

Effects of physiotherapeutic instructions on anxiety of CABG patients

Efeitos de orientações fisioterapêuticas sobre a ansiedade de pacientes submetidos à cirurgia de revascularização miocárdica

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Abstract

Objective: The coronary artery bypass graft surgery is an option of treatment for cardiovascular diseases, and the patients who underwent such procedure can suffer from preoperative anxiety. The aim of this study is to verify the effects of physiotherapeutic instructions at the anxiety level on patients undergone coronary artery bypass graft surgery.

Methods: Randomized clinical trial, with the sample composed by 51 individuals, 27 on the control group and 24 on the intervention; on which it was assessed the anxiety (Beck Scale for Anxiety) and pain (Visual Analog Scale) levels on the pre- and postoperative period and only the second group received instructions about the surgery procedures and ventilatory exercises. For statistical analysis the Wilcoxon, Mann-Whitney and Spearman tests were used.

Results: The lower anxiety levels were observed in patients that received the intervention on the period before surgery (9.6 ± 7.2 versus 13.4 ± 5.9 , $P=0.02$). On the control group, the difference among the anxiety levels before and after the surgery was statistically significant ($P= 0.003$). The female

individuals presented more anxious before the surgery compared to the male ones ($P=0.058$). It was also verified a relationship between length of stay at hospital and postoperative anxiety ($P=0.05$), where the more anxious individuals remained more time at the hospital.

Conclusion: Patients oriented and instructed about physiotherapeutic ventilatory exercises and hospital routine, presented their levels of anxiety reduced on the preoperative compared to the control group. However, at the postoperative, both groups presented their anxiety levels reduced without significant difference between them.

Descriptors: Anxiety. Myocardial revascularization. Physical therapy (Specialty).

Resumo

Introdução: A cirurgia de revascularização é uma opção de tratamento para as doenças cardiovasculares, sendo que os indivíduos a esta submetidos podem sofrer quadros de ansiedade pré-operatória.

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Objetivo: O objetivo deste estudo é verificar os efeitos de orientações fisioterapêuticas sobre o nível de ansiedade em pacientes submetidos à cirurgia de revascularização do miocárdio.

Métodos: Ensaio clínico randomizado, com amostra composta por 51 indivíduos, sendo 27 do grupo controle e 24 de intervenção, nos quais foram avaliados os níveis de ansiedade (Escala de Beck) e dor (Escala Análogo Visual), nos períodos pré e pós-operatório, sendo que somente o grupo intervenção recebeu orientações sobre os procedimentos cirúrgicos e exercícios ventilatórios. Para análise dos dados foram utilizados os testes de Wilcoxon, Mann-Whitney e Spearman.

Resultados: Observaram-se escores de ansiedade mais baixos nos pacientes que receberam a intervenção antes da cirurgia ($9,6 \pm 7,2$ versus $13,4 \pm 5,9$, $P=0,02$). No grupo controle, a diferença entre os escores de ansiedade antes e após a cirurgia foi significativa ($P=0,003$). Os indivíduos do sexo

feminino apresentaram-se mais ansiosos no pré-operatório comparados aos do sexo masculino ($P=0,058$). Verificou-se também relação entre o tempo de permanência no hospital e ansiedade pós-operatória ($P=0,05$), sendo que os indivíduos mais ansiosos permaneceram internados por maior período de tempo.

Conclusão: Pacientes orientados e instruídos, quanto a exercícios ventilatórios fisioterapêuticos e rotinas hospitalares, tiveram menores níveis de ansiedade no pré-operatório, quando comparados ao grupo controle. Entretanto, no período pós-operatório, ambos os grupos tiveram seus níveis de ansiedade reduzidos, sem diferença significativa entre eles.

Descritores: Ansiedade. Revascularização miocárdica. Fisioterapia (Especialidade).

INTRODUCTION

Cardiovascular diseases, in Brazilian reality, occupy the leadership of the causes of death and hospital stay, corresponding to 32.6% of deaths with determined cause [1]. Despite the numerous alternatives for the treatment of coronary artery disease, coronary artery bypass grafting is an option with accurate indications and good mid- and long-term results, providing the remission of angina symptoms and contributing to the increase in life expectancy and improved quality of life of patients with the aforementioned disease [2].

