Original Research Article

Effect of Handheld Finger-Grip Relaxation Technique on Post-Neurosurgery Patients' Pain and Anxiety

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Abstract

Introduction: Post-neurosurgery patients often experience pain and anxiety. Handheld finger-grip relaxation helps the body, mind, and spirit to achieve relaxation.

Objective: This study investigated the effect of a handheld finger-grip relaxation technique on pain and anxiety in post-neurosurgery patients.

Method: A quasi-experimental study of 160 patients was randomly assigned to either the intervention group (received the handheld finger-grip relaxation technique) or the control group (received standard care). The intervention group received the handheld finger-grip relaxation technique for 15 min twice daily for 3 days. The control group received standard care. Pain and anxiety were assessed using a visual analog scale and a Spielberger State-Trait Anxiety Inventory, respectively.

Results: The results showed that the intervention group had a highly statistically significant difference between pre and post-phase ($p < .0000$) regarding the severity of pain and anxiety level. Meanwhile, there was a statistically significant difference ($p < .05$) between pre and post-phase among the control group.

Conclusion: It is suggested that the handheld finger-grip relaxation technique may be an effective intervention for reducing pain and anxiety in post-neurosurgery patients.

Keywords

handheld finger-grip relaxation techniques, pain, anxiety, post-neurosurgery

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Introduction

Pain is one of the most common symptoms experienced by critically ill patients in postsurgical intensive care units (ICUs) (López-Alfaro et al., 2019). It is estimated that about 80% of patients have moderate to severe pain and 71% of critically ill patients recall experiencing pain postdischarge from the ICU (Olsen et al., 2021). Despite the importance of controlling pain among critically ill patients, pain is often overlooked and given less priority than other life-threatening conditions (Pour, 2017). Therefore, appropriate diagnosis and management of pain are key factors in improving postsurgical ICU patient outcomes and postdischarge pain (Ismail et al., 2019).

Uncontrolled pain in the neurosurgery patient is expressed and experienced in a multitude of ways and can lead to complications (Nordness et al., 2021). It can be directly associated with the primary pathology, painful procedures, or the

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psychological distress that comes with being critically ill and undergoing surgery (Shaikh et al., 2018). Uncontrolled painful stimuli have been demonstrated to lead to acute stress responses including endocrine secretion and psychological stress (Olsen et al., 2021). It also increases the incidence of nosocomial infections, the need for mechanical ventilation, and prolonged ICU length of stay (Constantin et al., 2016). In the ICU following surgery, uncontrolled pain has serious psychological ramifications as well (Nordness et al., 2021). A higher percentage of patients who feel pain may develop posttraumatic stress disorder, which affects 34–38% of patients who are discharged from the ICU (Shaikh et al., 2018).

Anxiety commonly occurs in critically ill patients with almost half of them with a length of stay ≥48 h (Kukimoto et al., 2017). Postoperative admission to the ICU exposed to stressors known to increase anxiety and pain, such as noise, sleeplessness, mechanical ventilation, and immobility (Andersson et al., 2020). These stressors may lead to longer hospitalization and higher use of benzodiazepines and opioids, with their inherent risk of side effects and adverse events (Abitbol et al., 2017). Pain that is not sufficiently controlled can also contribute to generalized sympathetic responses, which may precipitate sleep and appetite disruption, elevating anxiety states (Glowacki, 2015).

Nonpharmacologic pain management is an effective way to reduce pain severity and it can be independently used by nurses (Yaban, 2019). One nonpharmacological management of pain is known as the handheld finger-grip relaxation technique (Calisanie & Ratnasari, 2021). This technique is part of the Jin Shin Jyutsu technique which is a Japanese acupressure strategy implementation that can be done for anyone since it depends on fingers and breathing. It uses a simple touch of hands and breathing to balance energy in the body to reduce pain (Mohamed Elghareeb Allam et al., 2023). Hands including fingers and palms are simple and powerful tools to harmonize and bring the body into balance and can reduce muscle tension and reduce stress (Alfajar et al., 2022). Each finger is related to everyday attitudes; the thumb is associated with anxiety, the index finger is associated with fear, the middle finger is associated with anger, the ring finger is associated with sadness, and the little finger is associated with low self-esteem and discouragement (Haniyah & Adriani, 2020).

