

Original Article

Nursing intervention based on Neuman's theory and mediated by an educational game

Intervenção de enfermagem baseada na teoria de Neuman mediada por jogo educativo

Intervención de enfermería basada en la teoría de Neuman mediante juegos educativos

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Nursing care; Nursing theory; Stress, physiological; Anxiety; Myocardial revascularization

Descritores

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Abstract

Objective: To evaluate nursing intervention based on Betty Neuman's theory and mediated by an educational game, regarding the reduction of anxiety and stress levels experienced by patients undergoing myocardial revascularization.

Methods: An interventional study was carried out with preoperative patients undergoing myocardial revascularization in reference hospitals from the southeast region of Brazil. The sample was made up of 32 participants, two of whom as a pre-test. Data collection occurred from May to November 2016 with the use of the following instruments: questionnaire for identification of sociodemographic data and evaluation of patients' experiences in face of hospitalization; State-Trait Anxiety Inventory (STAI); and Stress Symptoms List (SSL/VAS) for evaluation of anxiety and stress levels before and after application of an educational game. The data were analyzed by means of the Statistical Package for the Social Sciences 21 (SPSS) software.

Results: Participants, before the nursing intervention mediated by the educational game, presented anxiety trait with a median of 37, anxiety state with a median of 31, and stress level with a median of 30. After application of the educational game, a significant reduction ($p < 0.001$) was found in anxiety and stress levels (median of 25 and 11, respectively).

Conclusion: The nursing intervention mediated by the educational game significantly reduced the anxiety and stress levels of the participants in the study.

Resumo

Objetivo: Avaliar intervenção de enfermagem baseada na teoria de Betty Neuman mediada por jogo educativo no que tange à redução dos níveis de ansiedade e estresse vivenciados pelos usuários submetidos à revascularização miocárdica.

Métodos: Trata-se de estudo de intervenção, realizado com usuários em pré-operatório de revascularização miocárdica, internados em hospitais de referência localizados na região Sudeste do Brasil. A amostra constituiu-se de 32 participantes, sendo 2 deles como pré-teste. O período de coleta de dados foi de maio a novembro de 2016. Utilizaram-se os seguintes instrumentos: questionário para identificação dos dados sociodemográficos e para avaliação das experiências da pessoa perante a internação; Inventário de Ansiedade Traço-Estado (IDATE) e Lista de Sintomas de Stress (LSS/VAS) para avaliação dos níveis de ansiedade e estresse antes e depois do jogo educativo. Os dados foram analisados por meio do programa IBM SPSS Statistics version 21.

Resultados: Verificou-se que os participantes, antes da intervenção de enfermagem mediada pelo jogo educativo, apresentaram um traço de ansiedade com mediana de 37, estado de ansiedade com mediana de 31 e um nível de estresse com mediana de 30. Após aplicação do jogo educativo, verificou-se que houve redução significante ($p < 0,001$) dos níveis de ansiedade e estresse (mediana de 25 e mediana de 11).

Conclusão: A intervenção de enfermagem mediada pelo jogo educativo reduziu significativamente os níveis de ansiedade e estresse dos participantes do estudo.

Resumen

Objetivo: Evaluar la intervención de enfermería basada en la teoría de Betty Neuman mediante juegos educativos en lo que atañe a la reducción de los niveles de ansiedad y estrés que sufren los usuarios sometidos a baipás coronario.

Métodos: Se trata de un estudio de intervención, realizado con usuarios en preoperatorio de baipás coronario, internados en hospitales de referencia ubicados en la región Sudeste de Brasil. La muestra consistió en 32 participantes, siendo dos de ellos como preprueba. El período de recolección de datos fue de mayo a noviembre de 2016. Se utilizaron los siguientes instrumentos: cuestionario para identificar datos sociodemográficos y evaluar las experiencias de la persona ante la internación, Cuestionario de Ansiedad Estado Rasgo (STAI) y Lista de Síntomas de Estrés (LSS/VAS) para evaluar los niveles de ansiedad y estrés antes y después del juego educativo. Los datos fueron analizados a través del programa IBM SPSS Statistics version 21.

