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DIFFERENCES IN ANXIETY LEVELS BETWEEN CHEWING GUM AND LEMON INHALATION AROMATHERAPY IN HEMODIALYSIS PATIENTS

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ABSTRACT

End-stage kidney disease requires long-term management and renal replacement therapy such as hemodialysis (HD), peritoneal dialysis, or transplantation. Patients with chronic kidney disease who undergo regular hemodialysis therapy can increase life expectancy; however, hemodialysis therapies can cause stressors leading to psychological problems. This research aims to determine the difference in anxiety levels between chewing gum and lemon inhalation aromatherapy in hemodialysis patients. Furthermore, this research uses a quantitative quasi-experiment research approach with a two-group pre-posttest design, while a purposive sampling technique employs 32 samples at the Hemodialysis Unit of Permata Medika Hospital, Semarang. In addition, data analysis uses the Wilcoxon signed test and the Mann-Whitney test. The research was conducted in July 2023. The research results show that the Wilcoxon test p-value for both interventions was 0.001, and the Mann-Whitney test p-value was 0.494. It can be concluded that there was no difference in anxiety levels between chewing gum and lemon inhalation aromatherapy in hemodialysis patients. The use of non-pharmacological techniques of chewing gum and lemon inhalation aromatherapy can reduce patient anxiety levels during hemodialysis.

Keywords: Anxiety; Aromatherapy; Chewing Gum; Hemodialysis

BACKGROUND

End-stage kidney disease is a worldwide public health issue because patients must continue to get hemodialysis (HD) for the rest of their lives.. In 2016, End-stage kidney disease disease was ranked fifth on a global scale and is expected to be ranked fifth as the leading cause of death by 2040 (Jager et al., 2019). The number of people living with Chronic Kidney Disease (CKD), Acute Kidney Injury (AKI), and Renal Replacement Therapy (RRT) surpasses 850 million, which is more than double the anticipated number of people living with diabetes mellitus and AIDS/HIV worldwide (Jager et al., 2019). Over the last two decades, chronic kidney disease has been one of the leading causes of death globally (Kovesdy, 2022). End-stage renal disease is more likely in patients with a history of diabetes, hypertension, and hypercholesterolemia (Hidayati, Adiningrat, & Akrom, 2019).

The end-stage kidney disease exhibits somatic symptoms that result in reduced health-related quality of life and lifestyle limitations. Ultimately, patients with end-stage kidney disease experience psychological stress (C. W. Huang et al., 2020). Chronic kidney disease damages the filtering system of the kidneys and nephrons, causing a decrease in the ability to eliminate metabolic waste and a buildup of urea in the blood, which can poison all organs. Long-term care and renal replacement therapy, such as hemodialysis (HD), peritoneal dialysis, or transplantation, are necessary for end-stage kidney disease (Qawaqzeh, Masa'deh, Hamaideh, Alkhawaldeh, & ALBashtawy, 2023). Hemodialysis is a procedure for removing blood from the patient's body and circulating it in a machine outside the body (dialyzer) (Rahman & Pradido, 2020). Kidney hemodialysis therapy takes 4-5 hours for one cycle. Hemodialysis will result in changes in quality of life, so patients need to adapt to their physical condition. Although hemodialysis is the main treatment for end-stage kidney disease, it also causes psychosocial problems. Anxiety is brought on by financial difficulties, therapy-related stress, managing diet, and familial issues in hemodialysis patients (Barati, Nasiri, Akbari, & Sharifzadeh, 2016). The higher incidence of chronic kidney disease is in line with the increasing costs of hemodialysis therapy the patients must undergo throughout their lives (Cahyati & Rosdiana, 2022).