Handheld finger-grip relaxation techniques may be used as complementary forms to manage patients' symptoms such as anxiety and pain (Mohamed Ahmed Ayed et al., 2023). Numerous studies have shown handheld finger-grip relaxation technique improves patient symptoms such as anxiety, pain, and relaxation (Rambe et al., 2023; Safariyah et al., 2022). It was found that the use of the handheld finger-grip relaxation technique is readily available, low risk, and inexpensive and does not require intense training by staff (Dinengsih & Suciatmi, 2018). It helps the body, mind, and spirit to achieve relaxation, which naturally triggers the release of endorphins (Suri et al., 2017). This hormone is a natural analgesic from the body, thereby reducing the bad effects of stress and pain (Alam et al., 2022). A study performed by Rahman and Khalilati (2019) revealed that after implementing finger hold therapy there was a decrease in pain results and patients began to feel mild pain and not feel severe pain and only a few still feel moderate pain. This could be related to the feel of comfort and withstand pain level when given the therapy. Additionally, Alam et al. (2022) revealed that patients who undergo finger-grip relaxation had a decreased anxiety level than other patients.

Pain and anxiety among critically ill patients in the postoperative period were recognized as distressing side effects that affect the patient's functional status, and consequently the quality of life (Tadesse et al., 2022). Therefore, the management of these side effects represents a great challenge for the nurse. In an attempt to evaluate the effect of using alternative methods, this study was conducted to evaluate the effect of the fingerhold technique on pain and anxiety levels among critically ill patients. Hence, this study aims to evaluate the effect of the handheld finger-grip relaxation technique on post-neurosurgery patients' pain and anxiety.

The study hypothesized that:

H1: Patients who receive the handheld finger-grip relaxation technique will have decreases in pain intensity than the control group.
H2: Patients who receive the handheld finger-grip relaxation technique will have decreases in anxiety levels than the control group.

Review of Literature

For patients recovering from neurosurgery, several therapies are available to help with pain and anxiety management. These interventions consist of psychotherapy, physical therapy, and medicine. These treatments might not work for every patient. Furthermore, some patients might not want to receive physical therapy or take their medications. As a result, autonomous nursing action is required through straightforward management.

The handheld finger-grip relaxation technique is a safe nonpharmacological relaxation strategy that is easy to apply, nonexpensive, and safe with no side effects (Mohamed Elghareeb Allam et al., 2023). It involves applying gentle pressure to specific points on the fingers to relieve anxiety and pain (Pongoh et al., 2020). This method is based on the principles of traditional Chinese medicine and is related to acupressure and reflexology that is based on the idea that by stimulating these points, it is possible to release endorphins, which are hormones that have pain-relieving and mood-boosting effects (Silviani et al., 2021). Despite its ancient roots, recent research on handheld finger-grip relaxation techniques especially in Egypt is limited. This study was the first to use a handheld finger-grip relaxation technique on patients post-neurosurgery and demonstrated that this technique can be a supplement to regular treatment and medication for reducing pain and anxiety in patients undergoing neurosurgery.

Methods

Design

A quasi-experimental design (one group pretest–posttest design) was used to conduct the current study.

Sample

A convenience sampling method was used consisting of 160 patients was admitted to the previously selected ICU during the study period. Patients were assigned randomly and enrolled into two groups; an intervention group and a control group (80 patients in each one). Basic random sampling was used to select the participants, in which randomization was achieved by requesting that each participant select a coin piece. The participants who select the piece carrying a picture face are in the control group, and the written face carrying is in the experimental group. The control group receives regular treatment while the experimental group receives finger handheld relaxation techniques with regular treatment. Data collection extended over six months between April and September 2023.

Inclusion/Exclusion Criteria

The inclusion criteria were (1) Patients aged >18 years with GCS of ≥13, (2) undergoing surgery (first day after surgery post 8 h) (3) accepted to participate voluntarily in the study, (4) patients who were not getting analgesics experience pain ranging from moderate pain and their' hospital stay for at least 5 days. On the other hand, patients suffering from psychological disorders and morbid obesity were excluded from the study.

