

Effect of Alternate Nostril Breathing Exercise on Preoperative Patients' Anxiety, Blood Pressure and Heart Beats

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Abstract:

Context: Preoperative anxiety is considered real concern for many patients undergoing anesthesia and surgery that may cause tachycardia, hypertension and arrhythmias. **Study aim:** To evaluate effectiveness of alternate nostril breathing exercise on preoperative patients' anxiety, blood pressure and heart beats. The study used a **quasi-experimental design**, specifically employing a pre/post-test on **purposive sample** of 100 adult preoperative patients' who divided equally into study and control group in accordance to inclusion and exclusion criteria. **Setting:** conducting of this study was in general surgery units at Benha University Hospital, Qalyubia Governorate, Egypt. Three tools were utilized in this study: **I:** Patient' Structured interview questionnaire, **II:** Beck Anxiety Inventory Scale, **III:** Physiological parameters assessment. **Results:** Indicated a statistically significant improvement in total mean score of patients' anxiety, systolic blood pressure, diastolic blood pressure and heart beats after exercise implementation ($P < 0.001$) as, the total mean score of patients' anxiety, systolic blood pressure, diastolic blood pressure and heart beats for study group were (134.80 ± 6.14 , 84.10 ± 5.41 and 95.06 ± 8.10 respectively) pre-exercise and declined post exercise into (116.40 ± 4.84 , 77.20 ± 4.53 and 78.90 ± 6.94 respectively). **Conclusion:** Alternate nostril breathing exercise seemed to have a positive impact on preoperative patients' anxiety, blood pressure and heart beats. **Recommendations:** Further research studies should be done on a large probability sample from different geographical areas is needed.

Keywords: Alternate Nostril Breathing Exercise, Blood Pressure, Patients' Anxiety, Pulse.

Introduction:

Surgical interventions are usually associated with anxiety feelings and distress. Preoperative anxiety rates among adult patients undergoing surgery range widely from 11% to 80%. Despite being normal response from patients, it can have adverse effects on patients' physiological, emotional, and cognitive well-being. subsequently, increased bleeding risk may occur and enhance postoperative complications, poor patient' satisfaction, and delayed surgical outcomes (Chiu et al., 2023).

Perioperative period describes three phases of any surgical procedure (pre-operative, intraoperative, post-operative). preoperative phase begins when the patient made decision for surgery until the patient wheeled into operating room. While, intraoperative phase involves surgical procedure and ends when the patient transferred into recovery room. Postoperative phase starts once the patient is ready to leave recovery room until resolution of surgical squeale (Govind, 2022).

Surgical patients usually experienced nervousness, fears of being unable to wake up

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from anesthesia, postoperative pain and fear of death. Therefore, preoperative anxiety considered a significant mental health problem especially among female patients who had not past surgical history and usually ask many questions concerning surgery and anesthesia (**Tadesse et al., 2022**).

When the patient feels anxiety or stress, the heart contracts strongly and the blood redistributed leading to narrowing of blood vessels. After that, Increased blood volume increases cardiac output and blood flow to the respiratory muscles causing tachypnea, elevated blood pressure, tachycardia, and other hemodynamic disturbances that affect myocardial perfusion, autonomic nervous system regulation, platelet activation. if surgery performed, it could be difficult to control anesthesia adverse events and perioperative bleeding (**Pardede et al., 2020**).

Alternate nostril breathing exercise considered as a common yogic technique involving breathing through one nostril at a time while closing the other nostril manually. Anxious patients can practice alternate nostril breathing exercise to relieve anxiety as sitting in a comfortable position, inhale from one nostril while closing the other nostril then release closing and exhale while closing the other nostril and start with left nostril (**Udaykumar et al., 2021**).

Significance of the Study:

Millions of people undergo surgical procedures annually and surgical interventions account for an estimated 13% of the world's total disability-adjusted life years (**World Health Organization, 2023**). About 266–360 million surgeries occur around the world every year. Studies indicate that approximately 75% of people were anxious before surgery (**World Health Organization, 2022**). Anxiety prior to surgery was found as

high as 60% to 90% among surgical patients (**Bedaso et al., 2022**). In addition, Hypertension associated with anxiety and stress considered as the most common avoidable medical reason for postponing surgery (**Tait & Howell, 2021**).