The coronary artery bypass grafting presents satisfactory results, however, it has the pain caused by the nociceptive stimulus from sternotomy [3] as an important cause of mortality and morbidity in the postoperative period, which leads less effectiveness of cough, by adopting a rapid and superficial breathing, and can cause pulmonary complications such as atelectasis [4].

Nevertheless, patients who had undergone heart surgery may suffer psychological disorders such as anxiety [5,6], which is hardly noticeable in the pre-operative, and it may go unnoticed by the medical team [7], since often such disorder is related to physical illnesses [8].

Anxiety consists of the set of somatic transient manifestations, such as tachycardia, hyperventilation,

sweating and psychological manifestations with feelings of apprehension, nervousness, restlessness, and may also cause changes in sleep-wake cycle [9].

Patients who had undergone heart surgery present symptoms such as fear, anxiety and worry, from the moment they are reported on the need to perform the procedure. The reduction of these symptoms, giving rise to positive feelings and comfort and hope, occurs in the postoperative period [10].

It is worth noting that anxiety can be caused by fear and lack of knowledge about the surgical process. Researches have shown that this feeling together with stress can have an effect in the postoperative recovery, and that preoperative informations, if effective, reduce stress, anxiety and pain levels [6,11-13].

The perioperative pain and anxiety can affect the transport of oxygen and can lead to postoperative complications, whereas informations about this phase minimize this feeling and also the patients's fear [14]. In addition to that, the hospital stay usually causes discomfort, stress, depression, disquiet, boredom, exacerbation of pain and anxiety [15-17].

According to Pritchard [18], the nursing team also has the leading role in trying to minimize preoperative anxiety, not only providing medications, but also knowledge in order to help that an informed decision is taken. In each meeting

with the patient, one should ensure he is physically and psychologically ready to face both the procedure and the postoperative period.

Since the team has missing, many times, important aspects of daily routine, whether the high level of demand in the team's overloaded or the loss of human feeling, the anxiety is one of those points still less explored and could, when reversed, improve patient comfort during the hospital stay and increase the reliability in the team such patient is under care. However, it is important that only the level of information that the patient wants to receive is given, since too much information given to patients who do not want it, can also increase the level of anxiety.

The preoperative physiotherapy in heart surgery includes assessment, education in procedures to be performed, the relationship that such procedures have with the breathing capacity and it may help in patient recovery in addition to verify possible risk of respiratory complications, by establishing the main behaviors postoperatively [19]. Thus, patients should be advised of their responsibilities in their treatments and how to perform the ventilatory exercises during the physiotherapist care [20], due to the importance of direct participation of the patient with this professional in the postoperative period [4].

The aim of this study was to investigate the effects of physiotherapy guidelines on the level of anxiety in patients undergoing coronary artery bypass grafting, as well as describing the level of pain at rest and correlate anxiety with the clinical and epidemiological variables.

METHODS

This study consists of a randomized clinical trial, composed of individuals of both genders, different ages and skin color, who underwent elective CABG at the São Vicente de Paulo Hospital. This study was approved by the Research Ethics Committee of Passo Fundo University (protocol No. 057/2007).

One should emphasize that doctors were not part of the randomization process, therefore, they did not know for which group the patients were allocated, in order to avoid possible selection bias. Patients were included in the study, according the surgical schedule, since such scheduling occurred 24 hours before elective surgery. So, we worked consecutively with all the cases.

The written informed consent was signed by all patients, since a copy was delivered to the patient and another for the researchers.

Soon after, the patients were randomized by mean of a table of random numbers into two groups: control group (27 patients) and intervention group (24 patients).

In the intervention group, a preoperative evaluation was

performed, 24 hours before surgery, using a detailed data sheet containing data such as: name, age, gender, height, weight, body mass index (BMI), education, prior surgical procedures, use of antidepressant medication, alcoholism and smoking. Overweight patients were considered those with BMI > 25 and obese BMI \geq 30 [21]. Patients who smoked or had smoked at least 30 days before surgery were classified as smokers.

Then, informations were given and demonstrations of ventilatory exercise** were performed to the patients individually, for the improvement of pulmonary ventilation and bronchial hygiene. The patient's awareness about the importance of physiotherapy and also early mobility in bed allows them to collaborate with the treatment, thus reaching a better recovery and reduced hospital stay.

