

REVIEW

Preoperative anxiety: an important, but neglected issue

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Summary

Preoperative anxiety refers to a state of discomfort caused by an upcoming operation, anesthesia, the disease itself, or hospitalization. Although the reported incidence of preoperative anxiety varies in a wide range, the majority of surgical patients experience at least some degree of anxiety preoperatively and it can be frequently seen in the preoperative setting. The specific factor that contributes most to the emergence of perioperative anxiety has not been identified yet. Still, older age and female gender have been consistently marked as independent predictors of preoperative anxiety. Several different scales have been proposed in recent decades for the measurement of preoperative anxiety. Since high-level preoperative anxiety is associated with severe postoperative complications and can significantly alter surgical treatment outcomes, this issue should not be neglected. Timely identification of anxious patients may reduce the incidence of preoperative anxiety and its possible consequences.

Keywords: preoperative anxiety; postoperative complications; incidence; measurement.

INTRODUCTION

The term anxiety is derived from the Latin word *anxietas*, meaning concern, i.e., from Greek ανησυχία – worry, restlessness. Anxiety disorders have been known for thousands of years but were acknowledged as a separate diagnostic entity within psychiatric diseases only in the late 20th century. (1) Nowadays, those mental disorders are defined as: “*non-psychotic mental disorders in which anxiety is the only one or the leading symptom and is not caused by organic brain diseases or other psychiatric diseases*”, (2) i.e. mental disorders in which anxiety represents the most prominent symptom. (3)

The preoperative period is a stressful time, characterized by the emergence of specific emotional, cognitive and psychological responses to the anticipation of the upcoming surgery. (4) Since the feeling of anxiety arises due to the anticipation of a potentially unfavorable, risky, or unpleasant event or outcome, preoperative anxiety refers to a state of discomfort caused by an upcoming operation, anesthesia, the disease itself, or hospitalization. (5) It has been shown that preoperative anxiety can significantly alter surgical treatment outcomes. (6) Thus, the present review aims to briefly summarize the current knowledge of the basic characteristics and importance of preoperative anxiety.

THE INCIDENCE OF PREOPERATIVE ANXIETY

In a study by Kuzminskaitė et al. (7) that included 149 patients scheduled for elective non-cardiac surgery only 12.6% of patients felt anxious preoperatively. On the other hand, several recent studies revealed that preoperative anxiety could be seen in over 70% of surgical patients. (8-11) Furthermore, a cross-sectional study conducted by Aust et al. in 2018 that included over 3000 adult surgical patients showed that only 8% of patients did not feel anxious at all during the preoperative period. (12) Thus, based on the available literature data, the reported incidence of preoperative anxiety varies to a large degree, depending on several factors, such as the type of the study, the population in question, the geographical region where the study was conducted, the measurement scale and the type of the surgery. Still, most authors agree that the majority of surgical patients experience at least some degree of anxiety preoperatively.

THE RISK FACTORS FOR PREOPERATIVE ANXIETY

When it comes to the factors that contribute to the development of preoperative anxiety, the literature data are inconsistent. Many patients' characteristics have been associated with the occurrence of preoperative anxiety, such as demographic factors, socio-economic factors, psychosocial fac-

tors, as well as the type of surgery/anesthesia. Among these factors, age, female gender, worse socio-economic status, lower level of education, more extensive surgery, and previous bad experiences with surgery and anesthesia were most often associated with the onset of preoperative anxiety. (8, 13-17) Although older age and female gender were consistently marked as independent predictors of preoperative anxiety in several studies, (18-20), the specific factor that contributes most to the emergence of preoperative anxiety has not been identified yet. This suggests that additional studies are required to further clarify which patients' characteristics and surgical factors are responsible for the development of preoperative anxiety so that an individual approach to the assessment and/or therapy of preoperative anxiety in those subgroups of patients can be applied to reduce the incidence of preoperative anxiety. (21)