Aim of the study: to evaluate effectiveness of alternate nostril breathing exercise on preoperative patients' anxiety, blood pressure and heart beats.

Operational definition: Alternate nostril breathing (Nadi shodhana Pranayama) refers to controlled, rhythmic, deep, and slow breathing exercises that reduce response of sympathetic nerve and peripheral adrenergic system to state of anxiety or stress. So, it can provide autonomic hemodynamic balance (**Upadhyay et al., 2023**).

Research hypotheses

H1- The level of anxiety among preoperative patients could be significantly reduced after implementing the exercise than before.

H2- The measurements of blood pressure and heart beats could be reduced after implementing the exercise than before.

Subject and Methods:

Research design: A quasi-experimental research design (pre/post) was utilized. This design aims to establish a cause-and-effect relationship between an independent and dependent variable and is more useful in situations where true experiments can't be used for ethical or practical reasons (**Sefidkar & Madadzadeh, 2022**).

Study setting:

The study was carried out in general surgery departments (male & female) at Benha University Hospital, Qalyubia Governorate, Egypt.

Sample: A purposive sample of 100 preoperative patients involved in the study and divided equally into two groups:

- **Control group** was 50 patients who received routine nursing care only.
- **Study group** was 50 patients who received routine nursing care and demonstrated alternate nostril breathing exercise instructions.

Inclusion criteria:

- Male and female patients who aged 20- 60 years' old.
- Agreed to take apart in the study.
- Hospitalized before the operation at least 24 hours.
- Stressful patients who experienced elevated blood pressure prior to surgery (not more than 150/90 mm/hg).

Exclusion criteria:

- Patient who diagnosed with hypertension and take antihypertensive drugs
- take tranquilizer at preoperative period
- have hearing impairment. Who has any nasal pathology as nasal bone fractures, nosebleed (epistaxis), cuts, abrasions and burns involving the nose and face
- patients with a previous history of cardiovascular disease, respiratory illness, chronic diseases, receiving respiratory depressant drugs, vertebral deformities, smoking patients, presence of arteriovenous fistulas, peripheral vascular disease of the arms, surgery and fracture

Tools of Data Collection: The study utilized the following three tools to collect pertinent data:

Tool I: Patient' Structured interview questionnaire: It was constructed in Arabic language involving two main parts as follow:

Part 1: Patients' personal data including age, gender, marital status, residence, level of education and job.

Part 2: Patients' history data including pervious surgeries, time of hospitalization before surgery, type of surgery, previous training for any breathing exercises, and required lab investigations and radiological imaging.

Tool II: Beck Anxiety Inventory Scale: It was adopted from (Quintao, et al., 2013), to assess patients' anxiety level by researchers. it consists of 21 main items: (numbness or tingling, feeling hot, wobbliness in legs, unable to relax, fear of worst happening, dizzy or lightheaded, heart pounding/racing, unsteady, terrified or afraid, nervous, feeling of choking, hands trembling, shaky / unsteady, fear of losing control, difficulty in breathing, fear of dying, scared, indigestion, faint / lightheaded, face flushed, hot/cold sweats). The patient' response for each item ranging from 0-3. (0= not at all, 1= mild, 2= moderate and 3= Severe).

Scoring system: The total score summed up and categorized into:

- 0-21 score = low anxiety
- 22-35 score = moderate anxiety
- 36 and above score = severe anxiety

Tool III: physiological parameters measurement sheet: It contains blood pressure and heart beats measurements (pre /post exercise) that recorded by the researchers.

Tools validity and reliability:

Tools were reviewed by a panel of five experts (four professors of medical surgical nursing, faculty of nursing, Benha University & one professors from the college of physiotherapy, Benha University to test the relevance, clarity of tools' content,

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comprehension, understanding and necessary modifications were done accordingly. Cronbach's alpha coefficient test used to test tools' reliability indicating value of 0.84 for questionnaire, 0.77 for anxiety scale, 0.89 for parameters sheet proving good reliability.