Resultados: Se verificó que los participantes presentaron, antes de la intervención de enfermería mediante juego educativo, un rasgo de ansiedad con mediana de 37, estado de ansiedad con mediana de 31 y nivel de estrés con mediana de 30. Después de la aplicación del juego educativo, se verificó que hubo una reducción significativa ($p < 0,001$) de los niveles de ansiedad y estrés (mediana de 25 y mediana de 11).

Conclusión: La intervención de enfermería mediante juegos educativos redujo significativamente los niveles de ansiedad y estrés de los participantes del estudio.

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Introduction

The hospitalization process means depersonalization for ill patients, because they recognize the difficulty in keeping their identities, intimacy, and privacy.⁽¹⁾ These issues, according to Betty Neuman, result in stressors, which increase anxiety and stress levels of hospitalized patients.⁽²⁾

Neuman classifies stressors into three types: extrapersonal, intrapersonal, and interpersonal. Therefore, individuals' environmental, emotional, and daily living factors may cause anxiety and stress.⁽²⁾ In addition, the author uses a system analysis based on human needs for stress protection and reduction, because she believes that stress causes, as well as risk factors, may be preventively identified and dealt with by means of nursing interventions. She emphasizes human beings' need for dynamic balance, which may be provided by nurses when using prevention as an intervention, providing patients with full care, that is, providing individual care to families and groups, with the aim of keeping a maximum well-being level.⁽²⁾

Stressors are present in patients undergoing heart surgery, in different ways and intensities during their hospital stay, because still in the preoperative period, they have to deal with anxiety with surgery, fear of anesthesia, fear of intubation, fear of death, fear of the intensive care unit (ICU), fear of pain, and absence of their families. The stressors experienced by these patients may negatively affect surgery and their recovery,⁽³⁻⁵⁾ because they may develop problems and complications that compromise their surgical recovery.⁽⁶⁾

Betty Neuman's holistic view enables nurses to see individuals as owners of a culture, as individuals who belong to societies or groups, have principles, families, and different education and knowledge levels, especially enabling them to see that these human beings have full interaction with the environment, becoming potential targets of stressors.⁽²⁾ Therefore, Neuman's theory inspired and grounded the development of a game-shaped educational technology.

In the public healthcare area, the term technology is used according to the following classifications: "hard"; "soft-hard", and "soft". The technology categorized as "hard" is associated with objects and machinery; "soft-hard" with structured knowledge; and "soft" with processes that affect relationships among individuals. Therefore, the conception of technology, opens a wide range of possibilities and challenges.⁽⁷⁾

Nurses may make use of these technological tools in different ways, especially educational technologies, to communicate with patients, either by means of primers, booklets, manuals, protocols, educational games, or resources such as software and websites, with the presence or not of nurses during their use. By integrating patients with the teaching-learning process, they may become potential mediators and protagonists in care.⁽⁸⁾

The need for searching pedagogical strategies for self-care promotion with preoperative patients undergoing myocardial revascularization enabled the development of a game-shaped educational technology, which, in a problem-solving and interactive playful way, would promote knowledge on patients' experiences in the surgical process.

The use of educational games as a teaching resource must promote interesting and challenging situations, allowing the self-questioning of learners regarding their performance, in addition to promoting the active participation of all players. Educational games enable the development of the ability to think, reflect, analyze, understand, formulate hypotheses, and test and evaluate them with autonomy and cooperation.⁽⁹⁾

Nurses, as care providers and educators, may also make use of playful tools, such as diagrams, primers, constructs, software, and other educational technologies, working with the reality that individuals will experience in their preoperative period. Therefore, information and education may reduce anxiety and depression, improve individuals' performance in the prevention of complications, thus significantly contributing to their recovery process in the postoperative period.^(10,11)

It is in this context that games gain space as positive and attractive tools in the teaching-learning process and health education carried out by nurses.

