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RESEARCH **Open Access**

The Effect of Smartphone-Based Nursing Therapy to Reducing Post Cardiac Surgery

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Abstract

The disease that is the number one cause of death in the world today is heart disease. Actions to overcome the problem of coronary heart disease, one of them with surgery. Pain is a significant issue at all stages of surgery. Post-cardiac surgery discomfort should be manageable with smartphone-based nursing care. The goal of this study was to determine if smartphone-based nursing care may help heart surgery patients feel less pain. The research design used a quasi-experimental pre- and post-control group design. The sample size in this study was 46 respondents, which were divided into 23 respondents in the intervention group and 23 respondents in the control group. The inclusion criteria of this study were cardiac surgery patients on the first day, adult patients receiving paracetamol drip therapy and 1000 mg tablets, and hemodynamic stability. Nursing interventions to deal with pain in this study were carried out using hypnosis and music videos in smartphone-based applications. Research results showed a post-treatment pain score of 2.04 in the intervention group and 4.60 in the control group. Nursing interventions carried out using videos in smartphone-based applications are able to overcome post-cardiac surgery pain, so pain management using smartphones can be an intervention choice to deal with post-cardiac surgery pain. Hypnosis and music nursing interventions using videos on smartphone-based applications can be used as nursing therapy to treat pain after cardiac surgery.

Keywords: Cardiac Surgery, Pain, Smartphone, Nursing Therapy.

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1. INTRODUCTION

Heart disease remains the world's number-one killer and a major public health concern. The WHO estimates that 17.9 million deaths from cardiovascular disease occurred in 2016, which represents 31% of all deaths worldwide. Heart failure is the leading cause of mortality when compared to other medical diagnoses, and it accounts for the majority of heart disease diagnoses, along with coronary heart disease, hypertensive heart disease, and heart failure (Virani et al., 2021).

One of the management options for coronary heart disease is surgery (Zipes, 2018). Both elective and cito surgery are stressful events that require special nursing care (Chandrababu et al., 2017; Smeltzer et al., 2015). Each stage of cardiac surgery has a major problem, namely pain. The surgical nurse has a role in dealing with every patient's pain complaint so that the patient is free from pain. Various types of nursing therapy can treat pain, such as hypnosis and music.

Hypnosis nursing therapy is a technique or practice of influencing someone who intentionally enters into a sleep-like state. In this condition, the hypnotized person can follow orders and accept suggestions without resistance. Hypnosis is a brief cognitive-behavioral technique without specific side effects. Hypnosis involves being introduced to procedures that the subject is told to experience imaginatively. Hypnotic procedures are used to encourage and evaluate responses to suggestions. In the process of hypnosis, one is guided by a hypnotist to receive suggestions from subjective experience and changes in perception, taste, emotion, thought, and behavior (Awaludin et al., 2022). Hypnosis is used by the surgeon to see himself or herself through each of the different parts of the procedure, from start to finish, very easily and pain-free (Awaludin, Nurachmah, & Novitasari, 2020). Hypnosis affects a person's perception and behavior by means of the suggestibility principles, entering a condition known as transhipnosis. There is a significant degree of suggestibility in trance, an altered state of consciousness that differs from regular sleep, unconsciousness, and coma. In 1996, 20 kids were hypnotized by Andrew and Welbury, and they found that in 16 of them who were both hypnotized and under anesthesia at the same time, their sense of pain decreased (Abdeshahi et al., 2013; Eren et al., 2015). Since a long time ago, hypnosis has been successfully applied during eye surgery in a number of instances. Overall, our findings indicate that even though hypnosis in combination with topical anesthetics could not be completely eradicated, patients in the hypnosis group had much better outcomes. Given the individual variances in hypnotic efficacy and pain sensitivity, pain for all patients may make sense. In general, a lot of patients in the hypnosis group showed less pain, less fear, and more cooperation (Chen et al., 2018).

