

The Effect Of Garputala Auditory Sensory Stimulation On The Acceleration Of Consciousness In Postoperative Patients Who Underwent General Anesthesia In The Recovery Room At Keluarga Sehat Pati Hospital

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Abstract. Sensory stimulation therapy given to patients who experience impaired consciousness is able to increase mobility responses in the presence of sensory stimulation. The five sense functions of patients who are experiencing decreased consciousness can also immediately respond to the stimulation that has been given. The way sensory stimulation works is by providing a stimulus or stimuli that can create a perception that can cause a reaction from the patient. Researchers used a tuning fork to speed up consciousness because the tuning fork has a buzzing sound in the respondent's ear, so it will be stimulated to the patient's brain to be transmitted to the central nervous system. The aim of this research is to determine the effect of tuning fork auditory sensory stimulation on the acceleration of post-operative patient awareness using general anesthesia in the Recovery Room at the Pati Sehat Family Hospital. The research method used in this research uses a quasi-experimental method with a One-Group Pre Test – Post Test Design approach. The sample used was 36 respondents using purposive sampling technique. The Wilcoxon test results show that the p value is 0.000, less than 0.05, so these results can be interpreted as indicating that there is an influence of auditory sensory stimulation of the tuning fork on the acceleration of post-operative patient awareness using general anesthesia in the Recovery Room at the Pati Sehat Family Hospital.

Keywords: Auditory Fork Sensory Stimulation, Awareness, Post-Operationa

INTRODUCTION

Level of consciousness is one of the indicators of emergency status and prognosis in postoperative patients undergoing general anesthesia. Critically ill patients experience both physiological and psychological changes; therefore, critical care nurses play a central role in understanding these changes, identifying nursing problems, and determining appropriate interventions. Physiological changes occurring in patients with impaired consciousness include disturbances in meeting basic needs, such as respiratory disorders, impaired physical mobility, fluid imbalance, swallowing difficulties, communication impairment, and elimination problems. Quantitative assessment of consciousness level commonly used in emergency and critical care settings is the Glasgow Coma Scale (GCS) (Potter, 2020).

Data from the World Health Organization (WHO) indicate that surgical care has been an essential component of healthcare worldwide for more than a century. It is estimated that approximately 230 million surgical procedures, including both minor and major surgeries, are performed annually worldwide. In the United States, the incidence of postoperative complications associated with general anesthesia is approximately 2%–4% among surgical patients each year (Aziz, 2020). In Indonesia, the prevalence of postoperative effects of general anesthesia ranges from 2.3% to 18.3% (Putra *et al.*, 2019). The reported percentages of postoperative general anesthesia-related effects were 12% in 2017, 5.9% in 2018, and 5.6% in 2019.

Central Java Province ranks first in surgical cases involving general anesthesia, predominantly cesarean section procedures, accounting for 23% or 21,321 cases, while Pati Regency recorded 8,489 surgical cases (7%) (Pati Health Office, 2021). The management of anesthesia-related complications in the recovery room may involve both pharmacological treatment and complementary therapies as adjunctive interventions. Complementary therapies can be implemented through music therapy or tuning fork stimulation to stimulate the patient's auditory senses (Rusnoto *et al.*, 2017).

According to Potter (2020), sensory stimulation is one form of complementary therapy that may accelerate the recovery of consciousness in postoperative patients. Nurses may provide sensory stimulation as an environmental and mood-modifying intervention to promote patient comfort, relaxation, and consciousness recovery. The researchers were interested in conducting this study because one of the common effects of general anesthesia is physical weakness associated with decreased consciousness. Appropriate management is therefore necessary to prevent complications, one of which is sensory stimulation therapy.

Sensory stimulation therapy administered to patients with impaired consciousness has been shown to improve responsiveness through sensory input. The sensory functions of patients experiencing decreased consciousness may respond more rapidly following sensory stimulation. Sensory stimulation works by providing stimuli that generate perceptions capable of eliciting physiological responses in patients. In this study, a tuning fork was used to facilitate the recovery of consciousness because the humming sound produced by the tuning fork stimulates the auditory system and transmits sensory impulses to the brain and central nervous system. This theory is supported by the findings of Septiani (2018) in the study entitled "Auditory Stimulation in Patients with Head Injury and Decreased Consciousness The study concluded that auditory stimulation using a tuning fork significantly improved the level of consciousness among patients with head injuries. Therefore, tuning fork auditory stimulation may be recommended as an adjunctive non-pharmacological therapy for patients experiencing decreased consciousness.