The objective of the present study was to evaluate a nursing intervention based on Betty Neuman's theory, mediated by a game-shaped educational technology regarding the reduction of anxiety and stress levels experienced by patients undergoing myocardial revascularization.

Therefore, the following question was considered: Does nursing intervention mediated by a game-shaped educational technology reduce anxiety and stress levels experienced by patients in pre-operative myocardial revascularization?

Methods

This was an interventional study carried out with perioperative patients undergoing myocardial revascularization in reference hospitals for heart surgery in the metropolitan region of Vitória, a city in the state of Espírito Santo, from May to November 2016.

The total number of participants who underwent myocardial revascularization in the hospitals that served as study settings in 2015 was 352. The following parameters were used to make up the total sample: confidence level of 90%, maximum expected error of 8%, population ratio of 10%, and correction factor for finite population. Therefore, the sample was made up of 32 patients, with two of them as pre-test of nursing intervention mediated by the educational game. Data collection occurred from May to November 2016.

The following inclusion criteria were adopted: patients from both genders; patients aged 18 years or older; patients with more than 24 hours of hospitalization; patients undergoing myocardial revascularization surgery. The following aspects were considered as exclusion criteria: patients in isolation; patients with hearing or language impairment with intellectual disability that could compromise the interview or intervention.

The following instruments were used for data collection: a structured questionnaire for identification of sociodemographic data (Part I) and evaluation of the participants' experiences when facing hospitalization (Part II), which consisted of the following questions: A) What bothers you in hospitalization?; B) What do you feel when bothered?; the State-Trait Anxiety Inventory (STAI) developed by Spielberger, Gorsuch, and Lushene⁽¹²⁾, and translated and adapted for Brazil by Biaggio and Natalício,⁽¹³⁾ and the Stress Symptoms List (SSL/VAS), developed by Vasconcelos.⁽¹⁴⁾

Data collection occurred in three stages during the perioperative period, in three consecutive days, and each stage had an average time of 45 minutes (first stage), 60 minutes (second stage), and 30 minutes (third stage), respectively.

In the first stage, sociodemographic data were collected and evaluation of patients' experiences regarding perioperative hospitalization was carried out, as well as anxiety and stress evaluation before the nursing intervention mediated by the educational game. The second stage was directed to the implementation of the nursing intervention mediated by the educational game. The patients were led in groups to a previously prepared room in the hospitalization area. In the third and last stage, after the nursing intervention mediated by the educational game, patients' anxiety and stress levels were evaluated for the second time.

The educational game used as a nursing intervention mediator instrument entitled "Surgical experience game with self-care promotion", whose authors are Diniz, Bringuente, Amorim, and Luz,⁽¹⁵⁾ was submitted to patent application in the Brazilian National Institute of Industrial Property (INPI, as per its acronym in Portuguese), under protocol no. BR1020170091880. The game is considered a hard technology (instrument-tool), which, used in an interactive-dialogic-care process between nurses and patients, becomes a hard-soft technology, according to Merhy,⁽⁷⁾ enabling learning regarding the preoperative process and promoting patient self-care.

The educational game was validated by the participants in the study (patients).

The following stages were considered for the development of the educational game: a) definition of the objective; b) determination of the target-population's characteristics; c) choice of the pedagogical framework: Paulo Freire; d) choice of the theoretical framework: Betty Neuman; e) selection of the content; f) development of the educational game's physical structure.⁽¹⁶⁾

The game consists of a rectangular board (65 cm length and 39 cm width) containing thirty numbered counters, six colored pawns, one dice, twelve figures with drawn images regarding the game's theme, and a quiz handled by the person in charge of the teaching-learning process, using a problem-solving approach, dialog, and issues regarding pre-, intra-, and postoperative myocardial revascularization. Each numbered counter of the board corresponds to the number of the quiz's questions. The game approaches the following topics: myocardial revascularization surgery; fasting; trichotomy; anesthesia; body hygiene for surgery; surgery clothing; intensive care unit (ICU); positioning in bed; mobility and active movement in bed; surgical wounds; dressing; pain; breathing

and coughing exercises; hand hygiene; release of postoperative diet in ICU; stress; and lifestyle after hospital discharge (Figure 1).