Explanation to the patients who composed the intervention group was done, regarding the sternotomy, a procedure in which a suture is performed in the sternum, allowing access to the heart. It was explained the importance of maintaining an appropriate pulmonary ventilation and cough, whereas these may be reduced in the postoperative as a result of pain, anesthesia, drains and probes, so avoiding possible pulmonary complications. Also, the general information approached on the CABG were: the time of stay in cardiac ICU, the possibility of daily visits, hospital routines, changes in habits, and the hospital discharge expectancy. Each patient received, on written, physiotherapeutic guidelines on ventilatory exercise that could be performed after surgery, without affecting the hospital physiotherapeutic routines.

After guidance, quantification of pain referred in the preoperative period was performed, by Visual Analogue Scale, ranging from 0 to 10, with 0 indicating no pain and 10 unbearable pain (maximum) [22].

For evaluation and classification of the patient's anxiety, we used the assessment tool Beck anxiety Inventory, as it is the most widely used protocol both in research and in clinics to assess levels of anxiety [23]. The inventory consists of 21 items, on which each of them reflects on the gradual levels of each symptom, whereas the anxiety is classified as minimal with values between (0-10), mild (11-19), moderate (20-30) and severe anxiety (31-63) [24]. The application of the scale was performed by the psychologist, and she has no knowledge of which group (intervention or control) the patient belonged.

The control group underwent the same detailed assessment, pain assessment and assessment of anxiety up to 24 hours before surgery, but it did not receive physiotherapeutic guidance or printed material.

Finally, the levels of anxiety and pain in both groups were re-examined on the fourth postoperative day. When it was necessary, the ventilatory exercises were reminded to

patients participating in the intervention group, which might have their doubts clarified.

Numerical variables were described as mean and standard deviation or median and interquartile range, when non-parametric variables. Categorical variables were described as absolute and relative frequency. We used the Wilcoxon and Mann-Whitney test and Spearman correlation, considering differences as significant at 5%.

RESULTS

In this study, from 51 patients who were part of the sample, 24 (47.1%) received physiotherapeutic intervention and 27 (52.9%) were part of the control group. Table 1 shows the characteristics of the sample studied, with no clear

Table 1. Characteristics of the sample

	Intervention (n=24)	Control (n=27)	P
Mean age (years)	64.5 ± 9.5	62.6 ± 10.4	0.50 ¹
Male	18 (75.0%)	18 (66.7%)	0.73 ²
BMI (kg/m ²)	26.1 ± 4.5	27.5 ± 3.9	0.23 ¹
Smoking	7 (29.2%)	3 (11.1%)	0.16 ³
Alcoholism	1 (4.2%)	1 (3.7%)	1.00 ²
Previous surgeries	13 (54.2%)	14 (51.9%)	1.00 ²
Use of antidepressant	9 (37.5%)	7 (25.9%)	0.56 ²
Education			0.92 ⁴
Illiterate	3 (12.5%)	4 (14.8%)	
Incomplete Elementary school	12 (50.0%)	14 (51.9%)	
Complete Elementary school	4 (16.7%)	1 (3.7%)	
Incomplete High school	2 (8.2%)	3 (11.1%)	
Complete High school	2 (8.3%)	5 (18.5%)	
Graduated	1 (4.2%)	0	
Preoperative pain	0.63 ± 1.5	1.0 ± 1.4	0.18 ⁵
Postoperative pain	3.1 ± 2.8	3.04 ± 2.6	0.95 ⁵

Variable presented as mean ± Standard deviation or as absolute frequency (relative frequency):¹: Student's t test; ²: Chi-square continuity correction test; ³:Fisher's exact test; ⁴: Somer's test; ⁵: Mann Whitney U-test; BMI: body mass index. *P<0,05

significant baseline differences between intervention and control groups.

In this study, patients who received physiotherapy in the preoperative period were significantly less anxious than those from control group (9.6 ± 7.2 versus 13.4 ± 5.9, P=0.02). In the postoperative period, there was no statistically significant difference in the values of anxiety among patients who received - or not - intervention before surgery (7.1 ± 5.2 versus 8.7 ± 8.0, P=0.64) (Figure 1).

When compared the pre- and postoperative levels of anxiety, the difference between anxiety scores was statistically significant in the control group (13.4 ± 5.9 and 8.7 ± 8.0, P=0.003) a found close the level of significance in the group receiving the intervention (9.6 ± 7.2 and 7.1 ± 5.2, P=0.06). In addition to that, we observed that female patients were more anxious than men before surgery (14.6 ± 6.8 versus 10.5 ± 6.5, P=0.058), but without reaching statistical significance level. Likewise, this difference was not observed in the postoperative period (8.6 ± 7.3 versus 7.6 ± 6.6, P=0.63).