MEASUREMENT OF PREOPERATIVE ANXIETY

Basically, preoperative anxiety can be measured using two different approaches: objectively and by subjective scales. Objective methods include indirect assessment of anxiety levels through the estimation of the degree of sympathoadrenal system activation, and, more directly, by measuring stress hormones. An increase in heart rate, blood pressure, plasma cortisol and catecholamines values, as well as a decrease in heart rate variability and oxygen saturation, were described as consequences of higher levels of preoperative anxiety. (22-24) For instance, a study by Balasubramaniyan N. et al. from 2016 investigated the association of cardiovascular alterations and anxiety in 80 hypertensive patients undergoing dental procedures. The authors demonstrated that high-level preoperative anxiety is associated with significant increases in heart rate and systolic blood pressure. (25) Furthermore, newer studies suggest that the measurement of catechol-o-methyltransferase may be useful in identification of patients with preoperative anxiety. Namely, it has been shown that anxious patients have lower levels of this enzyme (and thus higher levels of circulating catecholamines) compared to the patients who are not anxious during the preoperative period. (26) The main disadvantage of objective techniques for anxiety measurement is that they are time-consuming and not easy to apply in a busy daily practice, which is why they are rarely used nowadays. Recently described positive correlation between subjective and objective methods of anxiety measurement, (27) along with the development of a variety of reliable subjective (and easy-to-use) scales limit the routine application of objective anxiety measurements even further.

On the other hand, the level of preoperative anxiety can also be assessed using the subjective (self-descriptive) scales. The most commonly used are the Hospital Anxiety and Depression scale (HAD), (28) Visual Ana-

logue Scale for Anxiety (VAS-A), the State-trait anxiety inventory (STAI), (29) the Amsterdam Preoperative Anxiety and Information Scale (APAIS), (30) Linear Analog Anxiety Scale (LAAS) (31) and Multiple Affect Adjective Check List (MAACL), (32), and each one of them has its specific advantages and flaws.

The VAS-A is certainly the simplest one to use. Created in 1976, the scale consists of a 100 mm horizontal line, which is marked with zero at its left end (meaning: "I am not anxious at all") and with 100 at its right end (meaning: "I am extremely anxious"). The subjects are asked to indicate the level of anxiety they feel at the moment by drawing a vertical line on the scale, with the line drawn closer to the right end indicating a higher degree of anxiety. The main disadvantage of this scale is reflected in the fact that it doesn't have a precisely established cut-off point. Still, according to Facco et al., (33) a score over 46 mm represents a clinically significant level of anxiety, while a score of ≥ 70 mm correlates with very high levels of anxiety. (34)

The original Dutch version of the Amsterdam Preoperative Anxiety and Information Scale (APAIS), developed in 1996 by Moerman et al., (30) nowadays represents a valuable and widely accepted instrument for the measurement of preoperative anxiety. As a matter of fact, some experts even consider the APAIS scale as a "gold standard" for the identification of anxious patients preoperatively. (12, 35) The scale consists of six questions, grouped into two components: the first one measures anxiety (related to anesthesia and surgery, four questions) and the second assesses the need for information (the two remaining questions). The questions are scored from 1 to 5 based on the Likert method, where 1 means "not at all" and 5 means "extremely". The total score ranges from 4 to 20 points for the part of the scale related to anxiety and from 2 to 10 points for the part of the scale related to the need for information. A higher score indicates a higher level of anxiety and a greater need for information. The scale has been translated and validated into several languages - French, Malay, Spanish, and Chinese, (36-39) and, since recently, the scale has even been adapted and validated among the Serbian population. (40) The main limitation of the APAIS scale, as stated by the authors of the original scale, is its inability to distinguish anxiety related to anesthesia from anxiety related to surgery. Due to its different and specific structure, the Serbian APAIS version has overcome this disadvantage: anesthesia- and surgery-related anxieties can be separately assessed.

The selection of the most appropriate scale remains difficult. This process should be guided by the time available for the assessment of preoperative anxiety, patients' characteristics and comorbidities, physicians' preferences, and the reliability of a specific scale. Still, it should be emphasized that the choice of the scale is not as important as the timely identification of anxious patients and the application of measures to lower the level of preoperative anxiety.