The data were analyzed by means of the Statistical Package for the Social Sciences 21 (SPSS) software, with the following items considered for descriptive statistics: observed frequency, percentage, median, mean, and standard deviation. Chi-square test was used to compare ratios of the anxiety trait questionnaire's categories. The Wilcoxon and Mann-Whitney tests evaluated the difference among the scores' medians to observe the effectiveness of the nursing intervention mediated by the educational game in the reduction of anxiety and stress levels, before and after application of the game. The significance level adopted was 5% and confidence interval was 95%. The study project was submitted to the human research ethics committee of the teaching hospital and philanthropic hospital of the metropolitan region of Vitória, a city in the state of the Espírito Santo, where the present study was carried out and approved under CAAE no. 52280315.0.0000.5071 and protocol no. 1.698.988. The abovementioned study is part of the master's dissertation of the present study's main researcher.

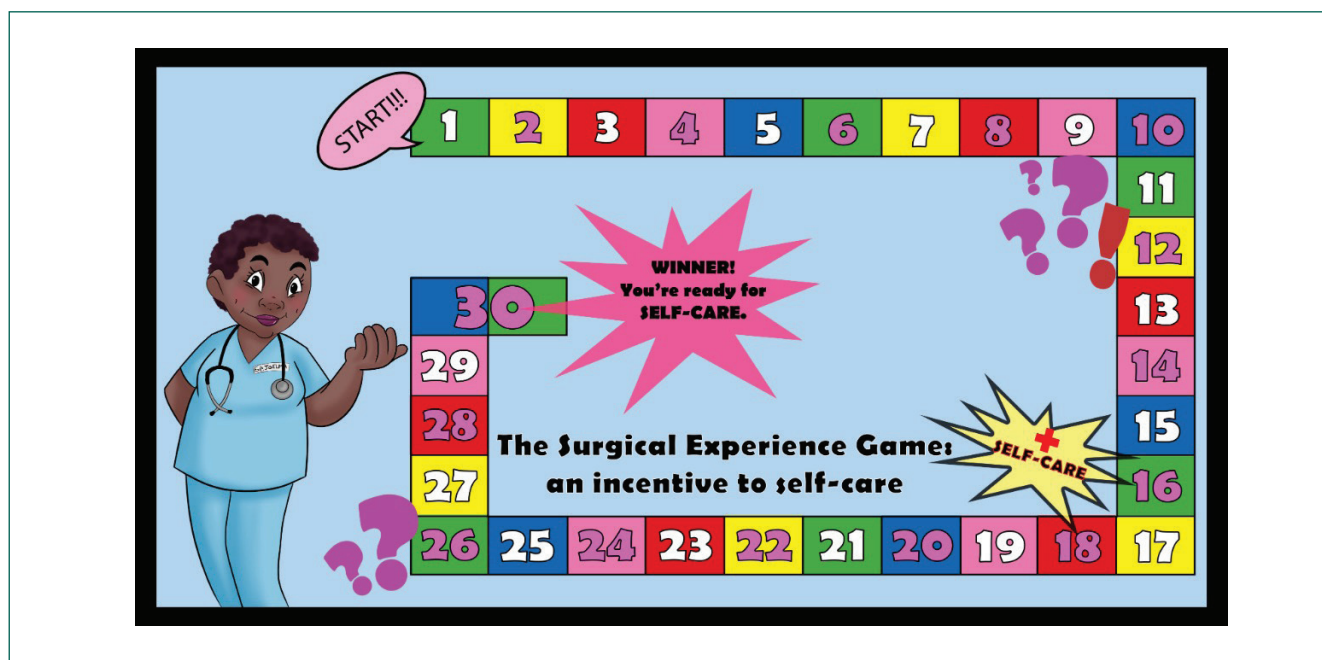


Figure 1. Presentation of the educational game's board

Results

According to the identification of sociodemographic data, the sample was mainly made up of men (76.6%), married (73.3%), retired (36%), with incomplete elementary education (73.3%), family social support (86.6%), and they were all (100%) from the southeastern region of Brazil.

To better understand stressors and anxiety/stress levels presented by the participants in the study, the results were presented into three items (I, II, and III), according to the aspect researched and instruments adopted in data collection.

I. Description of stressors based on the evaluation of patients' experiences when facing hospitalization during the preoperative period, before nursing intervention mediated by the educational game. The results regarding this item were presented in category A.