Patients receiving hemodialysis frequently experience anxiety, which makes it difficult for them to take their medications, manage their fluids, and take care of themselves. Patients with end-stage kidney disease may experience psychological issues such as anxiety. Anxiety manifests physically as headaches, restlessness, perspiration, and palpitations in addition to feelings of stress and tension (Barati et al., 2016). Hemodialysis machine alarms, central venous catheter insertion, needle insertion into fistulas, and patient loneliness during hemodialysis are some of the factors that contribute to anxiety in these patients (Zibaei, Nobahar, & Ghorbani, 2020). Accepting one's physical and physiological state as a crucial therapeutic tool for treating pathological, psychological, emotional, and social issues is

the first step toward practicing self-care. The treatment of hemodialysis patients cannot be sufficiently effective to produce the intended therapeutic outcomes if patients are not included and self-care activities are not implemented (Zibaei et al., 2020). Chewing sugar-free gum can help hemodialysis patients with dry mouth, but it had no effect on dialysis-related weight gain or thirst. Due to its affordable price and tasty flavor, sugar-free chewing gum has been popular among hemodialysis patients; nonetheless, there is ongoing debate regarding its potential therapeutic benefits (Y.-Q. Huang, Xiong, & Jin, 2019).

The aromatherapy types commonly used are roses, lavender (*Lavandula*), bergamot, oranges, and lemons. One of the interventions carried out to overcome anxiety is providing aromatherapy (rose, lavender, lemon). Anxiety activates the sympathetic nervous system and releases stress-related hormones, namely ortisol and adrenaline, which can increase pain levels (Skandurra et al., 2022). For convenience and cost, non-pharmacological treatments like massage, acupuncture, aromatherapy, and relaxation techniques are now being used. Prior studies compared the effects of five drops of either lavender or citron aurantium essential oils for thirty minutes to the anxiety and agitation of conscious patients admitted to the intensive care unit (ICU) with a placebo control group. Five drops of either lavender or citrus aurantium essential oil were provided to each aromatherapy group, and they were each allowed to inhale for thirty minutes. For 30 minutes, 5 drops of regular saline were administered to the placebo group. Following the intervention, the lavender and citrus aurantium groups experienced much less anxiety than the placebo group. The anxiety levels of the lavender and citrus aurantium groups did not significantly differ from one another. The study's findings demonstrate that aromatherapy with lavender and citrus aurantium helps patients receiving ICU treatment feel less anxious (Karimzadeh, Forouzi, Ahmadinejad, & Dehghan, 2021). Patient anxiety is greatly decreased by citrus aurantium. Essential oil of orange aurantium has calming properties, elevates mood, and activates the central nervous system (Razieh Shirzadegan, Gholami, Hasanvand, & Beiranvand, 2020). The mean differences in trait anxiety scores (pre- and post-intervention) do not depend on factors such as gender, age, education level, marital status, reason for starting dialysis, or length of treatment. This is demonstrated by earlier studies that found that the intervention group's four weeks of breathing rose water aromatherapy helped lower anxiety during hemodialysis treatment (Barati et al., 2016). Research on two groups, one using an effleurage massage and a combination of essential oils from Matricaria recutita L and Lavandula angustifolia mill, demonstrated the efficacy of aromatherapy. The control group, meanwhile, was only given effleurage massages. The 14 sessions, which take place once a week, last 30 minutes each. Consequently, there was a noteworthy 30% and 12% decrease in stress and anxiety levels in the intervention group. By contrast, the control group saw a lesser decrease in stress and anxiety levels of 2.6% and 3.3%, respectively (Paula, Luis, Pereira, & Maria Joao, 2017).

Preliminary studies in the Hemodialysis Room at Permata Medika Hospital Semarang in March 2023 on 10 intra-hemodialysis patients show that two patients experienced mild anxiety with a score of 30-40 (State-Trait Anxiety Inventory questionnaire). They underwent hemodialysis for the first time, accompanied by family. Furthermore, three patients experienced moderate anxiety with a score of 41-50 and no family to accompany them. Four patients experienced severe anxiety with a score of 51-80 due to fear of hemodialysis complications they had experienced. Finally, one patient was not anxious since a family member was accompanying, and this was not the first hemodialysis procedure. This condition can affect the psychological condition of chronic kidney disease patients when undergoing hemodialysis therapy. In addition, the nurses need to provide an intervention to reduce anxiety and provide a sense of comfort for patients undergoing hemodialysis to make chronic kidney disease patients carry out the therapy more easily.

METHOD

The research method used in this study is a quasi-experimental two-group pre-posttest design. The research respondents are 47 hemodialysis patients at Permata Medika Hospital, Semarang, divided into 2 intervention groups: chewing gum and lemon inhalation aromatherapy. The inclusion criteria for respondents include the general condition of the respondent being stable, having no problems with the mouth or smell, having no allergies, and having anxiety. Exclusion criteria are patients with shortness of breath, uncooperative patients, and patients with sensitive skin.