Music therapy is a therapy that uses music or musical elements by a therapist to improve, maintain, or restore physical, mental, emotional, and spiritual health. Music therapy is a complementary therapy (Comeaux & Steele-Moses, 2013). Music that can be used for the healing process is music that is tailored to your wishes, such as classical music, instrumental music (DevarePhadke & HadiyaParkar, 2014), and slow music (Amiri et al., 2017). Listening to music can affect the physiological functions of a person's body, such as breathing, heart rate, and blood pressure (Awaludin, et al., 2020; Heidari et al., 2015). Music relaxes the body, stabilizes the metabolic rate, and fulfills the body's oxygen needs, which affect vital signs such as heart rate, respiratory rate, and blood pressure that are within acceptable ranges (Berman, Snyder & Frandsen, 2016; Peate & Evans, 2020). The release of noradrenaline and adrenaline can be decreased by being relaxed. Reduced levels of the hormone noradrenaline result in lower blood pressure, whereas reduced levels of the hormone adrenaline have the opposite impact on the cardiovascular system, resulting in a reduction in heart rate (Jiménez-Jiménez et al., 2013). Listening to therapeutic music for 30–35 minutes can reduce anxiety and pain and maintain

hemodynamics within normal limits (Ciğerci & Özbayır, 2016; DevarePhadke & HadiyaParkar, 2014).

Providing nursing therapy can be done through smartphone media. The smartphone app provides useful functions that can be integrated into both conventional and modern maintenance manuals. Smartphone applications can also be programmed to respond to critical items in self-assessments to automatically detect significant problems (Bauer et al., 2020; Kim et al., 2016).

Based on this description, to provide nursing services to patients with cardiac surgery in the form of post-cardiac surgery pain management, it is necessary to conduct research on pain interventions in cardiac surgery patients by utilizing the development of smartphone technology. The purpose of this research is to determine the effect of smartphone-based nursing therapy on the pain of cardiac surgery patients.

2. RESEARCH METHOD

This research is a type of experimental research that used a quasi-experimental pre and post control group design. The sample size 46 participants; 23 of them were in the intervention group, and 23 of them were in the control group. The sampling technique used was consecutive sampling. The inclusion criteria of this study were first-day cardiac surgery patients, adult patients receiving paracetamol drip therapy and 1000 mg tablets, and hemodynamically stable patients. The nursing therapy provided in this study is hypnosis and music in smartphone applications. Instruments for measuring pain using the Visual Analogue Scale (VAS). Statistical analysis used the Mann Whitney test.

3. RESULTS AND DISCUSSION

Table 1. Distribution of respondents by age.

Group	n	Mean	SD
Control	23	60	5,7
Intervention	23	58	6,3

Table 1 shows the average age of respondents in the intervention group was 58 years and the control group was 60 years.

Table 2. Distribution of respondents by gender.

Group	Male		Female	
	n	%	n	%
Control	13	56.5	10	43,4
Intervention	15	65,2	8	34,7

Table 2 shows the majority of the gender of the respondents in this study were male.

Table 3. Results of the Pain Scale Mean Difference Test Respondents Between Post-Treatment Groups.

Variable	Intervention Group (Mean)	Control Group (Mean)	p-value
Pain Scale	2.04	4.60	<0.001*

**= p-value < 0.05*

Table 3 shows that the pain scale data between the treatment and control groups after the smartphone-based nursing intervention showed a significant difference (p-value <0.001 (0.05)

The results of the study based on the characteristics of the respondents, according to Table 1 show that the age range in this study was late adulthood and the elderly. With the increasing age of the elderly, degenerative diseases will arise, increasing the risk factors for coronary heart disease (Noale et al., 2020). A similar issue arises with valvular heart disease as well. According to the findings of research conducted in Brazil, individuals with valvular heart disease were 45.3 years old on average. Rheumatic heart disease (RHD) and degenerative valve disease are the most frequent causes; however, they can happen at any age, depending on the reason (Coffey et al., 2021; Tarasoutchi et al., 2020). Increasing age also increases the risk of calcification of the heart valves, causing heart valve dysfunction (Bhatt et al., 2015).

The majority of respondents in this study were male (table 2). Compared to women, men are more likely to have coronary heart disease; contrast this with coronary heart disease in women (Virani et al., 2021). Men who have unhealthy lifestyles, such as smoking, drinking, and unhealthy diets, are more likely to get heart disease (Khalili et al., 2014; Virani et al., 2021). Additionally, it is believed that hormones have a significant role in the prevalence of coronary heart disease. Estrogen and progesterone, which have an impact on the menstrual cycle and menopause, are the hormones that are involved. In addition, it is believed that the use of hormonal contraception may have an impact on the prevalence of coronary heart disease (Khan et al., 2017).