Ethical consideration:

Scientific Research Ethics Committee at Benha University's Faculty of Nursing approved the study with code **REC-MSN-P 62** to conduct study. Also, official endorsement gained from the dean of the nursing faculty and surgical unit directors at Benha University Hospital. The study's aim was clarified to patients along with freedom to discontinue their participation at any moment without any rationalization. Throughout study phases, researchers ensured the privacy, confidentiality and anonymity. Participated patients provided verbal and written consent.

Pilot study:

Ten percent (10 patients) of the study sample shared in a pilot study to test the tools' applicability, clarity, and the amount of time needed to complete them. After analyzing the data from the pilot study, the required modifications done. Exclusion of subjects who shared this study from actual sample was done later. It was done two weeks in August, 2023 before starting the study.

Field work:

From the beginning of September 2023 to end of February 2024, collection of data pertinent to study was completed. The data collection period extended over six months, during which the researchers conducted visits to surgical departments twice a week during the morning and afternoon shifts. The study progressed through four phases: planning, implementation, assessment, and evaluation

1-Assessment Phase (pre-exercise):

The researchers interviewed patients who met inclusion criteria individually to obtain their personal and history data using (Tool I). After that, the researchers assessed anxiety level for each one using tool II and measured blood pressure by mercury sphygmomanometer and palpated radial pulse at wrist area of patient' hand and documented readings in tool III.

2-Planning Phase

Based on information gathered during assessment phase, the researchers reviewed recent literature (**Tripathy & Sahu, 2019; Jiwanmall et al., 2020; Raslan et al., 2021; Maiye & Dal Yilmaz, 2022 and Bedaso et al., 2022) & Pardede et al., 2020; Khairy et al., 2022**) and designed an educational program and created an educational booklet with illustrations in simple Arabic language according to patients' needs. In addition, the number of sessions, their content, different teaching strategies and the instructional media were also determined. Booklet about alternate nostril breathing exercise includes information about: definition and signs of anxiety, its effect on body systems, benefits of alternate nostril breathing exercise, and its contraindications. In addition, practical part illustrated how to perform this exercise effectively. Among the teaching strategies used were lectures with simplified information followed by discussions, demonstration, re- demonstration. teaching materials included power point presentations, video, colored posters, and images. Required tool as mercury sphygmomanometer is also prepared.

3-Implementation phase:

Patients who matched sampling criteria and accepted to participate in the study divided

randomly into two equal groups. Group (A): Control group who received routine nursing care only. Group (B): Study group who received routine nursing care, learned and redemonstrated alternate nostril breathing exercise instructions. During this phase alternate nostril breathing exercise was applied to all study group of patients. Patients' intervention sessions were implemented in the form of two sessions (one theoretical session and one practical session). Each session lasted 30 to 45 minutes for (2 - 3 patients) included in each session. Motivation, feedback, and reinforcement techniques were used for active participation in educational sessions. In addition, comments were given, and questions were answered. After being completed, the educational booklet was distributed to each patient for reviewing exercise steps and support their teaching.

Session 1 (theoretical): At the onset of this session, the researchers provided introduction of self, discussed the educational program and its significance, and elaborated on its general and specific goals. The session covered topics such as understanding technique alternative nostril breathing exercise, preparations must be followed before exercise, contraindications to practice this exercise, risks of alternate nostril breathing exercise. specific instructions should be performed after the exercise.

Session 2 (practical) including steps of alternate nostril breathing exercise and how to practice it. The researchers explained and demonstrated the exercise instructions to the study group as:

- Sitting in a comfortable position.
- Close the right nostril with right thumb.
- Exhale completely through the left nostril.
- Inhale deeply through the left nostril.

- Do this to the count of four seconds.
- Close the left nostril with ring and little finger.
- Release the right nostril, exhale slowly and completely through the right nostril. This completes a half round.
- Inhale deeply through the right nostril. close the right nostril. Release the left nostril, exhale through the left nostril. This is 1 round of alternate nostril breathing.

Control group was allowed to receive routine care only and reassessed by the researchers for anxiety blood pressure and pulse level after 20 minutes since first time.

4-Evaluation phase (post exercise):

Post test was done by the researchers after practicing 20 min of alternate nostril breathing exercise by study group to evaluate the improvement in their condition by using the same tools as evidence by differences in anxiety, blood pressure, and pulse measurements among study group compared to control group.