Data obtained from Keluarga Sehat Hospital, Pati, revealed that postoperative patients transferred from the Central Surgical Installation (Operating Theater) to the Recovery Room require close monitoring. The number of postoperative patients receiving general anesthesia was 38 in September 2023, 34 in October 2023, and 44 in November 2023, with an average of 39 patients per month (Medical Records Department, Keluarga Sehat Hospital, Pati, 2023).

Postoperative patients in the Recovery Room commonly exhibit increased heart rate, decreased body temperature, rapid and deep respiration, pale lips and conjunctiva, generalized weakness, and decreased consciousness. Currently, postoperative patients in the Recovery Room at Keluarga Sehat Hospital, Pati, receive only vital signs monitoring and stimulation using eucalyptus oil, resulting in relatively slow recovery of consciousness. A preliminary study conducted by the researchers on December 8, 2023, involved direct observation using the Glasgow Coma Scale (GCS) in five postoperative patients who experienced decreased consciousness following general anesthesia in the Operating Theater of Keluarga Sehat Hospital, Pati.

These conditions represented expected postoperative effects of anesthesia administered according to surgical procedures. Recovery of consciousness varied among patients. Three patients (60%) presented with a GCS score of 7 during the first 10 minutes after admission to the Recovery Room and regained consciousness within 30 minutes, although they continued to experience physical weakness. One patient (20%) presented with a GCS score of 8 within the first 10 minutes and regained consciousness within one hour. Another patient (20%) presented with a GCS score of 7 during the first 10 minutes and achieved full consciousness after one hour and ten minutes.

Based on the foregoing, the researchers were interested in conducting a study entitled "The Effect of Auditory Sensory Stimulation Using a Tuning Fork on the Recovery of Consciousness in Postoperative Patients Receiving General Anesthesia in the Recovery Room at Keluarga Sehat Hospital, Pati".

METHODS

This study aimed to determine the effect of auditory sensory stimulation using a tuning fork on the recovery of consciousness in postoperative patients receiving general anesthesia in the Recovery Room at Keluarga Sehat Hospital, Pati. Therefore, a quasi-experimental research method was employed. Quasi-experimental research is a type of study that allows researchers to manipulate variables and examine their effects (Nursalam, 2019). The study used a One-Group Pretest–Posttest Design. This design examines causal relationships by involving a single group of participants who are observed before and after the intervention. No control group was included because the study employed a one-group observational approach.

The study population consisted of postoperative patients who received general anesthesia. There were 38 patients in September 2023, 34 patients in October 2023, and 44 patients in November 2023, with an average of 39 patients per month (Medical Records Department, Keluarga Sehat Hospital, Pati, 2023). A sample is defined as a subset or representative portion of the population under investigation. Research findings derived from a sample are intended to be generalized to the target population (Arikunto, 2019). The present study included 36 respondents. Samples were selected using purposive sampling, a non-probability sampling technique in which researchers determine participants based on

specific characteristics relevant to the study objectives to address the research problem appropriately (Sugiyono, 2019).

Data were analyzed using SPSS software to describe the characteristics of the collected data through frequency distributions of respondents' age, sex, educational level, occupation, and levels of consciousness before and after auditory sensory stimulation using a tuning fork. Bivariate analysis was conducted to examine the effect of auditory sensory stimulation using a tuning fork on the recovery of consciousness among postoperative patients receiving general anesthesia in the Recovery Room at Keluarga Sehat Hospital, Pati, using the Wilcoxon Signed-Rank Test. The Wilcoxon test is a non-parametric statistical test used to determine whether there is a significant difference between paired observations (Riwidikdo, 2017). A $p\text{-value} \leq 0.05$ indicated rejection of the null hypothesis (H_0) and acceptance of the alternative hypothesis (H_1), demonstrating a statistically significant effect of auditory sensory stimulation using a tuning fork on the recovery of consciousness among postoperative patients receiving general anesthesia in the Recovery Room at Keluarga Sehat Hospital, Pati.

RESULTS AND DISCUSSION

Results

Respondent Characteristics

Table 1 Frequency Distribution by Age of Respondents in the Recovery Room at the Pati Healthy Family Hospital

Age	Frequency	%
Adolescent (12-25 Year)	15	41,7
Adults (26-45 Year)	21	58,3
Total	36	100

Gender

Table 2 Frequency Distribution by Gender of Respondents in the Recovery Room of the Healthy Family Hospital, Pati.