The results of this study showed that the postoperative pain scale on the first day between the treatment and control groups was in the moderate pain category. On the first day of surgery, the patient received morphine analgesic therapy after regaining consciousness, then was extubated, and the morphine therapy was replaced with paracetamol 1000 mg drip up to H on the second day of operation. When the patient was moved to the usual treatment room, the paracetamol 1000 mg drip therapy was replaced with tablets, and the dose was reduced to 500 mg. The analgesic therapy given is in accordance with the theoretical concept. Analgesic therapy given to cardiac surgery patients is in the form of opioid and non-opioid analgesics. The non-opioid type most often used is paracetamol. Non-steroidal anti-inflammatory drugs (NSAIDs), metamizole N-methyl-D-aspartate (NMDA) antagonists, alpha-2 agonists, local anesthetics, and gabapentinoids (Yu et al., 2019).

The analgesic effect is very good when combined with opioid analgesics. This enables an approximate 40%–50% dosage decrease of the opioid, which can lessen the likelihood of side effects from usage. Opioid analgesics are frequently used to relieve postoperative pain, but they have undesirable side effects such as sleepiness and respiratory depression that can prolong the patient's stay in intensive care and postpone extubation. Due to the possibility of renal damage and bleeding in patients undergoing heart surgery, the use of NSAIDs may be restricted (Bigeleisen & Goehner, 2015; Keawnantawat et al., 2017; Zubrzycki et al., 2018).

In this study, video-based smartphone applications were used to deliver nursing interventions for pain management. The findings of this study are consistent with the idea that smartphones are cellular technologies that offer advantages in the medical field, including standardizing therapy, boosting motivation and adherence to therapeutic programs, providing education, and facilitating quick decisions (Soangra & Lockhart, 2021), and observing the interventions provided. Nursing interventions are given to patients according to predetermined programs; nursing therapy videos can be easily accessed and followed by patients via their smartphones (Xu et al., 2019). The limitation of this study is that it only combines two nursing interventions to relieve pain post cardiac surgery.

4. CONCLUSION

Hypnosis and music nursing therapy using videos in smartphone-based applications can significantly overcome post-cardiac surgery pain. The study's findings are consistent with the

idea that smartphones are cellular technologies with advantages in the medical field, including standardizing therapy, boosting motivation and adherence to treatment plans, offering education, and facilitating early decision-making. Patients using cellphones can readily obtain and follow smartphone-based nursing interventions.

REFERENCES

Abdeshahi, S. K., Hashemipour, M. A., Mesgarzadeh, V., Payam, A. S., & Monfared, A. H. (2013). Effect of hypnosis on induction of local anaesthesia, pain perception, control of haemorrhage and anxiety during extraction of third molars: a case–control study. *Journal of Cranio-Maxillofacial Surgery*, *41*(4), 310–315. https://doi.org/10.1016/j.jcms.2012.10.009

Amiri, M. J., Sadeghi, T., & Negahban Bonabi, T. (2017). The effect of natural sounds on the anxiety of patients undergoing coronary artery bypass graft surgery. *Perioperative Medicine*, *6*, 17. https://doi.org/10.1186/s13741-017-0074-3

Awaludin, S., Nurachmah, E., & Novitasari, D. (2020). Hypnosis is a surgical pain intervention: a systematic review. *1st International Conference on Community Health (ICCH 2019)*, 276–284. https:doi.org/ 10.2991/ahsr.k.200204.059

Awaludin, S., Nurachmah, E., Soetisna, T. W., & Umar, J. (2022). The effect of a smartphone-based perioperative nursing intervention: Prayer, education, exercise therapy, hypnosis, and music toward pain, anxiety, and early mobilization on cardiac surgery. *Journal of Public Health Research*, *11*(2), jphr-2021. https://doi.org/10.4081/jphr.2021.2742

Awaludin, S., Sumeru, A., Alivian, G. N., & Novitasari, D. (2020). The Effect of Sikkomodo (Combination of Music, Humor, and Prayer) Formulation Toward Blood Pressure of Hypertension Patient on The Elderly Group in Banyumas Regency. *SHS Web of Conferences*, *86*, 1002. https://doi.org/10.1051/shsconf/20208601002