A simplified formula was used to calculate the sample size based on a prior study by Dinengsih and Suciatmi (2018). The sample size at 5% error (95.0%) and 20.0 β error (80.0% study power), where

- N = Size of the population (200),
- Z = standardization degree for 95.0% significance, which is equal to 1.96,
- d = Percentage of error (0.05),
- P = Percentage of occurrence of an event or not, it is 0.5.

$$n = \frac{N \times p(1-p)}{[[N-1 \times (d^2 \div z^2)] + p(1-p)]}$$

The study was conducted at Neurosurgery ICU affiliated with Mansoura University Hospital in Egypt. It included five beds and they provided services to patients with postoperative neurological disorders. These ICUs are well equipped with advanced machines, equipment, and the manpower required for patients' care with a nurse–patient ratio in the ICU of 1:2.

One tool was used to collect the data developed by three researchers based on reviewing recent relevant literature (Dinengsih & Suciatmi, 2018; Purwanto et al., 2021; Rahman & Khalilati, 2019). In this study, a Handheld Finger Hold technique Evaluation Sheet Tool was used. This tool is composed of three parts, namely (1) the patient's demographic and health-relevant data including date of admission, age, sex, marital status, level of education, medical diagnosis, and length of ICU stay, (2) Patients' Pain Assessment Scale that used to evaluate the effect of handheld finger-grip relaxation technique on pain level among critically ill patients. Pain assessment is carried out using the Numerical Rating Scale (NRS) to assess pain intensity (Ismail & Abass, 2023). It is a straight line that comprises 10-point scale with the left end of the line 0 = no pain, 1–3 = mild pain, 4–6 = moderate pain, and 7–10 = severe pain, (3) Patients' Anxiety Assessment Scale, using the short version of Spielberger State-Trait Anxiety Inventory (STAI; Spielberger et al., 1971). The STAI-5 is a self-report measure intended to assess postoperative anxiety. The questionnaire was done on the pre and postsurgery day; it included 10 items on a 4-point Likert scale. Each statement responds to rating the patient's level of anxiety; 1 = not at all, 2 = somewhat, 3 = moderately so, and 4 = very much. The highest Youden index is 0.784 for STAIS-5 achieved using a cutoff score of >9.5. This suggested that someone scoring ≥10 on the STAIS-5 can be considered potentially clinically anxious. The highest Youden index (0.747) for STAIT-5 was achieved using a cutoff score of >13.5. This suggested that someone scoring ≥14 on the STAIS-5 should be considered potentially clinically anxious. Therefore, both the STAIS-5 and STAIT-5 are potentially useful as screening tools.

The content validity of the tool was tested by five experts in the field of the study. All necessary modifications were made. The reliability testing was done using Cronbach's alpha on a sample of 16 subjects that measured the degree of reliability for the entire content. Cronbach's Alpha coefficients of inside consistency were utilized to evaluate the inner dependability of the investigation devices portrayed as Part II: Patients' Pain Assessment Scale = 0.8, and Part III: Patients' Anxiety Assessment Scale = 0.94.

A pilot study was carried out on 10% of the total sample ($n = 16$ patients), who were excluded from study subjects. Using 10% as a sample size is a common practice for several reasons including manageability since a 10% sample size of piloting is small enough and manageable; detection of issues such as problems in design, methodology, and overall feasibility. Overall, the 10% figure is a rule of thumb that strikes a balance between thoroughness and efficiency, allowing researchers to validate their approach without excessive expenditure or effort.

It was conducted to test the feasibility and clarity of the tools used in this study. Necessary modifications were done accordingly. After observation by an expert physiotherapist, the handheld finger-grip relaxation technique, pain, and anxiety level were evaluated precisely.

Institutional Review Board Approval

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Nursing—Mansoura University. Permission to conduct the study was obtained from the responsible authorities of Mansoura University Hospital after explaining the aim and procedure of the study under the registration number of Ref. No. P.:0448 on 5/4/2023. Before data collection, three researchers received practical training on applying the handheld finger-grip relaxation technique under the supervision of specialist trainers in the field of physiotherapy. The practical training included the precautions that should be used before, during, and after applying this technique. The researchers interviewed patients who met the inclusion criteria one day before surgery to explain the nature of the study and invite them to participate in the study. Written consent was taken from them. The researchers emphasized that participation in this study was entirely voluntary, and anonymous, and they could withdraw at any time without any coercion. The privacy and confidentiality of the study subjects were respected and assured.