In respect to the use of antidepressants, there was no difference in the scores of preoperative anxiety among those patients who were using and who were not using such medication (12.4 ± 7.2 versus 11.3 ± 6.6, P=0.62). This difference was not observed in the postoperative period (7.3 ± 5.3 versus 8.2 ± 7.4, P=0.86). Comparing smokers and nonsmokers, the following levels of preoperative anxiety were found 9.0 ± 5.3 and 12.3 ± 7.0, respectively (P=0.17), and after surgery: 8.8 ± 4.7 and 7.7 ± 7.2 (P=0.33). Finally, analyzing the non- alcoholics and alcoholics, anxiety levels also presented no significant difference either before (13.0 ± 7.1 and 11.6 ± 6.8, P=0.69), or after surgical intervention (5.5 ± 6.4 and 8.0 ± 6.8, P=0.56).

In order to analyze the correlation between the preoperative and postoperative score of anxiety, we obtained significant results (r=0.53, P<0.001) also between anxiety and pain in the postoperative period (r=0.3, P=0.035). There was no significant correlation between hospital stay and anxiety in the postoperative period, neither between pre- and postoperative pain; it was only found significant correlation between duration of hospital stay and postoperative anxiety, as shown in Table 2.

Table 2. Correlation between anxiety, pain and pre- and postoperative hospital stay

		Preoperative anxiety	Postoperative anxiety	Preoperative pain	Postoperative pain	Hospital stay
Preoperative anxiety	Corr. Coeff. Sig.	1.000-	0.5260.000*	0.1040.474	0.1990.166	0.0870.584
Postoperative anxiety	Corr. Coeff. Sig.	0.5260.000*	1.000-	0.0840.567	0.3010.035*	0.3080.050*
Preoperative pain	Corr. Coeff. Sig.	0.1040.474	0.0840.567	1.000-	-0.0190.896	0.0410.796
Postoperative pain	Corr. Coeff. Sig.	0.1990.166	0.3010.035*	-0.0190.896	1.000-	0.2120.177
Hospitalar stay	Corr. Coeff. Sig.	0.0870.584	0.3080.050*	0.0410.796	0.2120.177	1.000-

*Spearman correlation, P<0.05

When possible correlation between BMI and anxiety score is found between age and anxiety preoperatively and postoperatively, we noted no significant relationship. Similarly, no significant differences regarding pre- and postoperative anxiety between groups with and without previous experience of surgery were found. In the analysis of correlation between education and anxiety before surgery, there was an inverse correlation statistically significant and the same correlation after surgery was not found (Table 3).

DISCUSSION

In daily clinical practice, it was observed that patients undergoing coronary artery bypass grafting presented preoperative anxiety that often, in addition to not be perceived by the team, did not receive appropriate

interventions. These interventions can be performed by any member of the multidisciplinary team, through guidance to the questions and wishes of the patient, without generating additional costs. Moreover, when such interventions are identified, it can be established strategies aiming at reducing anxiety and improving the stay and comfort of the patient in the hospital [25].

In this study, the patients who were guided presented less anxious in the preoperative period. However, this difference was not observed during postoperative follow-up. Heather et al. [26] applied a protocol of preoperative intervention in patients undergoing coronary artery bypass grafting by a multidisciplinary team of cardiologists, surgeons and physiotherapists. There was a reduction of one week in hospital stay in the group receiving the intervention, as well as improvement in quality of life of these patients, which lasted for 6 months. However,