This study uses the State-Trait Anxiety Inventory (STAI) anxiety level questionnaire by Spielberger (1983) (Zsidoa, Telekia, Csokasia, Rozsab, & Bandia, 2020), modified in Indonesian with correlation index results ranging from 0.196 to 0.664 and a reliability of 0.890. Research data were collected in July 2023. The research was carried out in the hemodialysis unit at Permata Medika Hospital, Semarang. Researchers conducted a pre-test using the STAI questionnaire on respondents. The intervention is given to each group after 30 minutes of hemodialysis. The patients in the intervention group chew 2 pieces of xylitol gum (not to be swallowed) for ± 10 minutes. Meanwhile, the other group of patients get aromatherapy for 30 minutes every time they undergo hemodialysis. Lemon aromatherapy is presented as tissue or gauze that has been dripped with oil (3 drops or 0.3 ml) and placed right next to the respondent's

pillow at a distance of 20-30 cm from the respondent's nose. Respondents are asked to inhale the aroma during the hemodialysis process. The intervention is given every time the patients undergo hemodialysis at 4 meetings for two weeks. After two weeks, a post-test is conducted to measure the patient's anxiety level with the STAI questionnaire after 30 minutes of intervention.

Univariate data analysis includes respondent characteristics (age, gender, education). These characteristics are displayed in a frequency distribution. Bivariate data analysis in the study uses the Wilcoxon test to determine hemodialysis patients' anxiety before being given intervention in each gum-chewing group and lemon inhalation aromatherapy group. The Mann-Whitney test is employed to determine the difference in anxiety levels between chewing gum and lemon inhalation aromatherapy in hemodialysis patients with the SPSS 22 application. This research has received approval from the ethics committee of Widya Husada University Semarang No. 68/EC-LPPM/UWHS/VIII-2023.

RESULT AND DISCUSSION

Table 1 shows negative rank values for 15 respondents and tie values for 1 respondent, meaning there was a decrease in anxiety scores between the pretest and posttest, and 1 respondent had the same score between the pretest and posttest. There was an influence on the anxiety level of hemodialysis patients before and after being given the chewing gum intervention. The research results show negative rank values for 14 respondents and tie values for 2 respondents, meaning there was a decrease in anxiety scores between the pretest and posttest, and 2 respondents had the same scores between the pretest and posttest. There was an influence on the anxiety level of hemodialysis patients before and after being given the lemon aromatherapy inhalation intervention. The research results show that the Mann-Whitney test obtained a p-value of 0.494 ($p > 0.05$), which means that Ha is rejected, and Ho is accepted. In addition, there was no difference in anxiety levels between chewing gum and inhaling lemon aromatherapy in hemodialysis patients.

Table 1. Differences in Anxiety Levels Between Chewing Gum and Lemon Inhalation Aromatherapy in Hemodialysis Patients

	Negative Ranks	Positive Ranks	Ties	n	*p*-Value
Chewing Gum	15	0	1	16	0,494
Lemon Inhalation Aromatherapy	14	0	2	16	

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The safest gum to chew is sugar-free gum that contains xylitol. Xylitol is a natural sweetener that helps reduce stress and anxiety (Rajapaksha et al., 2019). It also helps reduce cravings for sweet foods, plaque, and cavities (Nassar, 2017). However, it should be noted that chewing gum excessively every day can cause jaw pain and headaches. Chewing gum can reduce anxiety levels in certain situations due to the release of endorphins that are triggered when chewing gum. Candy containing xylitol is a natural sweetener that can help relax the body. Meanwhile, chewing gum containing chamomile is an herbal medicine that contains sedatives. These two ingredients combined can help reduce feelings of stress and anxiety. Chewing gum helps calm and focus the mind, reduces symptoms of depression, increases self-confidence by reducing anxiety, and provides a feeling of calm and relaxation. Additionally, chewing gum increases saliva production, which can help reduce tooth decay and freshen breath (Luo, Xia, & Zhang, 2022).Chewing gum can reduce salivary cortisol levels. In this case, the chewing movement can reduce anxiety because this movement can reduce muscle tension and energy produced through chewing. This process occurs at the beginning of digestion and increases saliva flow, which causes cortisol levels to decrease and is followed by a decrease in anxiety levels.