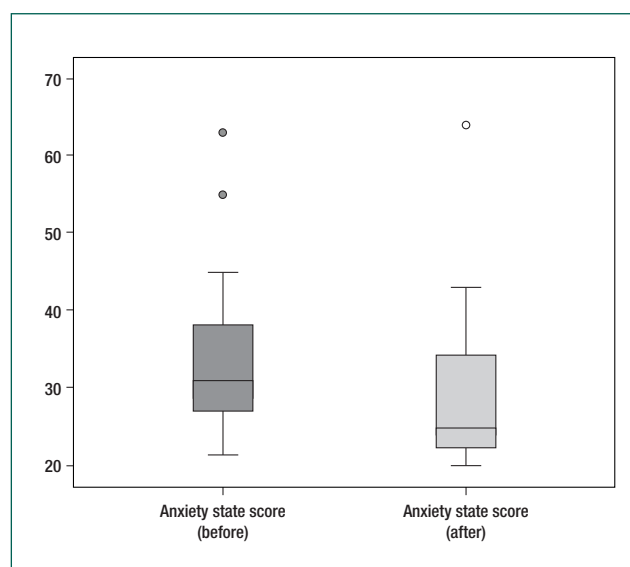
Category A - Distribution of stressors developed by Betty Neuman, identified in answers of the participants in the study to the following questions: "What bothers you in hospitalization?" and "What do you feel when bothered?" The stressors developed by Betty Neuman were distributed as follows: intrapersonal, interpersonal, and extrapersonal stressors, as follows:

- **Intrapersonal:** nervous (P1); contempt (U3); sadness (U4), nervous and worried (U5); sadness and feeling like crying (U6); sadness and worry with child (U7); regret for having smoked, not having eaten well and being sick (U8); sadness for not working (U9); worry (U12), eagerness, nervous, and homesick (U13); anguish and anxiety (U15); fear (U18); thinking about surgery (U21);
- **Interpersonal:** falsehood (U3); loss of mother (U7); being far from family, being sick, and depending on people (U13); being sick and depending on people (U15);
- **Extrapersonal:** Noise (U1); being regularly sick (U4); being inactive (U6); being in hospital (U8; U26; U28); being on work leave (U9); not working (U10); being unemployed

(U11; U17); waiting for surgery (U24); being far from farm (U27).

II. Anxiety level presented by patients regarding answers to questions of the instrument Anxiety Trait/State, before and after nursing intervention mediated by the educational game.

When observing the scores achieved by patients in the evaluation of anxiety trait, the participants presented anxiety median of 37.0. Regarding the evaluation of anxiety state, before and after nursing intervention mediated by educational game, it was found a significant reduction in anxiety level ($p < 0.001$), from a median of 31.0 to 25.0, after application of the game (Figure 2).