Statistical analysis:

Data analysis was performed using the SPSS software (version 25). Chi-square tests were used to compare nominal variables in the two groups and compare between different periods. For comparing the mean scores in two groups were used to the independent t-tests, paired t test for comparing mean score of different periods within the same group. Pearson method was used to test correlation between numerical variables. A p-value < 0.05 was considered significant, and <0.001 was considered highly significant.

Results:

Table (1) clarifying that 40% & 50%, respectively of subjects had 40-< 50 years old

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with a mean age of 39.44 ± 0.95 & 39.68 ± 0.84 years, while 74% & 60% of them were females, 80% & 72% respectively were married. In addition, 66% & 60% of them had an intermediate qualification. Moreover, 56% & 60%, respectively of them were not working. Moreover 86% & 80%, respectively were living in rural area.

Table (2) pointing out that 40% and 26%, respectively, had undergone previous surgeries. In addition, 86% and 92% were hospitalized one day before surgery, especially major surgeries among 90% and 96%, respectively. 100% of both groups didn't perform any breathing exercises while being in the hospital previously. Moreover, 94% and 92%, respectively, performed required lab test, also 88% and 84% Performed required radiological examination.

Figure (1) illustrates that, 78.0% and 82.0%, respectively among control and study groups had severe anxiety level pre-exercises

implementation with no significant differences, to be highly statistically significant different post 20 min of exercises, where the control group had severe level among 68.0% and low anxiety level among 60.0% of study group.

Table (3) reveals the comparison of patients' hemodynamic parameters between control and study groups, pointing out that there was no significant statistical difference between both groups' pre-exercise, while there were significant statistical differences post 20 min of exercises implementation, in which the systolic blood pressure was 134.80 ± 6.14 pre-exercise implementation and decreased to 116.40 ± 4.84 immediately post exercise implementation with $t=14.977$ & $p < 0.001$

Table (4) shows that there was a significant, positive correlation between anxiety score with systolic, diastolic blood pressure and heart beats among study group observed as p value at ≤ 0.05 .

Table (1): Frequency distribution of studied patients both control & study group according to their personal data (N=100).

Patients' personal data	Variables	Control group n=50		Study group n=50		test	
		No	%	No	%	X ²	P value
Age (year)	20-<30	10	20.0	5	10.0	2.336	0.506 ^{n.s}
	30-<40	14	28.0	13	26.0		
	40-<50	20	40.0	25	50.0		
	50- 60	6	12.0	7	14.0		
	Mean ± SD	39.44±0.95		39.68±0.84		t= 1.335	0.185^{n.s}
Gender	Male	13	26.0	20	40.0	2.216	0.137 ^{n.s}
	Female	37	74.0	30	60.0		
Marital status	Single	2	4.0	7	14.0	3.055	0.217 ^{n.s}
	Married	40	80.0	36	72.0		
	Widowed	8	16.0	7	14.0		
Educational level	Don't read or write	2	4.0	10	20.0	6.508	0.089 ^{n.s}
	Read and write	11	22.0	7	14.0		
	Intermediate qualification	33	66.0	30	60.0		
	University qualification	4	8.0	3	6.0		
Job	Working	22	44.0	20	40.0	2.564	0.109 ^{n.s}
	Not working	28	56.0	30	60.0		
Residence	Urban	7	14.0	10	20.0	0.638	0.424 ^{n.s}
	Rural	43	86.0	40	80.0		

(n.s) not significant
Significant at ≤0.05

(*) Statistically Significant at ≤0.05

(**) Highly statistically

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Table (2): Frequency distribution of both control and study group of patients regarding their medical health history (N=100).

health history	Variables	Control group N=50		Study group N=50		X ² test	P value
		No	%	No	%		
Past history							
➤ Previous surgeries	Yes	20	40.0	13	26.0	2.216	0.137 ^{n.s}
	No	30	60.0	37	74.0		
➤ Period since undergoing surgery	➤ 6 months	20	100.0	13	100.0	N.A	N.A
➤ Practicing any breathing exercises in the hospital previously	Yes	0	0.0	0	0.0	N.A	N.A
	No	50	100.0	50	100.0		
Current History							
➤ Time of hospitalization before surgery	One day before surgery	43	86.0	46	92.0	0.919	0.338 ^{n.s}
	Two days before surgery	7	14.0	4	8.0		
➤ Type of surgery	Minor	5	10.0	2	4.0	1.382	0.240 ^{n.s}
	Major	45	90.0	48	96.0		
➤ Required lab tests (Routine blood tests)	Yes	47	94.0	46	92.0	0.154	0.695 ^{n.s}
	No	3	6.0	4	8.0		
➤ Required radiological imaging (Chest, abdominal and pelvic X ray as well as ECG)	Yes	44	88.0	42	84.0	0.332	0.564 ^{n.s}
	No	6	12.0	8	16.0		