Gender	Frequency	%
Males	17	47,2
Females	19	52,8
Total	36	100

Respondent Education

Table 3 Frequency Distribution Based on Respondent Education in the Recovery Room of the Healthy Family Hospital, Pati

Education	Frequency	%
Elementary School	6	16,7
Junior High School	8	22,2
Senior High School	22	61,1
Total	36	100

Occupation

Table 4 Frequency Distribution Based on Respondents Occupation in the Recovery Room of the Pati Healthy Family Hospital

Occupation	Frequency	%
Unemployed	14	38,9
Farmer	5	13,9
self-employed	17	47,2
Total	36	100

Acceleration of Consciousness before Tuning Fork Sensory-Auditory Stimulation

Table 5 Frequency Distribution Based on Acceleration of Consciousness before Tuning Fork Sensory-Auditory Stimulation in the Recovery Room at the Pati Healthy Family Hospital

Acceleration of Consciousness before Tuning Fork Sensory-Auditory Stimulation	Frequency	%
Acceleration of Consciousness Occurred (GCS 10-15)	0	0
No Acceleration of Consciousness Occurred (GCS <10)	36	100.0
Total	36	100

Acceleration of Consciousness after Tuning Fork Sensory-Auditory Stimulation

Table 6 Frequency Distribution Based on Acceleration of Consciousness after Tuning Fork Sensory-Auditory Stimulation in the Recovery Room at the Pati Healthy Family Hospital

Acceleration of Consciousness after Tuning Fork Sensory-Auditory Stimulation	Frequency	%
Acceleration of Consciousness Occurred (GCS 10-15)	27	75,0
No Acceleration of Consciousness Occurred (GCS <10)	9	25,0
Total	36	100

The Effect of Tuning Fork Auditory Sensory Stimulation on Accelerating Consciousness in Postoperative Patients Under General Anesthesia in the Recovery Room of the Healthy Family Hospital, Pati

Table 7 The Effect of Tuning Fork Auditory Sensory Stimulation on Accelerating Consciousness in Postoperative Patients Under General Anesthesia in the Recovery Room of the Healthy Family Hospital, Pati

Acceleration of Awareness	Before Treatment (pre-test)		After Treatment (post-test)		P value Wilcoxon test
	f	%	f	%	
Acceleration of Consciousness Occurred (GCS 10-15)	0	0	27	75,0	0,000
No Acceleration of Consciousness Occurred (GCS <10)	36	100,0	9	25,0	

Discussion

Recovery of Consciousness Before Auditory Sensory Stimulation Using a Tuning Fork

The results showed that none of the respondents experienced accelerated recovery of consciousness before auditory sensory stimulation using a tuning fork was administered (36 respondents; 100.0%). These findings indicate that all respondents experienced delayed recovery of consciousness prior to receiving sensory stimulation. This condition may be attributed to the effects of general anesthesia, which can decrease the level of consciousness following surgery. Decreased consciousness indicates impaired brain function, which may occur when the brain receives insufficient oxygen. The findings demonstrated that respondents exhibited somnolent and stuporous levels of consciousness, with Glasgow Coma Scale (GCS) scores below 10.

The absence of accelerated recovery of consciousness in this study was associated with the effects of general anesthesia. These findings are consistent with Pratama (2021), who reported that one of the most common complications following general anesthesia is delayed emergence or prolonged recovery of consciousness. Delayed recovery may result from several factors, including the duration of surgery and anesthesia. In the present study, most respondents underwent major surgical procedures lasting ≤ 60 minutes (71.4%), and the majority experienced delayed recovery of consciousness (62.9%).

According to Muhlisin (2018), consciousness is influenced by stimuli originating from the surrounding environment. The Glasgow Coma Scale is widely used to assess the level of consciousness. Delayed awakening following general anesthesia is generally defined as unconsciousness lasting 60–90 minutes after anesthesia administration, whereas full recovery of consciousness typically occurs within 30–60 minutes postoperatively.

Martono (2016) conducted a related study entitled "Early Detection of Consciousness Level Using Critical Mean Arterial Pressure Measurements." The study employed an explanatory cross-sectional design involving 34 patients with head injuries. The findings demonstrated that mean arterial pressure had a significant positive effect on the level of consciousness ($p = 0.00 < 0.05$) and was able to predict the level of consciousness with an accuracy of 77.8%.

Recovery of Consciousness After Auditory Sensory Stimulation Using a Tuning Fork

The results revealed that accelerated recovery of consciousness occurred in 27 respondents (75.0%) following auditory sensory stimulation using a tuning fork, whereas nine respondents (25.0%) did not experience accelerated recovery. These findings suggest that auditory sensory stimulation effectively improved the level of consciousness in postoperative patients.