THE CONSEQUENCES AND SIGNIFICANCE OF PREOPERATIVE ANXIETY

The significance of preoperative anxiety is clearly reflected in the fact that it has been designated as by far the worst aspect of preoperative care by the majority of surgical patients (worse even than the pain), as evidenced by the results of a large observational study by Walker et al. from 2016, which included over 15,000 patients. (41) The importance of preoperative anxiety is also emphasized by the fact that the latest guidelines of the European Society of Anesthesiology (ESA) from 2018 included the assessment of preoperative anxiety as an unavoidable step and a part of the routine preoperative preparation and evaluation of surgical patients. (42) Furthermore, it has been shown that if the level of preoperative anxiety exceeds normal ranges, it can lead to numerous consequences. First of all, anxiety can significantly affect the patient's psychological status, leading to psychological alterations, from nervousness to agitation. Moreover, mediated through sympathetic, parasympathetic, and endocrine stimulation, preoperative anxiety may contribute to the development of numerous complications, starting from minor ones - in the form of inability to cannulate peripheral veins due to sympathetic vasoconstriction, through delayed relaxation of the masticatory muscles and increased cough reflex during the induction of anesthesia, hemodynamic fluctuations and an increased need for anesthetic agents intraoperatively, up to the more frequent occurrence of nausea and vomiting, an increased need for analgesics, prolonged mechanical ventilation and hospitalization in the postoperative period, as well as an increased risk of infections. (43-46) In addition, it has been shown that preoperative anxiety is an independent predictor of increased in-hospital mortality and morbidity from cardiovascular diseases in patients undergoing cardio-surgical operations. (44) Also, a strong correlation was found between preoperative anxiety and subsequent dissatisfaction with surgical treatment. (47) Finally, our previous study (6) demonstrated that high-level preoperative anxiety is associated with severe postoperative complications (postoperative mental disorders, pulmonary complications, and postoperative nausea).

MANAGEMENT OF PATIENTS WITH PREOPERATIVE ANXIETY

Although a lot is known about preoperative anxiety, the best way for managing those patients is still unknown and this issue represents a matter of debate in perioperative medicine. This is further emphasized by the fact that currently there are no guidelines that provide clear guidance on the prevention and/or treatment of patients with preoperative anxiety. (21) So, the question remains: "What can we do?".

Nowadays, a variety of measures and interventions can be applied to reduce the incidence of preoperative anxiety and alleviate its symptoms. Those include patient counseling and education, pharmacotherapy, and, recently more popular alternative methods. Patient education mainly represents the primary and the most commonly applied method to reduce the incidence of preoperative anxiety. Even though the effectiveness of these measures has been demonstrated by numerous studies, (48-50) there are dilemmas related to the choice of patient education methods. Specifically, while some authors advocate education by means of phone, written (typed) or video materials, (51, 52) results of other studies have shown that personal contact with patients and verbal means significantly relieve anxiety symptoms. (53, 54) Furthermore, modern-day techniques, such as mobile applications, (55) internet content, (56) and even virtual reality, (57) have been shown to be effective in the management of anxious patients. Still, in some patients, educational efforts will not bring good results, whether due to the patient's characteristics, time limits, or the complexity of anxiety causes. In such cases, conventional pharmacological approach may be useful: benzodiazepines, sympatholytics, gabapentinoids, and antidepressants. Recently it has been shown that even melatonin can have a beneficial effect on reducing the degree of preoperative anxiety. (58) Besides the fact that some authors even refute the anxiolytic effects of frequently used medications, it should be emphasized that pharmacotherapy has its limitations and increases treatment costs. This is the reason why alternative and less expensive methods for the management of anxious patients have lately gained a lot of interest. Beneficial effects of aromatherapy, (59, 60) music therapy, (61) acupuncture, (62) and even therapeutic inhaled essential oils (63) have been

described. Still, to the best of our knowledge, currently, there are no studies that have compared the effects of all available measures. Thus, the best and the most effective method for the reduction of anxiety in patients during the preoperative period is yet to be found. Until further research is conducted, clinical evaluation is of greatest importance and interventions should be tailored according to the patient's individual needs.

Conclusion

Preoperative anxiety can greatly affect the outcome of surgical patients' treatment. The present review briefly summarizes the current knowledge on the topic and emphasizes the importance of preoperative anxiety. It also suggests that this issue should not be neglected. Given that anxiety is a frequent problem during the preoperative period, both for patients and for medical professionals, it is necessary to perform timely identification of anxious patients and to apply the appropriate measures in order to reduce the incidence of preoperative anxiety and its possible consequences.