(n.s) not significant Significant at ≤ 0.05

(*) Statistically Significant at ≤ 0.05

(**) Highly statistically

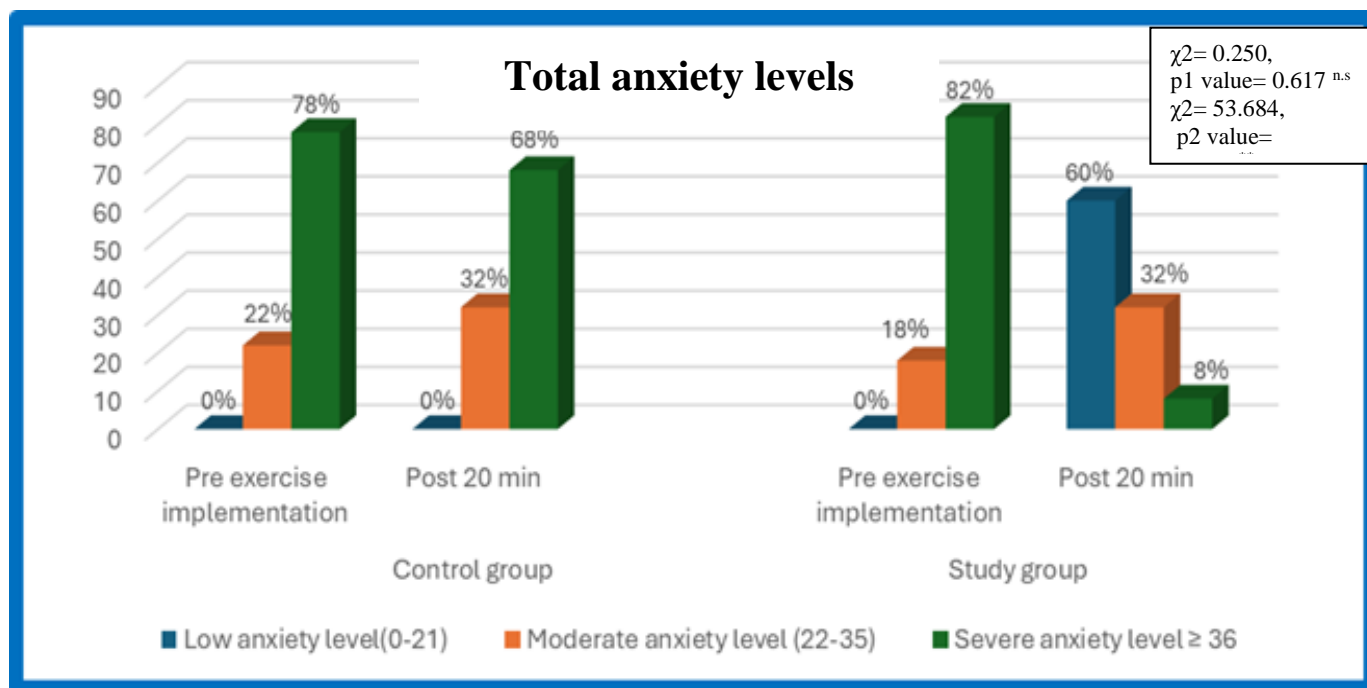


Figure (1): Comparison of total anxiety levels among patients pre and post 20 minutes of exercise implementation (control group=50, and study group =50)

Table (3): Comparison of patients' hemodynamic parameters between control and study group of patients pre and post 20 min of exercise implementation (N=100).