Patients' demographical data were obtained from their medical records. Allocation of participants was done a day before surgery by using a randomization technique into an intervention group and a control group.

In the intervention group, the patient was assisted to lie down in a supine position with eyes closed, the head of the bed about 30 degrees elevated, and the patient took deep breaths. First, the researcher removed any metal object, cleaned the patient's hands with a wet towel, washed their hands, and lubricated them with nontherapeutic baby oil to facilitate massaging. The handheld finger-grip relaxation technique is used to decrease or relieve the strength of postoperative pain as it is considered an easy way to manage emotions (Siauta & Yusuf, 2017). There are many energy pathways that run the length of our fingers and are linked to numerous bodily functions and emotions.

When the patient has pain, this technique is administered one by one, holding each of the five fingers from the thumb to the little finger for three to five minutes at a time. Holding a finger while deeply breathing (relaxing) can assist in lessening and healing physical and mental strain because the finger grasp heats the sites of entry and entry of energy to the meridians (energy channels) on our fingertips. The handheld finger relaxation technique was conducted for 30–50 min for both hands. Thirty-minute sessions can provide therapeutic and relaxation benefits. It is given every 6 and 12 h and at the time of pain for 3 consecutive days postoperative. The unpleasant reported feelings by patients before and after intervention were observed by the researchers (Figure 1).

A control group received routine hospital care. Both groups were examined at three hours following surgery; the researchers used a NRS and a short version of the Spielberger STAI (pretest) to assess the level of pain and anxiety, respectively. To determine the effectiveness of the intervention before and after the surgery, the assessment of pain and anxiety levels was repeated (posttest) for both groups. Data collection extended over six months between April and September 2023.

Statistical Analysis

The data were sorted, categorized, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 21. Descriptive statistics using means and standard deviation for the continuous variables as well as frequencies and percentages for the dichotomous or categorical variables were used to describe the data. Inferential statistical analyses of the chi-square test were used to identify associations among variables. The level of Significance was set as $p < .05$.

Results

In this trial, 160 patients in total were included. It was found that, with mean ages of (M = 35.33, SD = 8.43), and (M = 36.76, SD = 11.48), respectively, the majority of patients (56.2%) in the intervention groups and roughly half (50.0%) in the control groups belonged to the 30- to 40-year-old age range. Furthermore, male patients made up little less than two-thirds (65.0%) of the intervention groups and slightly more than half (57.5%) of the control groups, respectively. The majority of the intervention group (75.0%) and the control group (73.8%) were married. Regarding sociodemographic factors, the mean difference between the intervention and control groups was not statistically significant. The medical data of the studied groups demonstrated that postoperative brain tumor and postoperative subdural hemorrhage were the most common diagnoses in less than half (45.0%, 47.5%) of the intervention and control patient groups, respectively. Regarding prior medical history, it was found that the most common conditions in the intervention and control groups (40.0% and 37.5%, respectively) were hypertension and other specific (respiratory) disorders. In terms of overall duration of length of stay in the ICU, the table indicated that around 55% and 75%, respectively, of both groups had stays of ≥5 days and 7 days (Table 1).

According to the results of the chi-square test, there was no statistically significant difference in the two groups' pre-intervention pain levels. However, for the first, second, and third day as well as the total pain level after the intervention period, there was a highly statistically significant difference between the intervention and control group (Table 2).

A significant improvement in the intervention group's overall pain level following the handheld finger-grip relaxation technique, with over three-quarters (80%) reporting no pain, compared with the control group's minimal improvement, with roughly two-fifths (40%) reporting mild pain.

A paired sample *t*-test was used to assess the mean difference between the level of pain in both intervention and control groups. Pre- and post-phase differences were statistically significant (t (79) = 19.42, $p < .00001$). Conversely, among the control group, there was a statistically significant difference (t (79) = 1.96, $p < .05$) between the pre and post-phases (Table 3).