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1) the conception or design of the work: K.J., N.K., S.S.G.; 2) the acquisition: K.J., N.K., S.S.G.; 3) analysis, or interpretation of data: K.J., S.S.G.; 4) preparing the draft of the manuscript: K.J., N.K.; 4) interpretation of revised version of manuscript: K.J., S.S.G.

References

- Crocq MA. A history of anxiety: from Hippocrates to DSM. *Dialogues Clin Neurosci* 2015;17(3):319-25.
- Latas M, Jašović Gašić M. Neurotični, sastresompovezaniisomatoforniporemećaji: anksiozniporemećaji. U: Jašović Gašić M, Lečić Toševski D, urednici. *Psihijatrija za studente medicine*. Beograd, Medicinskifakultet; 2007;pp:156-69.
- American Psychiatric Association. *American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders*. 5th ed., 2013, Arlington, VA.
- Sigdel S. Preoperative anxiety: A short review. *Glob Anaesth Perioper Med* 2015;1(4):107-8.
- Yilmaz M, Sezer H, Gürlür H, Bekar M. Predictors of preoperative anxiety in surgical inpatients. *J Clin Nurs* 2012;21(7-8):956-64.
- Jovanovic K, Kalezić N, Sipetic Grujicic S, Zivaljevic V, Jovanovic M, Kukic B, et al. Preoperative Anxiety is Associated With Postoperative Complications in Vascular Surgery: A Cross-Sectional Study. *World J Surg* 2022;46:1987-96.
- Kuzminskaitė V, Kaklauskaitė J, Petkeviciūtė J. Incidence and features of preoperative anxiety in patients undergoing elective non-cardiac surgery. *Acta Med Litu* 2019;26(1):93-100.
- Nigussie S, Belachew T, Wolancho W. Predictors of preoperative anxiety among surgical patients in Jimma University Specialized Teaching Hospital, South Western Ethiopia. *BMC Surg* 2014;14(67):1-10.
- Hernández-Palazón J, Fuentes-García D, Falcón-Araña L, Roca-Calvo MJ, Burguillos-López S, Doménech-Asensi P, et al. Assessment of preoperative anxiety in cardiac surgery patients lacking a history of anxiety: contributing factors and postoperative morbidity. *J Cardiothorac Vasc Anesth* 2018;32(1):236-44.
- Erkilic E, Kesimci E, Soykut C, Doger C, Gumus T, Kanbak O. Factors associated with preoperative anxiety levels of Turkish surgical patients: From a single center in Ankara. *Patient Prefer Adherence* 2017;11:291-6.
- Millán JV, Serrano JR, Aguirre JM. Anxiety in preoperative anesthetic procedures. *Cir Cir* 2010;78(2):147-51.
- Aust H, Eberhart L, Sturm T, Schuster M, Nestoriuc Y, Brehm F, et al. A cross-sectional study on preoperative anxiety in adults. *J Psychosom Res* 2018;111:133-9.
- Basak F, Hasbahceci M, Guner S, Sisik A, Acar A, Yuçel M, et al. Prediction of anxiety and depression in general surgery inpatients: A prospective cohort study of 200 consecutive patients. *Int J Surg* 2015;23:18-22.
- 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.
15. Burkle CM, Mann CE, Steege JR, Stokke JS, Jacob AK, Pasternak JJ. Patient fear of anesthesia complications according to surgical type: potential impact on informed consent for anesthesia. *Acta Anaesthesiol Scand* 2014;58(10):1249-57.
 16. Pan X, Zan W, Xiong MA, Wang D, Liu J. Related risk factors of moderate and severe preoperative anxiety. *J Clin Anesthesiol* 2018;5(34):425-8.
 17. Almalki MS, Hakami OA, Al-Amri AM. Assessment of preoperative anxiety among patients undergoing elective surgery. *Egypt J Hosp Med* 2017;69(4):2329-33.
 18. Celik F, Edipoglu IS. Evaluation of preoperative anxiety and fear of anesthesia using APAIS score. *Eur J Med Res* 2018;11;23(1):41.
 19. Rodrigues HF, Furuya RK, Dantas RAS, Rodrigues AJ, Dessotte CAM. Association of preoperative anxiety and depression symptoms with postoperative complications of cardiac surgeries. *Rev Lat Am Enfermagem* 2018;29;26:e3107.
 20. Sahib AJ, Hussein KO. Anxiety in the Preoperative Period: Associated Risk Factors and General Health Condition. *Prensa Med Argent* 2020;3:1-16.
 21. Stamenkovic DM, Rancic NK, Latas MB, Neskovic V, Rondovic GM, Wu JD, et al. Preoperative anxiety and implications on postoperative recovery: what can we do to change our history. *Minerva Anestesiol* 2018;84(11):1307-17.
 22. Williams JG, Jones JR, Williams B. The chemical control of preoperative anxiety. *Psychophysiology* 1975;12:46-9.
 23. Fell D, Derbyshire DR, Maile CJ, Larsson IM, Ellis R, Achola KJ, et al. Measurement of plasma catecholamine concentrations. An assessment of anxiety. *Br J Anaesth* 1985;57:770-4.
 24. Kalra N, Sabherwal P, Tyagi R, Khatri A, Srivastava S. Relationship between subjective and objective measures of anticipatory anxiety prior to extraction procedures in 8- to 12-year-old children. *J Dent Anesth Pain Med* 2021;21:119-28.
 25. Balasubramanian N, Rayapati DK, Puttiah RH, Tavane P, Singh ES, Rangan V, et al. Evaluation of anxiety induced cardiovascular response in known hypertensive patients undergoing exodontia - a prospective study. *J Clin Diagn Res* 2016;10:123-7.
 26. Nasution AH, Lelo A. Catechol-o-methyltransferase (comt) enzyme levels in patients with preoperative anxiety. *Comorbid J* 2022;1(1):33-40.
 27. Galamb D, Lenkey A, Olah A, Math J, Marton I, Alberth M. Objective and subjective measurements for assessing dental fear in adolescents: a pilot study. *Ital J Dent Med* 2017;2:3-8.
 28. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983;67:361-70.