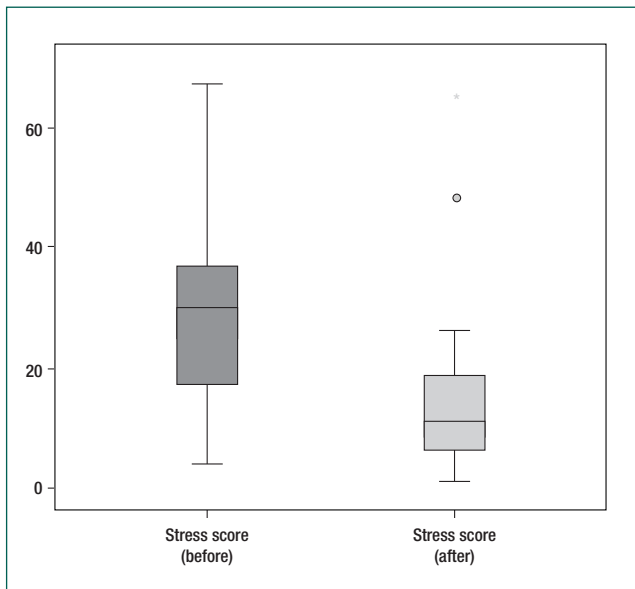


Note: Symbols out of the boxplot represent divergent data. Statistical analysis was carried out using the Wilcoxon test.

Figure 2. Description of the questionnaire's scores regarding anxiety states before and after application of the educational game

III. Stress level presented by patients when answering questions of the Stress Symptoms Instrument (SSI/VAS), before and after nursing intervention mediated by the educational game.

When observing the scores achieved by patients in the evaluation of stress before and after nursing intervention mediated by the educational game, a significant reduction in stress levels ($p < 0.001$) was found, from a median of 30.0 to 11.0 (Figure 3).



Note: Symbols out of the boxplot represent divergent data. Statistical analysis was carried out using the Wilcoxon test.

Figure 3. Description of the scores of the list of stress symptoms before and after application of the educational game

Discussion

The hospitalization process triggers stress and anxiety. This process becomes enhanced when the purpose of hospitalization is to undergo heart surgery, which is an organ socially associated with emotions and life. Therefore, these individuals must be understood as single beings, an open system, which consists of physiological, psychological, sociocultural, developmental, and spiritual variables that constantly interact among themselves and with the environment, and as owners of a basic structure of energy resources that may be depleted without interventions in primary, secondary, and tertiary levels, with prevention in all these levels.⁽²⁾

One study that used Neuman's framework showed that patients hospitalized in ICUs presented stressors caused by the environment, unmet basic human needs, and ineffective relationship processes between nurses and patients.⁽³⁾ The results of the present study showed the nurses' need for drawing on their systematized observations, with a theoretical basis to identify patients' needs, suggesting and negotiating goals, as well as planning and implementing nursing interventions with the aim to reduce stressors, seeking to make patients aware of their current situation.⁽²⁾

When using the educational game as a nursing intervention mediator, a significant reduction was found in anxiety ($p < 0.001$) and stress ($p < 0.001$) levels of preoperative patients undergoing myocardial revascularization.

Authors⁽¹⁷⁾ highlight the importance in using playful ways to improve assimilation of the content approached in the teaching-learning process, as learners verbally express that the use of educational games encourages participation and contributes to knowledge construction. Therefore, educational games are effective instruments in this teaching-learning process, in addition to providing participants with instant emotional gratification.