However, nine respondents (25.0%) still experienced delayed recovery of consciousness following surgery. These findings are consistent with Suratinoyo (2022), who reported that 51.5% of patients receiving general anesthesia experienced delayed emergence, whereas 48.5% did not. Delayed recovery may be associated with minimal responses observed during GCS assessment, in which patients appeared deeply asleep but still demonstrated responses to painful stimuli. Some respondents also exhibited

decreased consciousness characterized by slow motor responses and drowsiness, although consciousness could be restored following stimulation (Aipviki, 2018).

According to Maramis (2019), levels of consciousness are categorized into five stages: *compos mentis* (fully conscious), apathy, delirium, somnolence (obundation or lethargy), stupor (sopor), and coma. Somnolence is characterized by decreased consciousness, slow psychomotor responses, easy arousal by stimulation, and the ability to provide verbal responses. Stupor is characterized by a sleep-like state in which patients respond only to painful stimuli, whereas coma is defined as an unarousable state with no response to external stimuli.

Septiani (2018) reported that auditory stimulation using a tuning fork significantly improved the level of consciousness in patients with head injuries. Therefore, auditory sensory stimulation using a tuning fork may serve as an adjunctive non-pharmacological intervention for patients experiencing decreased consciousness.

The Effect of Auditory Sensory Stimulation Using a Tuning Fork on Recovery of Consciousness in Postoperative Patients Receiving General Anesthesia

The results of the Wilcoxon Signed-Rank Test demonstrated a p-value of 0.000 (< 0.05), indicating a statistically significant effect of auditory sensory stimulation using a tuning fork on the recovery of consciousness among postoperative patients receiving general anesthesia in the Recovery Room at Keluarga Sehat Hospital, Pati. These findings indicate that auditory sensory stimulation using a tuning fork is effective in accelerating postoperative recovery of consciousness.

Before the intervention, none of the respondents demonstrated accelerated recovery of consciousness because their GCS scores indicated somnolent and stuporous states (< 10). Following the intervention, most respondents experienced accelerated recovery of consciousness, although nine respondents (25.0%) continued to exhibit delayed recovery. These patients demonstrated minimal responses during GCS assessment and remained in sleep-like states while responding only to painful stimuli.

The findings suggest that auditory sensory stimulation using a tuning fork can improve the recovery of consciousness following surgery. The procedure involves providing auditory sensory stimulation by speaking directly near the patient's ear or by striking a tuning fork close to the patient's ear (Keliat, 2019).

Purwaningsih (2018) stated that sensory stimulation aims to facilitate communication in patients who are unable or unwilling to express themselves verbally. Sensory stimulation may also enhance sensory function in patients experiencing decreased consciousness following anesthesia, improve mobility responses, and stimulate emotional and affective functions.

Potter (2020) explained that postoperative anesthesia-related complications in the recovery room may be managed pharmacologically or through complementary therapies. Auditory sensory stimulation using a tuning fork represents one such complementary therapy that may accelerate postoperative recovery of consciousness. Nurses may provide this intervention as an environmental and mood-modifying therapy to promote patient relaxation and comfort.

Valentina (2019) reported that sensory stimulation significantly improved GCS scores in patients with primary head injuries ($p = 0.041$). Before receiving therapy, 67.9% of respondents had GCS scores below 10, whereas after receiving sensory stimulation for 20–30 minutes, 81.7% achieved GCS scores ranging from 10 to 12, indicating accelerated recovery of consciousness.

Similarly, Febriawati (2023) found that before auditory sensory stimulation, most respondents (40%) were classified as stuporous. Following the intervention, most respondents (26.7%) demonstrated somnolent levels of consciousness. Bivariate analysis revealed a significant effect of auditory sensory stimulation on changes in GCS scores ($p = 0.002$). These findings support the effectiveness of auditory sensory stimulation in improving consciousness among patients with impaired consciousness.

CONCLUSION

1. Prior to auditory sensory stimulation using a tuning fork, none of the respondents experienced accelerated recovery of consciousness (36 respondents; 100.0%).
2. Following auditory sensory stimulation using a tuning fork, 27 respondents (75.0%) experienced accelerated recovery of consciousness, whereas nine respondents (25.0%) did not.
3. The Wilcoxon Signed-Rank Test demonstrated a p-value of 0.000 (< 0.05), indicating that auditory

sensory stimulation using a tuning fork had a statistically significant effect on accelerating recovery of consciousness among postoperative patients receiving general anesthesia in the Recovery Room at Keluarga Sehat Hospital, Pati.

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