 29. Spielberger CD, Gorsuch RL, Lushene RE, Vagg PR, Jacobs GA. *Manual for the State-trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press, 1983.
 30. Moerman N, van Dam FS, Muller MJ, Oosting H. The Amsterdam preoperative anxiety and information scale (APAIS). *Anesth Analg* 1996;82(3):445-51.
 31. Hicks JA, Jenkins JG. The measurement of preoperative anxiety. *J R Soc Med* 1988;81:517-9.
 32. Zuckerman M, Lubin B, Rinck CM. Multiple Affect Adjective Check List--Revised. *J Behav Assess* 1985.
 33. Facco E, Stellini E, Bacci C, Manani G, Pavan C, Cavallin F, et al. Validation of visual analogue scale for anxiety (VAS-A) in preanesthesia evaluation. *Minerva Anestesiol* 2013;79(12):1389-95.
 34. Hernández-Palazón J, Fuentes-García D, Falcón-Araña L, Rodríguez-Ribó A, García-Palenciano C, Roca-Calvo MJ. Visual analogue scale for anxiety and Amsterdam preoperative anxiety scale provide a simple and reliable measurement of preoperative anxiety in patients undergoing cardiac surgery. *Int Cardiovasc Res J* 2015;9:1-6.
 35. Eberhart L, Aust H, Schuster M, Sturm T, Gehling M, Euteneuer F, et al. Preoperative anxiety in adults-a cross-sectional study on specific fears and risk factors. *BMC Psychiatry* 2020;20:1-4.
 36. Maurice-Szamburski A, Loundou A, Capdevila X, Bruder N, Auquier P. Validation of the French version of the Amsterdam Preoperative Anxiety and Information Scale (APAIS). *Health Qual Life Outcomes* 2013;11:166.
 37. Lai LL, Loh PS. Validation of the Malay version of the Amsterdam Preoperative Anxiety and Information Scale (APAIS). *Med J Malaysia* 2015;70(4):243-8.
 38. Vergara-Romero M, Morales-Asencio JM, Morales-Fernández A, Canca-Sanchez JC, Rivas-Ruiz F, Reinaldo-Lapuerta JA. Validation of the Spanish version of the Amsterdam Preoperative Anxiety and Information Scale (APAIS). *Health Qual Life Outcomes* 2017;15:120.
 39. Wu H, Zhao X, Chu S, Xu F, Song J, Ma Z, Gu X. Validation of the Chinese version of the Amsterdam Preoperative Anxiety and Information Scale (APAIS). *Health Qual Life Outcomes* 2020;18(1):1-6.
 40. Jovanovic K, Kalezić N, SipeticGrujicic S, Zivaljevic V, Jovanovic M, Savic M, et al. Translation and validation of the Amsterdam preoperative anxiety and information scale (APAIS) in Serbia. *Brain Behav* 2022;12(1):e2462.
 41. Walker EM, Bell M, Cook TM, Grocott MP, Moonesinghe SR. Patient reported outcome of adult perioperative anaesthesia in the United Kingdom: a cross-sectional observational study. *Br J Anaesth* 2016;117(6):758-66.
 42. De Hert S, Staender S, Fritsch G, Hinkelbein J, Afshari A, Bettelli G, et al. Pre-operative evaluation of adults undergoing elective noncardiac surgery. Updated guideline from the European Society of Anaesthesiology. *Eur J Anaesthesiol* 2018;35:407-65.
 43. Pokharel K, Bhattarai B, Tripathi M, Khatiwada S, Subedi A. Nepalese patients' anxiety and concerns before surgery. *J Clin Anesth* 2011;23(5):372-8.
 44. Williams JB, Alexander KP, Morin JF, Langlois Y, Noiseux N, Perrault LP, et al. Preoperative anxiety as a predictor of mortality and major morbidity in patients aged > 70 years undergoing cardiac surgery. *Am J Cardiol* 2013;111(1):137-42.
 45. Uysal Aİ, Altıparmak B, Tokar MK, Dede G, Sezgin Ç, Demirebilek SG. The effect of preoperative anxiety level on mean platelet volume and propofol consumption. *BMC Anesthesiol* 2020;20(1):34.
 46. Vičentić S, Kalezić N, Jovanović K, Dimitrijević I. Perioperativnolečenjebolesnikasapsihijatrijskimkomorbiditetima. U: Kalezić N: *Perioperativnamedicina 2.*, AkademijamedicinskihnaukaSrpskoglekarskogdruštva, Beograd, 2021;p463-90.
 47. Ali A, Lindstrand A, Sundberg M, Flivik G. Preoperative anxiety and depression correlates with dissatisfaction after total knee arthroplasty: A prospective longitudinal cohort study of 186 patients, with 4-year follow-up. *J Arthroplasty* 2017;32:767-70.
 48. Ruiz Hernández C, Gómez-Urquiza JL, Pradas-Hernández L, Vargas Roman K, Suleiman-Martos N, Albendín-García L, et al. Effectiveness of nursing interventions for preoperative anxiety in adults: A systematic review with meta-analysis. *J Adv Nurs* 2021;77:3274-85.
 49. Gözde Bumin Aydın, Bahar Sakızcı Uyar, Mothers Level of Education and Preoperative Informative Story Book Reading Helps Reduce Preoperative Anxiety in Children in Turkey. *J PediatrNurs* 2021;60:e19-e23.
 50. Lemos MF, Lemos-Neto SV, Barrucand L, Verçosa N, Tibirica E. Preoperative education reduces preoperative anxiety in cancer patients undergoing surgery: Usefulness of the self-reported Beck anxiety inventory. *Rev Bras Anestesiol* 2019;69(1):1-6.
 51. Bozkurt M, Erkoç M, Can O, Danış E, Canat HL. The effect of an information video on preoperative anxiety level before percutaneous nephrolithotomy procedure: A prospective, randomized trial. *CUAJ* 2022;17(3). Epub ahead of print. [http://dx.doi.org/10.5489/kuaj.8005](http://dx.doi.org/10.5489/cuaj.8005)
 52. Tom K, Phang PT. Effectiveness of the video medium to supplement preoperative patient education: A systematic review of the literature. *Patient Educ Couns* 2022;105:1878-87.
 53. Shamloo MB, Zonooori S, Naboureh A, Nasiri M, Bahrami H, Maneyei M, Bayatiani FA. Effect of Face-to-Face Education on Anxiety and Pain in Children with Minor Extremity Injuries Undergoing Outpatient Suturing in Emergency Department. *Indian pediatr* 2018;55(1):41-4.