Hemodynamic Parameters	Control group (n=50)		Study group (n=50)		T test P value (1)	T test P value (2)	T test P value (3)
	Pre	Post	Pre exercises	Post 20 min of exercises			
	X̄ ± SD	X̄ ± SD	X̄ ± SD	X̄ ± SD			
➤ Systolic blood pressure ≤120 mmHg	136.60±6.26	142.00±8.08	134.80±6.14	116.40±4.84	0.825 0.411 n.s	16.628 <0.001**	14.977 <0.001**
➤ Diastolic blood pressure ≤ 80 mmHg	85.30±5.47	86.90±5.70	84.10±5.41	77.20±4.53	0.910 0.365 n.s	6.911 <0.001**	7.920 <0.001**
➤ Heart beats (60-100) b/m	96.92±8.69	103.00±10.60	95.06±8.10	78.90±6.94	0.594 0.554 n.s	10.707 <0.001**	17.961 <0.001**

Not significant (p > 0.05) (*) Statistically Significant at ≤0.05 ** Highly significant (p ≤ 0.001)

p 1 value for comparing pre-exercise parameter scores between control and study groups

P 2 value for comparing post 20 min of exercises parameters scores between control and study groups

P3: value for comparing pre and post exercises hemodynamic parameters score among study group

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Table (4): Correlation coefficient between studied variables among patients (control & study groups) post 20 minutes of alternative nasal breathing exercise (N=100).

Variables		Anxiety score	
		r	P -value
Systolic blood pressure (MmHg)	Study group	0.737	0.049*
	Control group	0.435	0.002*
Diastolic blood pressure (MmHg)	Study group	0.322	0.023*
	Control group	0.512	<0.001**
Heart beats rate b/m	Study group	0.514	<0.001**
	Control group	0.368	0.008*
Anxiety	Study group	-	-
	Control group	-	-

Discussion:

Preoperative anxiety considered as subjective and non-specific condition of apprehension, stress and fear about something with an unspecific outcomes as: the disease itself, operation, anesthesia, death, pain, separation from loved persons, not waking up from anesthesia, permanent disability post-surgery, having severe discomfort after surgery or prolonged recovery (Ruiz Hernández et al., 2021).

Concerning the personal data of pre operative patients, the findings of the current study clarified that about half of study group and less than half of control group patients were in the age category 40 to less than 50 years old. this might be due to the health problems begin to appear in this age period that may need surgery, this because of changes in the body that occur due to a multitude of factors as genetic makeup and hormone changes.

This result agreed with Eberhart et al., (2020) who conducted a cross-sectional study on specific pre operative fears and its risks and reported that approximately half of

studied patient aged from 40-49 years old. In addition, study done by Yu et al., (2022) about anxiety among Chinese Patients who have elective surgeries confirmed that, more than half of studied patients aged from 37-48 years old.

At the same perspective, Rashid et al., (2023) in their study concerning and Health Problems associated with pre-operative anxiety of among patients attending hospitals, Iraq found that, the majority of studied patient aged from 40-49 years. On the other hand, this result disagreed with Barkhori et al., (2021) in study about anxiety among preoperative patients at educational hospitals that reported more than half of them aged from 20-40 years old.

Concerning to marital status, the present study revealed that more than half of study and control groups were married. This result may be due to that normal range of marriage's age is between 20 to 60 years old. This result agreed with Acharya et al., (2020) who revealed that the majority of studied group were married. Additionally, this finding

agreed with **Khalili et al., (2020)** who found that more than half of studied group were married. This result agreed with **Ibrahim, et al., (2022)** who revealed that the majority of surgical patients were married.

In relation to educational level, the current study' result was more than half of studied subjects had intermediate education. At the same line, **Oyediran et al., (2022)** showed that more than two third of studied group had intermediate education.

Also, this finding agreed with **Abate et al., (2020)** who conducted meta-analysis study about anxiety among surgical patients and found that, income and education level considered basic factors affecting anxiety as low education was associated with higher anxiety. Additionally, **Keshvari et al., (2021)** found in their study that the majority of patients had intermediate education. Conversely, **Acharya et al., (2020)** clarified that more than half of studied group had bachelor degree.

Regarding job, according to study results, more than half of study group and control group were not working. This might be due to the majority of sample were females and had intermediate education so they preferred to be a house wives rather than working. This finding agreed with **Woldegerima et al., (2018)** who showed that more than half of subjects were not working. While it disagreed with **Raslan et al., (2021)** who reported that more than half of the studied patients already working.