The development of educational games as a resource in the teaching-learning process for self-care makes nurses aware that care must be dealt with in a playful, creative, and participatory way, effectively integrating learners, which in this context, are patients undergoing preoperative myocardial revascularization.⁽¹⁸⁾

Nursing guidelines based on scientific knowledge and technical expertise, which complement care, when carried out in a didactic and simple way with a holistic and human approach, positively contribute to the teaching-learning process and significantly act in anxiety reduction of patients undergoing surgery, in addition to reducing postoperative pain.^(11,19)

One study carried out with pregnant women using a game in the prenatal teaching-learning process conducted by a nurse, with themes associated with labor, childbirth, puerperium, and breast care making use of colorful pictures associated with each theme, showed that the development of educational technology was relevant, promoting interactivity, dynamism, relaxation, and exchange of knowledge and experiences, which effectively contributed to learning.⁽²⁰⁾

Quality nursing care is of utmost importance in the hospital environment, because nurses have knowledge and strategic resources to fully meet patients' basic human needs, physically and emotionally prepare them for surgery, guiding and encouraging them for self-care, and understanding that these human beings are weakened and vulner-

able to complications that may deplete their basic energy by means of stressors, which may compromise their recovery process.^(3,11)

Betty Neuman, when characterizing the nursing profession as unique, committed to issues that involve and affect responses of individuals to stressors, shows the importance of nurses, since their role is to provide care with a holistic view, valuing the need for maintaining, recovering, or achieving the stability of the system/patients. The coordination of theory with practice enables the identification of stressors by means of the nurse-patient interaction and contributes to the development of confrontation strategies and important prevention levels.⁽²¹⁾

The use of technology in the form of educational games as a mediator of intervention to promote self-care becomes important, because it provides interaction between nurses and individuals, as well as individuals and groups, contributes to comprehensive and dynamic development of cognitive, emotional, and motor areas, in addition to contributing to the development of autonomy, criticism, and creativity of the elements involved.⁽¹⁸⁾

Therefore, nursing intervention mediated by educational games as prevention form according to Neuman's theory, enabled nurses to use this theoretical and methodological framework, creating space for patients to express their human needs affected and situations that were bothering them during preoperative hospitalization. In addition, it enabled nurses to deal with patients' care and stressors, promoting their well-being and preventively acting in all prevention levels, with the aim at preserving energy and the surgical recovery process of these patients. The limitations of the present study were centered on the need for increasing the number of participants in the study and using biological and social markers as one more evaluation method of intervention impacts. The present study brings as a contribution to education, the use of games as educational technology, using education and nursing principles, approaching playful ways in a process of high stressors, aiming at self-care promotion for preoperative myocardial revascularization patients.

Conclusion

In conclusion, nursing intervention mediated by educational game, having Betty Neuman's theory as a theoretical basis, significantly reduced the anxiety and stress levels of preoperative myocardial revascularization patients. This pedagogical strategy in the hospital context is considered relevant, which is presented as a cold, painful, and suffering environment with strict protocols and routines. The use of the educational game resource in this context makes both care and the environment humanized. The contribution of the present study for research lies in the scientific rigor observed and mediated by participatory educational technologies. In addition, it contributes to nursing care, which may be dealt with in a scientific and humanized way, thus generating a successful impact on life care.

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Collaborations

Diniz JSP, Batista KM, Luciano LS, Fioresi M, Amorim MHC, and Bringunte MEO declare that they contributed to the conception of the study, analysis, and interpretation of data, relevant critical review of the intellectual content, and approval the final version to be published.

References

1. Bezerra EP, Oliveira FC, Ramos IC, Moreira RV, Alves MD, Braga VA. Human suffering and nursing care: multiple views. *Esc Anna Nery*. 2014;18(1):175-80.
2. Neuman B. The Neuman systems model. Application to nursing education and practice. Norwalk: Comm Appleton & Long; 1989.
3. Bringunte ME. Estressores e sentimentos vivenciados por pacientes em unidade de terapia intensiva. Vitória: Edufes; 2012. p. 60-4.
4. Quintana JF, Kalil RA. [Heart surgery: feeling of patient before and after surgery]. *Psicol Hosp*. 2012;10(2):17-32. Portuguese.