54. Stephen D, Douglas M, Tata F. Preassessment clinic interview and patient anxiety. *Saudi J Anaesth* 2016;10:402-8.
55. Wantanakorn P, Harintajinda S, Chuthapisith J, Anurathapan U, Rattanatamrong P. A new mobile application to reduce anxiety in pediatric patients before bone marrow aspiration procedures. *Hosp Pediatr* 2018;8(10):643-50.
56. Kim MJ, Oh HK, Lee KC, Yang HH, Koo BW, Lee J, et al. Effects of an Internet-based informational video on preoperative anxiety in patients with colorectal cancer. *Ann Surg Treat Res* 2019;96(6):290-5.
57. Koo CH, Park JW, Ryu JH, Han SH. The effect of virtual reality on preoperative anxiety: a meta-analysis of randomized controlled trials. *J Clin Med* 2020;9(10):3151.
58. Madsen BK, Zetner D, Møller AM, Rosenberg J. Melatonin for preoperative and postoperative anxiety in adults. *Cochrane Database Syst Rev* 2020;12:CD009861.
59. Guo P, Li P, Zhang X, Liu N, Wang J, Yang S, et al. The effectiveness of aromatherapy on preoperative anxiety in adults: a systematic review and meta-analysis of randomized controlled trials. *Int J Nurs Stud* 2020;111:103747.
60. Jaruzel CB, Gregoski M, Mueller M, Faircloth A, Kelechi T. Aromatherapy for preoperative anxiety: A pilot study. *J PerianesthNurs* 2019;34(2):259-64.
61. Casarin J, Cromi A, Sgobbi B, Di Siena A, Serati M, Bolis ME, et al. Music therapy for preoperative anxiety reduction in women undergoing total laparoscopic hysterectomy: a randomized controlled trial. *J Minim Invasive Gynecol* 2021;28(9):1618-24.
62. Wunsch JK, Klausnitz C, Janner H, Hesse T, Mustea A, Hahnenkamp K, et al. Auricular acupuncture for treatment of preoperative anxiety in patients scheduled for ambulatory gynaecological surgery: a prospective controlled investigation with a non-randomised arm. *Med Acupunct* 2018;36(4):222-7.
63. Murphy AE, Belmont SL, Moriber NA. The Use of Therapeutic Inhaled Essential Oils (TIEO) as a Holistic Approach to Decrease Preoperative Anxiety in ERAS Gynecological Surgery. *J PeriAnesthNurs* 2022. Epub ahead of print. <https://doi.org/10.1016/j.jopan.2022.03.002>