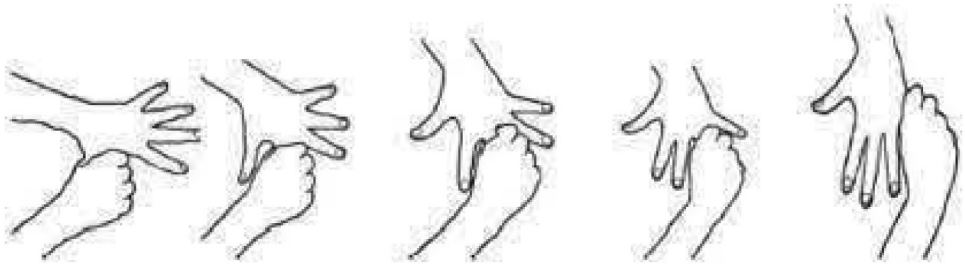

Figure 1. Technique demonstrating the finger handheld relaxation.

Table 1. Frequency Distribution According to Sociodemographic Characteristics of Studied Groups ($n = 160$).

	Sample					
	Intervention group, $n = 80$		Control group, $n = 80$			
Items	*N*	%	*N*	%	χ^2	*p*-value
Age (in Years)					0.677	.878
>18 and <30	16	20.0	18	22.5		
30–<40	45	56.2	40	50.0		
40–<50	11	13.8	12	15.0		
≥50	8	10.0	10	12.5		
Mean ± SD	35.33 ± 8.43		36.76 ± 11.48			
Range	19–55		19–59			
Gender					0.848	.209
Male	52	65.0	46	57.5		
female	28	35.0	34	42.5		
Marital Status					0.254	.885
Single	15	18.8	17	21.2		
Married	60	75.0	59	73.8		
Divorces	5	6.2	4	5.0		
Educational level					0.447	.308
Educated	55	68.8	51	63.8		
Illiterate	25	31.2	29	36.2		
Diagnosis					5.31	.152
Discectomy	11	13.8	8	10.0		
Laminectomy	9	11.2	8	10.0		
Postoperative subdural hemorrhage	36	45.0	26	32.5		
Postoperative brain tumor	24	30.0	38	47.5		
Past medical history					7.86	.164
Diabetes mellitus	7	8.8	6	7.5		
Ischemic heart diseases	7	8.8	7	8.8		
Hepatic impairment	8	10.0	5	6.2		
Hypertension	32	40.0	26	32.5		
Renal failure	11	13.8	6	7.5		
Other specify (Respiratory diseases)	15	18.8	30	37.5		
Total ICU length of stay	50	45.0	24	30.0	0.447	.308
≥5 days	14	17.5	16	20.0		
7 days	30	37.5	40	40.0		

Notes: N = Number; % = Percentage; SD = standard deviation; χ^2 = Chi-squared.

There was no statistically significant difference in the anxiety levels of the two groups during the pre-phase, as demonstrated by Table 4's illustration of the anxiety levels at various assessment dates for the examined groups, including the control and intervention groups. However, following the trial, a highly statistically significant difference was found between them for the first, second, third, and overall anxiety levels.

Table 2. Frequency Distribution of Patients According to Level of Pain at Different Times of Assessment among the Studied Groups ($n = 160$).

Times of assessment	Level of pain	Intervention group, $n = 80$		Control group, $n = 80$		χ^2	p-value
		N	%	*N*	%		
Preintervention	None	0	0.0	0	0.0	3.77	>.05
	Mild	6	7.5	4	5.0		
	Moderate	47	58.8	37	46.2		
	Severe	27	33.7	49	48.8		
Day 1	None	4	5.0	0	0.0	51.98	<.000**
	Mild	48	60.0	8	10.0		
	Moderate	19	23.8	47	58.8		
	Severe	9	11.2	25	31.2		
Day 2	None	59	73.8	1	1.2	90.63	<.000**
	Mild	12	15.1	26	32.5		
	Moderate	6	7.5	36	45.1		
	Severe	3	3.8	17	21.2		
Day 3	None	66	82.5	14	17.5	69.15	<.000**
	Mild	10	12.5	49	61.2		
	Moderate	4	5.0	10	12.5		
	Severe	0	0.0	7	8.8		
Total postintervention	None	64	80.0	14	17.5	63.59	<.000**
	Mild	10	12.5	40	40.0		
	Moderate	6	7.5	20	25.0		
	Severe	0	0.0	6	7.5		

*Statistically significant at $p < .05$, **Significant at $p < .01$.

Table 3. Paired *T*-Test to Assess Mean Differences of Pain Pre and Post-Handheld Finger-Grip Relaxation Technique ($n = 160$).

