTEQ na análise de dados em pesquisas qualitativas. Rev Esc Enferm USP. 2018;52:e03353. doi: https://doi.org/10.1590/S1980-220X2017015003353

16. Ministério da Saúde (BR). Conselho Nacional de Saúde. Resolução nº 466, de 12 de dezembro de 2012. Aprova diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. Diário Oficial União. 2013 jun 13 [cited 2023 Sep 12];150(112 Seção 1):59-62. Available from:: https://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?data=13/06/2013&jornal=1&pagina=59&totalArquivos=140
17. Sia CH, Ko J, Zheng H, Ho AFW, Foo D, Foo LL et al. Comparison of mortality outcomes in acute myocardial infarction patients with or without Standard Modifiable Cardiovascular Risk factors. Front Cardiovasc Med. 2022;9(1):876465. doi: https://doi.org/10.3389/fcvm.2022.876465
18. Mousavi Malek N, Zakerimoghadam M, Esmaeili M, Kazemnejad A. Effects of nurse-led intervention on patients' anxiety and sleep before coronary artery bypass grafting. Crit Care Nurs Q. 2018;41(2):161-9. doi: https://doi.org/10.1097/CNQ.0000000000000195
19. Niknejad R, Mirmohammad-Sadeghi M, Akbari M, Ghadami A. Effects of an orientation tour on preoperative anxiety in candidates for coronary artery bypass grafting: a randomized clinical trial. ARYA Atheroscler. 2019;15(4):154-60. doi: https://doi.org/10.22122/arya.v15i4.1806
20. Zahid M, Iqba lU, Khan A, Khlil H, Kausar N, Mumtaz S, et al. Cardiac rehabilitation as a dedicated clinical service: recent achievements and remaining challenges. Pak Armed Forces Med J. 2022 [cited 2023 Sep 13];72(Suppl-1):S82. Available from: https://www.pafmj.org/index.php/PAFMJ/article/view/8298/3931
21. Gomes AGA, Carvalho MFO. A perspectiva do paciente sobre a experiência de internação em UTI: revisão integrativa de literatura. Rev SBPH. 2018 [cited 2023 Sep 12];21(2):167-85. Available from: http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1516-08582018000200010
22. Silva RL, Ribeiro MAT, Azevedo CC. Concepções sobre o processo de alta hospitalar: uma revisão crítica. Tempus. 2018;12(1):135-46. doi: https://doi.org/10.18569/tempus.v10i4.1975
23. Golaghaie F, Esmaeili-Kalantari S, Sarzaeem M, Rafiei F. Adherence to lifestyle changes after coronary artery bypass graft: outcome of preoperative peer education. Patient Educ Couns. 2019;102(12):2231-7. doi: https://doi.org/10.1016/j.pec.2019.07.019
24. Hussain SMA, Harky A. Complications of coronary artery bypass grafting. Int J Med Rev. 2019;6(1):1-5. doi: https://doi.org/10.29252/IJMR-060101
25. Lee M, Lee H, Kim Y, Kim J, Cho M, Jang J, et al. Mobile app-based health promotion programs: a systematic review of the literature. Int J Environ Res Public Health. 2018;15(12):e2838. doi: https://doi.org/10.3390/ijerph15122838
26. Lall P, Rees R, Law GCY, Dunleavy G, Cotič Z, Car J. Influences on the implementation of mobile learning for medical and nursing education: qualitative systematic review by the digital health education collaboration. J Med Internet Res. 2019;21(2):e12895. doi: https://doi.org/10.2196/12895
27. Macleod CE. Emergency coronary artery bypass grafting: an overview. Nurs Crit Care. 2019;14(3):8-13. doi: https://doi.org/10.1097/01.CCN.0000554831.89961.bc
28. Hojskov IE, Moons P, Egerod I, Olsen OS, Thygesen LC, Hansen NV, et al. Early physical and psycho-educational rehabilitation in patients with coronary artery bypass grafting: a randomized controlled trial. J Rehabil Med. 2019;51(2):136-43. doi: https://doi.org/0.2340/16501977-2499
29. Lima Neto AV, Silva IP, Mesquita SKC, Salvador PTCO, Almeida TCS, Oliveira PP, et al. Application prototype for patient education before coronary artery bypass graft surgery. Acta Paul Enferm. 2023;36:eAPE010731. doi: https://doi.org/10.37689/acta-ape/2023AO0107331

Acknowledgments:
To the *Universidade Federal do Rio Grande do Norte* for the concession of a Scientific Initiation grant to the project "Development and validation of a mobile application for patient education in the preoperative period of myocardial revascularization", associated to PROPESQ Notice No. 01/2021.

Authorship contribution:
Project administration: Alcides Viana de Lima Neto, Isabelle Katherinne Fernandes Costa.
Formal analysis: Alcides Viana de Lima Neto, Isabelle Katherinne Fernandes Costa.
Funding acquisition: Isabelle Katherinne Fernandes Costa.
Conceptualization: Alcides Viana de Lima Neto, Isabelle Katherinne Fernandes Costa.
Data curation: Alcides Viana de Lima Neto, Vivianne Lima de Melo, Isabelle Pereira da Silva, Silvia Kalyma Paiva Lucena, Breno Wagner Araújo Cosme da Silva, Julliana Fernandes de Sena, Isabelle Katherinne Fernandes Costa.
Writing – original draft: Alcides Viana de Lima Neto, Isabelle Pereira da Silva, Silvia Kalyma Paiva Lucena, Julliana Fernandes de Sena, Isabelle Katherinne Fernandes Costa.
Writing – review & editing: Alcides Viana de Lima Neto.
Investigation: Alcides Viana de Lima Neto, Isabelle Katherinne Fernandes Costa.
Methodology: Alcides Viana de Lima Neto, Isabelle Katherinne Fernandes Costa.
Software: Alcides Viana de Lima Neto.
Supervision: Isabelle Katherinne Fernandes Costa.
Validation: Isabelle Katherinne Fernandes Costa.

The authors declare that there is no conflict of interest.

Corresponding author:
Alcides Viana de Lima Neto
E-mail: alcides.viana@ufrn.br

Associate editor:
Carlise Rigon Dalla Nora

Received: 09.20.2023
Approved: 12.18.2023

Editor-in-chief:
João Lucas Campos de Oliveira