Bauer, M., Glenn, T., Geddes, J., Gitlin, M., Grof, P., Kessing, L. V, Monteith, S., Faurholt-Jepsen, M., Severus, E., & Whybrow, P. C. (2020). Smartphones in mental health: a critical review of background issues, current status and future concerns. *International Journal of Bipolar Disorders*, *8*, 2. https://doi.org/10.1186/s40345-019-0164-x

Berman, A., Snyder, S. J., & Frandsen, G. (2016). *Kozier & Erb's. of Fundamentals Nursing Concepts, Process, and Practice* (10th ed.). England: Pearson Education, Inc.

Bhatt, H., Sanghani, D., Julliard, K., & Fernaine, G. (2015). Is mitral annular calcification associated with atherosclerotic risk factors and severity and complexity of coronary artery disease? *Angiology*, *66*(7), 659–666. https://doi.org/10.1177/0003319714550239

Bigeleisen, P. E., & Goehner, N. (2015). Novel approaches in pain management in cardiac surgery. *Current Opinion in Anesthesiology*, *28*(1), 89–94. https://doi.org/10.1097/ACO.0000000000000147

Chandrababu, R., Nayak, B. S., Pai, V. B., Patil, N. T., George, A., George, L. S., & Devi, E. S. (2017). Effect of complementary therapies in patients following cardiac surgery. *Holistic Nursing Practice*, *31*(5), 315–324. https://doi.org/10.1097/HNP.0000000000000226

Chen, X., Yuan, R., Chen, X., Sun, M., Lin, S., Ye, J., & Chen, C. (2018). Hypnosis intervention for the management of pain perception during cataract surgery. *Journal of Pain Research*, 1921–1926. https://doi.org/10.2147/JPR.S174490

Ciğerci, Y., & Özbayır, T. (2016). The effects of music therapy on anxiety, pain and the amount of analgesics following coronary artery surgery. *Turkish Journal of Thoracic and Cardiovascular Surgery*, *24*(1), 44-50. https://doi.org/10.5606/tgkdc.dergisi.2016.12136

Coffey, S., Roberts-Thomson, R., Brown, A., Carapetis, J., Chen, M., Enriquez-Sarano, M., Zühlke, L., & Prendergast, B. D. (2021). Global epidemiology of valvular heart disease.

Nature Reviews Cardiology, *18*(12), 853–864. https://doi.org/10.1038/s41569-021-00570-z

Comeaux, T., & Steele-Moses, S. (2013). The effect of complementary music therapy on the patient's postoperative state anxiety, pain control, and environmental noise satisfaction. *Medsurg Nursing*, *22*(5),313-318.

DevarePhadke, S., & HadiyaParkar, S. (2014). Effect of music intervention on immediate post operative coronary artery bypass graft surgery (CABG) patients. *Indian Journal of Physiotherapy & Occupational Therapy*, *8*(4), 106-111.

Eren, G., Dogan, Y., Demir, G., Tulubas, E., Hergunsel, O., Tekdos, Y., Dogan, M., Bilgi, D., & Abut, Y. (2015). Hypnosis for sedation in transesophageal echocardiography: a comparison with midazolam. *Annals of Saudi Medicine*, *35*(1), 58–63. https://doi.org/10.5144/0256-4947.2015.58

Heidari, S., Babaii, A., Abbasinia, M., Shamali, M., Abbasi, M., & Rezaei, M. (2015). The effect of music on anxiety and cardiovascular indices in patients undergoing coronary artery bypass graft: a randomized controlled trial. *Nursing and Midwifery Studies*, *4*(4), e31157. https://doi.org/10.17795/nmsjournal31157

Jiménez-Jiménez, M., García-Escalona, A., Martín-López, A., De Vera-Vera, R., & De Haro, J. (2013). Intraoperative stress and anxiety reduction with music therapy: A controlled randomized clinical trial of efficacy and safety. *Journal of Vascular Nursing*, *31*(3), 101–106. https://doi.org/10.1016/j.jvn.2012.10.002

Keawnantawat, P., Thanasilp, S., & Preechawong, S. (2017). Translation and validation of the Thai version of a modified brief pain inventory: a concise instrument for pain assessment in postoperative cardiac surgery. *Pain Practice*, *17*(6), 763–773. https://doi.org/10.1111/papr.12524