One hundred students who were given the intervention of chewing gum prior to the exam in order to reduce exam stress and improve exam performance were the subjects of the study. Gum chewing helps ease anxiety and tension. Gum chewing helps to enhance short-term memory. However, chewing gum can lead to jaw stress, headaches, and

digestive issues, therefore it is not advised for pupils who struggle with concentration over the long run. Chewing gum to relieve anxiety has the potential to develop into a habit that could become addictive (Yaman-Sozbir, Ayaz-Alkaya, & Bayrak-Kahraman, 2019). Students who chewed gum for 20 minutes a day reported less stress overall, with the biggest benefits occurring when they had a heavy workload (Smith & Clayton, 2020). While chewing gum reduces beforehand anxiety without raising the risk of pulmonary aspiration, it does aid women experiencing gynecological preoperative anxiety and dry mouth during the preoperative fasting period (Bang, Lee, Kim, Lee, & Min, 2022).

Aromatherapy is a simple and effective method for dealing with anxiety. Aromatherapy involves the use of the psychological, physiological, and medicinal effects of essential oils to improve the patient's condition. Aromatherapy can regulate emotions positively, control anxiety, reduce depression, and stimulate or strengthen memory. The particles in aromatherapy stimulate the olfactory nerves and then begin to be sent to the limbic system. Stimulation sent to the limbic system can stimulate the hypothalamus and then stimulate the vagus nerve. The vagus nerve conveys its parasympathetic signals to the heart, which then reduces the frequency and contractility of the heart. Hence, aromatherapy data provides a feeling of relaxation and calm in patients with anxiety (Soleimani, Kashfi, Mirmohamadkhani, & Ghods, 2022).

The study results show that the patient's anxiety can be overcome with lemon inhalation aromatherapy intervention. There were tie scores of 2 respondents who did not have a change in category in the pretest and posttest in providing this intervention even though there was a decrease in scoring values. This was due to the length of time hemodialysis was carried out routinely and continuously, making the patient bored and anxious. Meanwhile, there was a negative rank value of 14 respondents and a positive rank of 0, meaning that there was a decrease in the anxiety level value from pretest to posttest in a positive direction. One of the substances contained in lemon is linalool which is useful for stabilizing the nervous system to have a calming effect and reduce a person's anxiety level. Factors that influence reducing anxiety when giving aromatherapy include the content contained in lemon, the accuracy of the method of administration, the duration of administration, the quality of the essential oil, and the right dose so as not to cause side effects such as nausea and dizziness.

Reducing preoperative anxiety in individuals who are waiting for surgery can be achieved with the use of aromatherapy. When it came to reducing preoperative anxiety, shorter sessions (≤20 minutes) of aromatherapy performed better than longer sessions (>20 minutes) (Guo et al., 2020). Physiological measurements of vital indicators, such as blood pressure, heart rate, respiration rate, pulse rate, and saturation, can be used to objectively determine the degree of anxiety following lavender oil inhalation (Yoo & Park, 2023). Acute coronary syndrome patients experience anxiety, an unpleasant emotion that raises the heart's oxygen demand. Elevations in anxiety levels have been shown to alter blood pressure, pulse rate, respiratory rate, and myocardial oxygen consumption via raising plasma concentrations of adrenaline and norepinephrine (Soleimani et al., 2022).

Moreover, chewing gum and lemon aromatherapy inhalation interventions are effective for hemodialysis patients who experience anxiety. This is because the two interventions are relatively easy to implement and have cheap ingredients and can be found anywhere. However, comparing both interventions shows neither of which is superior.

CONCLUSION AND SUGGESTION

The study results show no difference in the level of anxiety between chewing gum and lemon inhalation aromatherapy for hemodialysis patients. The Mann-Whitney test shows the p-value is 0.494 (P > 0.05). The limitations of this study show that researchers were unable to explore in more depth other factors that could cause chronic kidney disease patients to experience anxiety when undergoing hemodialysis therapy. The results of this research can be used as evidence-based nursing practice for nurses in hemodialysis rooms regarding the use of non-pharmacological techniques by chewing gum and lemon inhalation aromatherapy on patient anxiety levels.

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