Total pain	Implementation phases		Paired samples *t*-test	p-value
	Pre Mean ± SD	Post Mean ± SD		
Intervention group	5.57 ± 1.72	2.24 ± 0.48	19.42	<.0000**
Control group	6.51 ± 1.79	6.22 ± 1.81	1.96	<.05*

*Statistically significant at $p < .05$, **Significant at $p < .01$.

A significant improvement in the intervention group's overall anxiety level following the handheld application of the finger-grip relaxation technique, with approximately 20% of them reporting no anxiety and over 38% reporting mild anxiety, respectively, in contrast to the control group, which showed little improvement with slightly over half 45% reporting moderate anxiety.

To assess the differences in the mean scores of anxiety levels between control and intervention groups, a paired sample *t*-test was used. It was indicated that there was a highly statistically significant difference ($p < .000$) between pre and post-phases in the intervention group. Conversely, among the control group, there was a statistically significant difference (<.05) between the pre and post-phases (Table 5).

There was a statistically significant correlation between the intervention group's baseline characteristics of sex, diagnosis, and past medical history and post-pain level following the portable finger-grip relaxation technique. In the meantime, there was a statistically significant relationship between the post-pain level and the variables of age, education, and length of stay in the ICU (Table 6).

The chi-squared test demonstrated a statistically significant relationship between the intervention group's baseline parameters of age, diagnosis, past medical history, length of stay in the ICU, and the postanxiety level following the portable finger-grip relaxation technique. In the meantime, there was a statistically significant relationship between post-pain level education and gender, respectively.

Discussion

This study aims to assess the effectiveness of the finger-grip relaxation technique among neurosurgical patients to reduce levels of pain and anxiety. Clinical assessment of this study found that the technique of handheld finger-grip relaxation

Table 4. Frequency Distribution of Patients According to Level of Anxiety at Different Times of Assessment among the Studied Groups ($n = 160$).

Times of assessment	Level of pain	Intervention group, $n = 80$		Control group, $n = 80$		χ^2	p-value
		N	%	N	%		
Preintervention	None	0	0.0	0	0.0	3.07	>.05*
	Mild	10	12.5	8	10.0		
	Moderate	40	50.0	31	38.8		
	Severe	30	37.5	41	51.2		
Day 1	None	0	0.0	0	0.0	11.04	<.004*
	Mild	13	16.2	9	11.2		
	Moderate	49	61.2	33	41.3		
	Severe	18	22.5	38	47.5		
Day 2	None	4	5.0	0	0.0	30.90	<.000**
	Mild	16	20.0	11	13.8		
	Moderate	54	67.5	32	40.0		
	Severe	6	7.5	37	46.2		
Day 3	None	48	60.0	5	6.2	84.49	<.000**
	Mild	26	32.5	14	17.5		
	Moderate	6	7.5	42	52.5		
	Severe	0	0.0	19	23.8		
Total postintervention	None	16	20.0	0	0.0	38.33	<.000**
	Mild	31	38.8	14	17.5		
	Moderate	26	32.4	36	45.0		
	Severe	7	8.8	30	37.5		

*Statistically significant at $p < .05$, ** Significant at $p < .01$.

Table 5. Anxiety in Patients Throughout Phases of Handheld Finger-Grip Relaxation Technique ($n = 160$).

Total anxiety	Implementation phases		Paired samples t-test	p-value
	Pre Mean ± SD	Post Mean ± SD		
Intervention group	27.36 ± 5.48	20.58 ± 6.74	9.04	<.000**
Control group	28.99 ± 5.68	27.03 ± 6.72	2.16	<.05*

has the potential to assist patients by offering a straightforward, nonpharmacological approach to managing stress and discomfort on their own. The finger-grip relaxation technique—which probably involves repetitive, focused squeezing of an object—may be able to promote relaxation through rhythmic, tactile stimulation. Through the activation of the parasympathetic nervous system, this physical exercise may help patients relax and maybe improve pain management by diverting their attention from their pain, lowering stress reactions, and possibly reducing perceived pain and anxiety levels.