Khalili, D., Haj Sheikholeslami, F., Bakhtiyari, M., Azizi, F., Momenan, A. A., & Hadaegh, F. (2014). The incidence of coronary heart disease and the population attributable fraction of its risk factors in Tehran: a 10-year population-based cohort study. *PloS One*, *9*(8), e105804. https://doi.org/10.1371/journal.pone.0105804

Khan, N. S., Shehnaz, S. I., Guruswami, G. K., Ibrahim, S. A. M., & Mustafa, S. A. J. (2017). Knowledge of warning signs, presenting symptoms and risk factors of coronary heart disease among the population of Dubai and Northern Emirates in UAE: a cross-sectional study. *Nepal Journal of Epidemiology*, *7*(2), 670-680. https://doi.org/10.3126/nje.v7i2.17973

Kim, K., Pham, D., & Schwarzkopf, R. (2016). Mobile Application Use in Monitoring Patient Adherence to Perioperative Total Knee Arthroplasty Protocols. *Surgical Technology International*, *28*, 253–260.

Noale, M., Limongi, F., & Maggi, S. (2020). Epidemiology of cardiovascular diseases in the elderly. *Frailty and Cardiovascular Diseases: Research into an Elderly Population*, 29–38. https://doi.org/10.1007/978-3-030-33330-0_4

Peate, I., & Evans, S. (2020). *Fundamentals of anatomy and physiology: For nursing and healthcare students*. John Wiley & Sons.

Smeltzer, S. ., Bare, B. ., Hinkle, J. L., & Cheever, K. . (2015). Handbook for Brunner and Suddarth's Textbook of Medical-Surgical Nursing. *Lippincott Williams & Wilkins*.

Soangra, R., & Lockhart, T. (2021). Smartphone-based prediction model for postoperative cardiac surgery outcomes using preoperative gait and posture measures. *Sensors*, *21*(5), 1704. https://doi.org/10.3390/s21051704

Tarasoutchi, F., Montera, M. W., Ramos, A. I. de O., Sampaio, R. O., Rosa, V. E. E., Accorsi, T. A. D., Santis, A. de, Fernandes, J. R. C., Pires, L. J. T., & Spina, G. S. (2020). Update of the Brazilian Guidelines for Valvular Heart Disease–2020. *Arquivos Brasileiros de*

Cardiologia, *115*, 720–775. https://doi.org/10.36660/abc.20201047

Virani, S. S., Alonso, A., Aparicio, H. J., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Cheng, S., Delling, F. N., Elkind, M. S. V., Evenson, K. R., Ferguson, J. F., Gupta, D. K., Khan, S. S., Kissela, B. M., Knutson, K. L., Lee, C. D., Lewis, T. T., Liu, J., … American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee (2021). Heart Disease and Stroke Statistics-2021 Update: A Report From the American Heart Association. *Circulation*, *143*(8), e254–e743. https://doi.org/10.1161/CIR.0000000000000950

Xu, L., Li, F., Zhou, C., Li, J., Hong, C., & Tong, Q. (2019). The effect of mobile applications for improving adherence in cardiac rehabilitation: a systematic review and meta-analysis. *BMC Cardiovascular Disorders*, *19*, 166. https://doi.org/10.1186/s12872-019-1149-5

Yu, H., Zheng, J.-Q., Hua, Y.-S., Ren, S.-F., & Yu, H. (2019). Influence of volatile anesthesia versus total intravenous anesthesia on chronic postsurgical pain after cardiac surgery using the initiative on methods, measurement, and pain assessment in clinical trials criteria: study protocol for a prospective randomized controlled trial. *Trials*, *20*, 645. https://doi.org/10.1186/s13063-019-3742-4

Zipes, D. P. (2018). Braunwald's heart disease: a textbook of cardiovascular medicine. *BMH Medical Journal*, *5*(2), 63.

Zubrzycki, M., Liebold, A., Skrabal, C., Reinelt, H., Ziegler, M., Perdas, E., & Zubrzycka, M. (2018). Assessment and pathophysiology of pain in cardiac surgery. *Journal of Pain Research*, 1599–1611. https://doi.org/10.2147/JPR.S162067