Regarding residence, the present study revealed that the majority of surgical patients lived in rural area. This might be due to distance from health services leading to increase the health problems due to lack of health follow up

This finding agreed with **Raslan et al., (2021)** who reported that more than half of patients lived at rural area. This finding disagreed with **Khalili et al., (2020)** who clarified that more than half of the studied group were urban.

In terms of previous surgical experience, the present study showed that more than two thirds of study group and more than half of control group had not any previous surgery and were more anxious prior to surgery. This could be due to being not have any previous experience regarding anesthesia and surgery increases patient' anxiety level.

This result was in alignment with **Engda et al., (2022)** in their study about magnitude of anxiety and its associated factors among surgical patients who confirmed that the majority of studied groups had not previous surgery.

Regarding practicing any breathing exercises in the hospital previously, majority of both study group and control group had not performed any breathing exercises while being in the hospital previously. **This might be** because efficacy of breathing exercises remains controversial and not included as part of care provided to patients.

On the same perspective, **Al-Reda & Rajha, (2020)** showed in their study that the majority of subjects had not perform any breathing exercises and there was an improvement in pulmonary function after the application of the breathing exercise. In addition, **Yilmaz, (2020)** found in his study that the majority of sample had not practice any breathing exercises before surgery.

In relation to time of hospitalization before surgery, the majority of studied

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patients hospitalized one day before surgery. This might be in accordance to hospital policy and surgeons order to: prepare patient for surgery and anesthesia, premedicate prior to surgery, and to control patients' level of anxiety that may cause delay in surgery or sever complication after surgery.

This finding supported by **Maiye & Dailmaz, (2022)** who revealed in their study that most of studied patients were admitted from 1to 2 days prior to surgery for preparations. In addition, **Jiwanmall et al., (2020)** clarified that, more than half of the patients admitted for one day preoperatively.

Concerning type of surgery, the present study showed that the majority of study group and control group admitted for performing a major operation. This finding agreed with **Bedaso& Ayalew, (2019)** who conducted prospective survey concerning anxiety among surgical patients showing that the majority of studied groups admitted for a major operation.

In terms of required lab test and radiological imaging, the majority of study group and control group performed required lab test and radiological examination. **This might be due to** hospital policy that obligate patients who had surgery to do comprehensive lab and radiological examinations to avoid further risks associated with surgery or anesthesia. This finding agreed with **Di Buono et al., (2021)** who found that the majority of studied groups had performed required lab test and radiological examination before surgery to identify high-risk procedures, to optimize the surgical plan and efficiency of the operating room and to change, when needed, the surgical technique or the surgeon.

The present study showed that the majority of patients scheduled for surgery experience both physiological and psychological reactions as anxiety that result in high blood pressure and tachycardia. this might be due to when facing fearful situation as surgery the amygdala (small organ in the middle of brain) goes to work. It alerts nervous system which sets body's fear response into motion. Stress hormones like cortisol and adrenaline are released this lead to increase blood pressure and heart rate this indicates an increase in anxiety level.

Similarly, **Tadesse et al., (2022)** who conducted a cohort study about hemodynamic impacts of preoperative anxiety and found high preoperative anxiety cause significant increase systolic and diastolic blood pressure and heart rate values before surgery.

The present study illustrates that there wasn't statistically significant difference between control group and study group related to anxiety levels before practicing Alternate nostril breathing exercise. This is in the line with a study conducted by **Bhowate & Valsalan,(2020)** about effect of Pranayama on Anxiety levels which reported that practicing pranayama was effective in reducing anxiety and physiological parameters among studied patients .

The present study revealed a significant reduction in anxiety levels and blood pressure among study group as compared to control group after practicing Alternate nostril breathing exercise. This result is roughly consistent with the study conducted by **Khairy et al., (2022)** who clarified that there was measurable reduction in anxiety level and blood pressure after exercise than before. In addition, **Sukumaran et al., (2020)** confirmed that alternative nostril breathing used to calm nervous system, responses,

purify the blood, calm the mind, reduce stress, and promote concentration.