According to the current study results, there were no significant differences in sociodemographic characteristics and medical data between the two groups. The researchers interpret this as evidence that the baseline levels of pain and anxiety are comparable between the two groups. More than half of the studied patients in both groups were male with a mean age of 35.33 ± 8.43 and 36.76 ± 11.48, respectively. This may be explained in the light that men currently have a lot of responsibilities regarding their families which increases their exposure to stress and becomes a risk for neurological disorders. Similarly, our results are aligned with a quasi-experimental study performed by Mohamed Elghareeb Allam et al. (2023) who reported that male patients had higher rates of being exposed to surgeries compared to women.

Proper postoperative pain management benefits patients' early ambulation, reduces analgesia-related side effects, and prevents the development of acute to chronic pain (Málek et al., 2017). The findings of this study support the first hypothesis that the handheld finger-grip relaxation technique decreases pain intensity compared to the control group. This is consistent with the Gate Control Theory from Dinengsih and Suciatmi (2010) who hypothesized that defense mechanisms along with the central nervous system might control or even block pain impulses. According to this idea, a pain impulse is delivered when the defense is opened and blocked when it is closed. The theoretical basis for pain loss is the effort to close the defense.

Table 6. Relation Between Pain Level Post Handheld Finger-Grip Relaxation Technique among Intervention Group and Basic Characteristics ($n = 160$).

	Pain level postintervention							
	None pain $n = 64$		Mild pain $n = 10$		Moderate pain $n = 6$			
Variables	*N*	%	*N*	%	*N*	%	χ^2	*p*-value
Age (in years)								
>18–<30	15	23.4	1	10.0	0	0.0	16.27	<.01**
30–<40	30	46.9	9	90.0	6	100.0		
40–<50	11	17.3	0	00.0	0	00.0		
≥50	8	12.4	0	00.0	0	00.0		
Gender								
Male	37	57.8	9	90.0	6	100.0	7.43	<.024*
female	27	42.2	1	10.0	0	00.0		
Marital status								
Single	13	20.3	2	20.0	0	0.0	3.78	>.05
Married	47	73.4	7	70.0	6	100.0		
Divorces	4	6.3	1	10.0	0	0.0		
Educational level								
Educated	49	76.6	4	40.0	2	33.3	9.27	<.010**
Illiterate	15	23.4	6	60.0	4	66.7		
Diagnosis								
Discectomy	11	17.2	0	00.0	0	0.0	13.13	<.041*
Laminectomy	8	12.5	1	10.0	0			
Postoperative subdural hemorrhage	23	35.9	7	70.0	6	100.0		
Postoperative brain tumor	22	34.4	2	20.0	0	0.0		
Past medical history								
Diabetes mellitus	7	10.9	0	00.0	0	00.0	17.90	<.05*
Ischemic heart diseases	4	6.2	2	20.0	1	16.7		
Hepatic impairment	6	9.4	2	20.0	0	0.00		
Hypertension	22	34.4	5	50.0	5	83.3		
Renal failure	11	17.2	0	0.00	0	0.00		
Other specify(Respiratory diseases)	14	21.9	1	10.0	0	0.00		
Total ICU length of stay								
≥5 days	32	50.0	3	30.0	1	16.7	16.53	<.002**
6 days	6	9.4	4	40.0	4	66.6		
7 days	26	40.6	3	30.0	1	16.7		

*Statistically significant at $p < .05$, ** Significant at $p < .01$.

By diverting attention or practicing relaxation, the blockage is created.

This finding also is consistent with the finding of the randomized controlled trial design by Jutras-Aswad et al. (2022), who found that the handheld finger-grip relaxation technique was more effective in reducing pain in participants who received handheld finger-grip than the participants who received placebo treatment concluding that handheld finger-grip relaxation may be an effective nonpharmacologic treatment for pain. Similarly, a systematic review including 12 studies found that acupressure, including handheld finger-grip relaxation, was effective in reducing pain in various clinical settings, such as postoperative pain, labor pain, and cancer pain (Ernst et al., 2011). Moreover, a quasi-experiment study with pre- and posttests with a control group design revealed that the participants in the experimental group who had finger-hold relaxation therapy for 30 min had lower pain scores than those who had not received the finger-hold relaxation technique (Ma'rifah et al., 2018). As regard the second hypothesis, the findings of this study revealed that anxiety scores of patients using the handheld finger-grip relaxation technique declined, and the effectiveness of this technique in reducing anxiety appeared to increase with time. Therefore, it can be inferred that the handheld finger-grip relaxation technique exerts a positive influence on reducing the postoperative anxiety of patients undergoing neurosurgery compared to the control group. Utilizing this technique can minimize the work of the brain and mindset that is negative thinking so as to relax the body and make the body into balance and comfort. In addition, it improves blood circulation that was inhibited due to the tension that occurs from the anxiety of the patient (Parellangi et al., 2018).