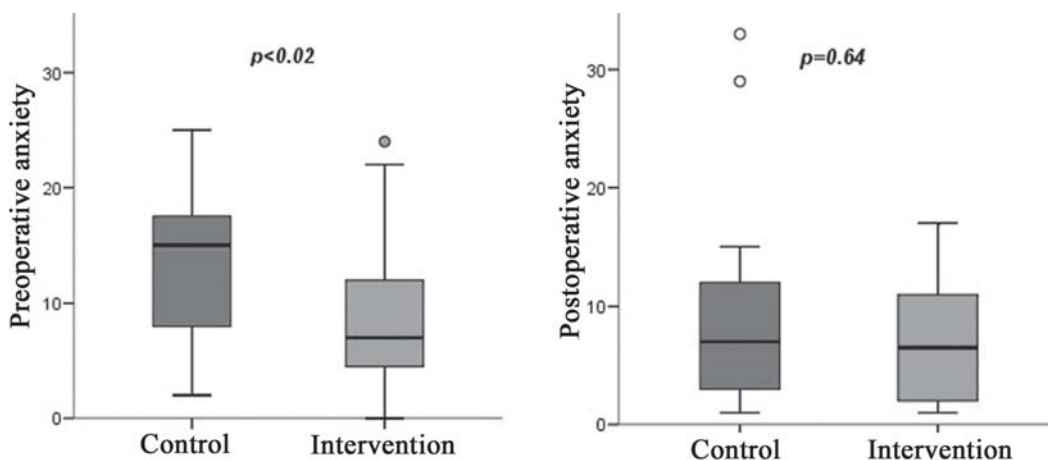


Fig. 1 - Anxiety score. A: Preoperative; B: Postoperative

Table 3. Correlation between BMI, education, age, previous surgery and pre- and postoperative anxiety.

		Preoperative anxiety	Postoperative anxiety
BMI	Corr. Coeff. Sig.	0.070.64	0.060.70
Education	Corr. Coeff. Sig.	-0.370.009*	0.080.578
Age	Corr. Coeff. Sig.	0.060.705	0.090.519
Previous surgery	Corr. Coeff. Sig.	0.040.791	0.070.335

*Spearman correlation, * P<0.05

** Ventilatory exercises applied consisted of appropriateness of the inspiratory and expiratory time and deep breathing, with the air inspired slowly and deeply through the nose in times 1:1, 2:1 e 3:1, and, in the end, cough.

mortality rates and levels of anxiety both preoperatively and postoperatively did not differ between groups.

Corroborating the findings of this study presented herein, lower levels of anxiety were noted in those patients who had knowledge about the surgical procedure, as described by Kiyohara et al. [27]. However, Bergmann et al. [5] and Schuldham et al. [28] found no significant difference in scores between patients guided or not on the same disorder before the surgery.

In the postoperative period, there was reduction in anxiety levels, but we did not find a significant difference between levels of anxiety when comparing both groups. Bergmann et al. [5] found that the anxiety level decreased significantly in the postoperative period in a study that aimed to assess the effects of oral information preoperatively combined with greater personal attention given by the surgeon on the levels of stress, anxiety and welfare.

Physiotherapists play an important role in the preparation and rehabilitation of patients who had undergone surgical procedures. In addition to having a large arsenal of techniques, the physiotherapist, notoriously, has been one of the professionals that more time is next to the patients. As such, it is suggested that time spent is better spent, by favoring professionals to clarify the doubts of the patients and guide them to the new situations that they will have to face.

Some symptoms reported by anxious patients, such as tachycardia, tachypnea, and high systemic blood pressure, may be mistaken as part of the presentation developed by coronary artery disease. Conceição et al. [6] reported that the measurement of blood pressure and heart rate are not good parameters to measure the patient's anxiety level, requiring the assessment of the disorder by means of validated scales such as the Beck anxiety Inventory. According Trame et al. [29], the Inventory is widely used because of its cost-effectiveness, ease of application and interpretation.

Nevertheless, preoperative anxiety may be normal, often undifferentiated from anxiety disorders (panic disorders, phobias, disorders by generalized anxiety, Mixed Anxiety-Depressive Disorder), which are persistent in nature and show reduced levels of anxiety postoperatively. In this context, it is critical that anxiety levels are assessed as well as the differentiation of anxiety disorder and preoperative anxiety is performed by a psychologist familiar with the tools for assessment of anxiety, as used in this study and suggested by Barbosa and Radomile [30].

In the preoperative period, women were more anxious, however, in the postoperative period this difference was not found. Differently of our findings, Kiyohara et al. [27] found no significant difference in anxiety levels between female and male. According to Gallagher and McKinley [31],

information provided at the time before surgery to reduce anxiety, especially in women.