PREOPERATIVNA ANKSIOZNOST: VAŽAN, ALI ZAPOSTAVLJEN PROBLEM

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Sažetak

Preoperativna anksioznost se odnosi na stanje nelagodnosti uzrokovano predstojećom operacijom, anestezijom, samom bolešću ili hospitalizacijom. Iako incidencija preoperativne anksioznosti varira u širokom rasponu, većina hirurških pacijenata iskusi barem mali stepen anksioznosti pre operacije, te je anksioznost česta u preoperativnom periodu. Specifičan faktor koji najviše doprinosi nastanku perioperativne anksioznosti do sada nije identifikovan. Ipak, uznapredovale godine starosti i ženski pol su dosledno označeni kao nezavisni prediktori nastanka preoperativne anksioznosti. Za

procenu i merenje nivoa preoperativne anksioznosti, u poslednjih nekoliko decenija predložen je veliki broj različitih skala. S obzirom da je pokazano da je visok nivo preoperativne anksioznosti povezan sa značajnim postoperativnim komplikacijama i da može značajno uticati na ishode hirurškog lečenja, ovaj problem svakako ne bi trebalo zanemariti. Pravovremena identifikacija anksioznih bolesnika i primena odgovarajućih terapijskih mera preoperativno, značajno može smanjiti incidenciju preoperativne anksioznosti i komplikacija do kojih ona može dovesti.

Ključne reči: preoperativna anksioznost; postoperativne komplikacije; incidencija; merenje.

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