Supporting our findings, a study performed by Calisanie and Ratnasari (2021) found that the handheld finger-grip relaxation

technique can reduce emotional tension and the reflection points on the hand gave the body a relaxed response. Along with the same line, a study conducted by Tadesse et al. (2021) using a quasi-experimental one-group pretest and posttest design reported that finger-holding relaxation techniques have been shown to reduce anxiety levels in patients before cataract surgery.

Besides the findings of the current study are harmonious with previous studies in different countries that concluded those who received the finger-grip relaxation technique experienced significantly less anxiety compared to a control group (Limmer et al., 2020; Silviani et al., 2021). On the contrary, a study performed by Herring et al. (2015) found that the handheld finger-grip relaxation technique was ineffective in reducing anxiety in people with generalized anxiety disorder. Also a review of the study performed by Yoon et al. (2021) concluded that there is insufficient evidence to support the use of handheld finger-grip relaxation techniques for reducing anxiety or improving sleep quality.

Along with the same line, a randomized controlled trial study recruited ($n = 100$) patients conducted at a large university hospital in the United States by Roberts et al. (2023) found that the handheld finger-grip relaxation technique was effective in reducing pain and anxiety post-surgery. The technique involves using a handheld device to apply pressure to the fingers. The results of the study showed that the mean visual analog scale score for the intervention group was 2.5 compared to 5.0 for the control group. In addition, the mean STAI score for the intervention group was 25 compared to 40 for the control group.

Strengths and Limitations

This study used a quasi-experimental design that is considered a strong design to prove the effectiveness of the finger-grip relaxation technique. In addition, the handheld finger-grip relaxation technique is a noninvasive and low-risk intervention that also empowers patients who are actively engaged in their recovery. On the other hand, ethical concerns could be considered as a limitation of this study since withholding a potentially helpful intervention could lead to greater discomfort and anxiety among patients in the control group who did not receive the relaxation treatment.

Implications for Nursing Practice

Handheld finger-grip relaxation technique is a noninvasive procedure that could be used to reduce pain and anxiety post-surgery and reduce medication use. It is a personalized treatment that allows the patient to engage in the treatment process. Besides, in patients recovering from neurosurgery, controlling pain and anxiety well may lower the chance of problems or a worsening of preexisting conditions. Better outcomes and increased patient safety may result from this.

Reflecting the interdisciplinary nature of such an intervention, it can applied in society to improve patient outcomes, reducing the reliance on medications for pain and anxiety management and thus reduce the cost needed for pharmacologic interventions, and focus on patient-centered care to promote nonpharmacological pain and anxiety management strategies, enhancing overall societal well-being. Concerning science and academia, healthcare professionals can receive training in handheld finger relaxation techniques as part of comprehensive pain and anxiety management strategies in continuing education programs, which emphasize patient care from a holistic perspective.

Depending on the evidence strength, incorporating the technique into standard post-neurosurgery care protocols, considering individual patient needs and preferences.

Conclusion

According to the study's findings, patients recovering from neurosurgery may find that the handheld finger-grip relaxation technique is a useful nonpharmacological intervention for lowering pain and anxiety which accomplishes the study hypothesis and thus achieves the study objectives. It is advised that ICU patients receive routine nursing care that includes the portable finger-grip relaxing technique. The method is simple to use and noninvasive, making it a good choice for people who refuse to take medicine or receive physical therapy.

Authors' Contributions

AMAE: Conceptualization, data collection, data analysis; NT: Data collection, data analysis, methodology; HAM: Data collection, interpretation findings; SBH: Data analysis, final drafting, editing; MAL: final drafting, supervision; AA: Methodology and data analysis; MFM: Data collection, final supervision, data interpretation.

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Institutional Review Board Statement

The Committees of Scientific Research and Ethics of Research at the Faculty of Nursing/Mansoura University with a reference number (Ref. No. P.: 0448) approved the ethical conduct of the study.

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