As in the present study, Nickinson et al. [32] found a correlation between postoperative anxiety levels and length of hospital stay, but the study of Nickinson investigated patients undergoing knee or hip arthroplasty, whose mean for the group who were anxious was 5 days versus 4 days for the group that did not show anxiety. Thus, it is thought that an appropriate intervention in order to reduce the anxiety levels of patients undergoing surgical procedures has not only clinical outcomes but also a reduction in costs generated by the reduction in length of hospital stay.

Significant differences in assessing the use of antidepressants, smoking and alcohol were not found. In a similar study, female patients, aged below 40 years, smokers, graduated or not and with depressive symptoms were the most affected by preoperative anxiety [33]. According to Conceição et al. [6], anxiety levels are not significant factors in the case of previous surgical experience, education and age, confirming the findings of this study.

CONCLUSION

Educated patients guided on physiotherapeutic ventilatory exercises and hospital routines in the preoperative presented anxiety levels decreased when compared with patients who did not receive guidance.

Female patients were more anxious than men before surgery. The more anxious the patients were after surgery, the higher levels of pain and hospital stay postoperatively. However, the pain did not affect the length of hospital stay. The lower the educational level of individuals, the higher the anxiety score in the preoperative.

REFERENCES

1. Almeida FF, Barreto SM, Couto BRGM, Starling CEF. Fatores preditores da mortalidade hospitalar e de complicações pré-operatórias graves em cirurgia de revascularização miocárdica. *Arq Bras Cardiol.* 2003;80(1):41-50.

2. Almeida RMS, Lima Jr JD, Martins JF, Loures DRR. Revascularização do miocárdio em pacientes após a oitava década de vida. *Rev Bras Cir Cardiovasc.* 2002;17(2):116-22.
3. Magnano D, Montalbano R, Lamarra M, Ferri F, Lorini L, Clarizia S, et al. Ineffectiveness of local wound anesthesia to reduce postoperative pain after median sternotomy. *J Card Surg.* 2005;20(4):314-8.
4. Dean E. Complicações, síndrome do desconforto respiratório do adulto, choque, sepse e falência de múltiplos órgãos. In: Frownfelter D, Dean E, editores. *Fisioterapia cardiopulmonar: princípios e prática.* 3ª ed. Rio de Janeiro:Revinter;2004. p.485-96.
5. Bergmann P, Huber S, Mächler H, Liebl E, Hinghofer-Szalkay H, Rehak P, et al. The influence of medical information on the perioperative course of stress in cardiac surgery patients. *Anesth Analg.* 2001;93(5):1093-9.
6. Conceição DB, Schonhorst L, Conceição MJ, Oliveira GRF. A pressão arterial e a frequência cardíaca não são bons parâmetros para avaliação do nível de ansiedade pré-operatória. *Rev Bras Anesthesiol.* 2004;54(6):769-73.
7. Alves MLM, Pimentel AJ, Guaratini AA, Marcolino JAM, Gozzani JL, Mathias LAST. Ansiedade no período pré-operatório de cirurgias de mama: estudo comparativo entre pacientes com suspeita de câncer e a serem submetidos a procedimentos cirúrgicos estéticos. *Rev Bras Anesthesiol.* 2007;57(2):147-56.
8. Marcolino JAM, Mathias LAST, Piccinini LF, Guaratini AA, Suzuki FM, Alli LAC. Escala hospitalar de ansiedade e depressão: estudo da validade de critério e da confiabilidade com pacientes no pré-operatório. *Rev Bras Anesthesiol.* 2007;57(1):52-62.
9. Dractu L, Lader M. Ansiedade: conceito, classificação e biologia: uma interpretação contemporânea da literatura. *J Bras Psiquiatr.* 1993;42(1):19-32.
10. Vargas TV, Maia EM, Dantas RA. Patient feelings during the preoperative period for cardiac surgery. *Rev Lat Am Enfermagem.* 2006;14(3):383-8.
11. Nelson S. Pre-admission education for patients undergoing cardiac surgery. *Br J Nurs.* 1996;5(6):335-40.
12. Peniche ACG, Chaves EC. Algumas considerações sobre o paciente cirúrgico e a ansiedade. *Rev latino-am Enferm.* 2000;8(1):45-50.
13. Nery AA, Pinheiro GML, Oliveira ZM. Dimensões da dor: (re)pensando o cuidado de enfermagem. *Enferm Atual.* 2005;5(29):27-31.
14. Dean E, Perlstein MF, Mathews M. Condições cirúrgicas agudas. In: Frownfelter, D, Dean E, editores. *Fisioterapia cardiopulmonar: princípios e prática.* 3ª ed. Rio de Janeiro:Revinter;2004. p.387-97.
15. Santos LM, Nascimento GP, Bachion MM, Munari DB. Percepções das pessoas internadas com alterações cardiovasculares sobre a hospitalização e a doença. *Ver SOCESP.* 2004;14(3):1-10.
16. Leguisamo CP, Freitas MF, Maciel NF, Donato P. Avaliação da dor e da função pulmonar em pacientes submetidos à cirurgia de revascularização miocárdica. *Fisioterapia Brasil.* 2007;8(1):14-8.
17. Asilioglu K, Celik SS. The effect of preoperative education on anxiety of open cardiac surgery patients. *Patient Educ Couns.* 2004;53(1):65-70.
18. Pritchard MJ. Managing anxiety in the elective surgical patient. *Br J Nurs.* 2009;18(7):416-9.
19. Bethune DD, Potter HM, McKenzie D. Técnicas fisioterápicas. In: Pryor JA, Webber BA, editores. *Fisioterapia para problemas respiratórios e cardíacos.* 2ª ed. Rio de Janeiro:Guanabara Koogan;2002. p.97-150.
20. Leguisamo CP, Kalil R, Furlani AP. A efetividade de uma proposta fisioterapêutica pré-operatória para cirurgia de revascularização do miocárdio. *Rev Bras Cir Cardiovasc.* 2005;20(2):134-41.
21. Huang KC, Lee MS, Lee SD, Chang YH, Lin YC, Tu SH, et al. Obesity in the elderly and its relationship with cardiovascular risk factors in Taiwan. *Obes Res.* 2005;13(1):170-8.
22. O'Sullivan SB, Schmitz TJ. *Fisioterapia: avaliação e tratamento.* 2ª ed. São Paulo:Manole;1993.
23. Marcolino JAM, Suzuki FM, Alli LAC, Gozzani JL, Mathias LAST. Medida da ansiedade e da depressão em pacientes no pré-operatório: estudo comparativo. *Rev Bras Anesthesiol.* 2007;57(2):157-66.
24. Cunha JA. *Manual da versão em português das escalas de Beck.* São Paulo:Casa do Psicólogo;2001.
25. Tromp F, Dulmen S, Weert J. Interdisciplinary preoperative patient education in cardiac surgery. *J Adv Nurs.* 2004;47(2): 212-22.
26. Arthur HM, Daniels C, McKelvie R, Hirsh J, Rush B. Effect of a preoperative intervention on preoperative and postoperative outcomes in low-risk patients awaiting elective coronary artery bypass graft surgery. A randomized, controlled trial. *Ann Intern Med.* 2000;133(4):253-62.
27. Kiyohara LY, Kayano LK, Oliveira LM, Yamamoto MU, Inagaki MM, Ogawa NY, et al. Surgery information reduces anxiety in the pre-operative period. *Rev Hosp Clin Fac Med Sao Paulo.* 2004;59(2):51-6.