5. Dias DS, Resende MV, Diniz GC. Patient stress in intensive care: comparison between a coronary care unit and a general postoperative unit. *Rev Bras Ter Intensiva*. 2015; 27(1):18-25.
6. McEwen M, Wills EM. *Bases teóricas para enfermagem*. 2a ed. Rio Grande do Sul; Artmed; 2009.
7. Merhy EE, Feuerwerker LC, Ceccim RB. [Permanent education in health: a strategy for acting upon the micropolitics of the work in health]. *Salud Colectiva*. 2006;2(2):147-60. Spanish.
8. Áfio AC, Balbino AC, Alves MD, Carvalho LV, Santos MC, Oliveira NR. [Analysis of the concept of nursing educational technology applied to the patient]. *Rev Rene*. 2014;15(1):158-65. Portuguese.
9. Moreira AP, Sabóia VM, Camacho AC, Daher DV, Teixeira E. [Educational game of medication administration: a validation study]. *Rev Bras de Enferm*. 2014;67(4):528-34. Portuguese.
10. Cacao LA, Oliveira GU, Maynard LG, Araújo Filho AA, Silva Junior WM, Cerqueira Neto ML, et al. The use of the virtual reality as intervention tool in the postoperative of cardiac surgery. *Rev Bras Cir Cardiovasc*. 2013;28(2):281-9.
11. Costa TM, Sampaio CE. [Nursing guidance and its influence on surgical hospital patients' anxiety levels]. *Rev Enferm UERJ*. 2015; 23(2):260-5. Portuguese.
12. Spielberger CD, Gorsuch RL, Lushene RE. *STAI: manual for the State – Trait Anxiety Inventory*. Palo Alto, California: Consulting Psychological Press; c1970.
13. Spielberger CD, Gorsuch RL, Lushene RE. *Inventário de ansiedade traço-estado - IDATE*. [Tradução e adaptação de Ângela M. Biaggio e Luiz Natalício]. Rio de Janeiro, CEPA - Centro Editor de Psicologia Aplicada. 1979. 60 p.
14. Vasconcelos EG, De Rose Junior D, Barrica AM, Ramirez Garcia LB, Oliveira ST, Matos TC, Vasconcelos BL. O estresse pré competitivo em atletas de aeróbica. In: *Congresso Interno do Instituto de Psicologia*, 3., São Paulo, 1995. Resumos. São Paulo: Instituto de Psicologia da Universidade de São Paulo; 1995. p. 123.
15. Diniz JS. *Tecnologias educacionais para incentivo ao autocuidado de pacientes em pré - operatório de revascularização miocárdica [dissertação]*. Vitória: Universidade Federal do Espírito Santo; 2017.
16. Bottil NC, Carneiro AL, Almeida CS, Pereira CB. [Construction of educational software about personality disorders]. *Rev Bras Enf*. 2012. 64(6):1161-6. Portuguese.
17. Gurge SS, Taveira GP, Matias EO, Pinheiro PNC, Vieira NF, Lima FE. [Educational games: didactic resources utilized at teaching health education classes]. *Rev Min Enferm*. 2017;21:e 1016. Portuguese.
18. Spagnol CA, Oliveira BK, Candian ES, Santos RO, Manoel VC, Moreira AR. [The game as a strategy in the promotion of quality of life in the work of the materials and sterilization centre]. *Rev Enferm Centro Oeste Mineiro*. 2015; 5(2):1562-73. Portuguese.
19. Paiva BC, Sousa CS, Poveda VB, Turrini RN. [Evaluation of the effectiveness of intervention with educational material in surgical patients: an integrative literature review]. *Rev SOBCEC*. 2017; 22(4): 208-17. Portuguese.
20. Alves AC, Figueiredo MF, Sousa NP, Oliveira CJ, Oliveira DR, Sousa WM. [Application of prenatal care light technology: focus on pregnant women's perception]. *Rev Enferm UERJ*. 2013;21(5):648-53. Portuguese.
21. Lima FD. [Betty Neuman Theory in nursing practice the elderly victim of violence]. *Rev Baiana Enferm*. 2014; 28(3):219-24. Portuguese.