28. Shuldham CM, Fleming S, Goodman H. The impact of pre-operative education on recovery following coronary artery bypass surgery. A randomized controlled clinical trial. *Eur Heart J*. 2002;23(8):666-74.
29. Trame CD, Greene E, Moddeman G, Booth BA, Konstantakos EK, Parada S, et al. Correlation of pain scores, analgesic use, and beck anxiety inventory scores during hospitalization in lower extremity amputees. *Open Orthop J*. 2008;2:145-50.
30. Barbosa VC, Radomile MES. Ansiedade pré-operatória no hospital geral. *Psicópio: Rev Virtual de Psicologia Hospitalar e da Saúde*. 2006;2(3):45-50.
31. Gallagher R, McKinley S. Stressors and anxiety in patients undergoing coronary artery bypass surgery. *Am J Crit Care*. 2007;16(3):248-57.
32. Nickinson RS, Board TN, Kay PR. Post-operative anxiety and depression levels in orthopaedic surgery: a study of 56 patients undergoing hip or knee arthroplasty. *J Eval Clin Pract*. 2009;15(2):307-10.
33. Caumo W, Schmidt AP, Schneider CN, Bergmann J, Iwamoto CW, Bandeira D, et al. Risk factors for preoperative anxiety in adults. *Acta Anaesthesiol Scand*. 2001;45(3):298-307.