The present study revealed a significant improvement of blood pressure and heart rate levels among study group after practicing Alternate nostril breathing exercise as compared to control group. This result is roughly consistent with the study conducted by **Shah& Kothari, (2020)**, who reported in his study that Alternate nostril breathing exercise had immediate effect on resting heart rate and blood pressure.

Also this is in the line with a study was conducted by **Agrawal et al ., (2020)**, which revealed that there was a significant decline in both systolic and diastolic blood pressure after Pranayama. This may be due to the slow and deep breathing technique activates the parasympathetic nervous system, which effectively manages the heart rate and dilates blood vessels, which in turn controls overall blood pressure. Alternate nostril breathing produces a positive impact on the cardiorespiratory system, where slow-paced breathing leads to decreased systolic and diastolic blood pressure. These findings had validated the first and second research hypothesis.

Regarding Correlation coefficient between studied variables among patients' groups (control & study) post 20 minutes of alternate nostril breathing exercise, the present study showed a positive correlation between anxiety score with systolic, diastolic blood pressure and heart beats. This study finding agreed with **Khairy et al., (2022)** who stated that there was a positive correlation between anxiety, blood pressure, and pulse. If anxiety level increased the blood pressure and heart beats increased and If anxiety level decreased the blood pressure and heart beats decreased too. Also, this

finding agreed with **Gouda et al., (2024)**, who found that there was a positive correlation between anxiety and blood pressure post alternate nostril breathing exercise.

Conclusion:

Alternate nostril breathing exercise seemed to have a positive impact on preoperative patients' anxiety, blood pressure and heart beats.

Recommendations:

- Colored posters that illustrated how to practice alternate nostril breathing exercise should be placed in surgical departments.
- Providing pre operative patients with illustrated, colored and simplified booklet related to alternate nostril breathing exercise
- The same study could be replicated on a large sample size of patients in a different clinical setting and with a different diagnosis
- Studying the effect of alternate nostril breathing exercise on other diseases as heart, respiratory and chronic diseases.

References:

- Abate, S., Chekol, Y. and Basu, B. (2020).** Global prevalence and determinants of preoperative anxiety among surgical patients: a systematic review and meta-analysis. *International Journal of Surgery Open*, 25():6-16, doi: 10.1016/j.ijso.
- Acharya, S., Gurung, R. and Parajuli, B. (2020).** Preoperative anxiety assessment in adult patients undergoing elective surgeries: a cross-sectional observational study. *Journal of Institute of Medicine Nepal*, 42(3): 18-22.

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- Agrawal, P., Sinha, A. and Garg, R. (2020).** Effect of 4 weeks of Pranayama training and 6 min walk test on blood pressure in healthy subjects. *International Journal of Scientific Research*, 9(8): 1-4, doi : 10.36106/ijsr.
- Al-Reda, D. and Rajha, A. (2020).** Effect of preoperative breathing exercise on postoperative patients' lung functions. *Indian Journal of Forensic Medicine & Toxicology*, 14(1):1036-1042, doi.org/10.37506/ijfmt.
- Barkhori, A., Pakmanesh, H., Sadeghifar, A., Hojati, A. and Hashemian, M. (2021).** Preoperative anxiety among Iranian adult patients undergoing elective surgeries in educational hospitals. *Journal of Education and Health Promotion*, 10(1):1-6, doi: 10.4103/jehp.jehp_815_20.
- Bedaso, A. and Ayalew, M. (2019).** Preoperative anxiety among adult patients undergoing elective surgery: a prospective survey at a general hospital in Ethiopia. *Patient safety in surgery*, 13(18): 1-8. doi:10.1186/s13037-019-0198-0
- Bedaso, A., Mekonnen, N. and Duko, B. (2022).** Prevalence and factors associated with preoperative anxiety among patients undergoing surgery in low-income and middle-income countries: a systematic review and meta-analysis. *British medical journal*, 12(3): e058187, doi: 10.1136/bmjopen-2021-058187.
- Bhowate, A. and Valsalan, W. (2020).** An Experimental Study on Effect of Pranayama on Anxiety and Selected Physiological Parameters in Patients Undergoing Radiation Therapy for the First Time at a Selected Hospital of a Metropolitan City. *International Journal of Nursing and Medical Investigation*, 5(3):27-32, doi:10.31690/ijnmi.2020.v05i03.001
- Chiu, P., Li, H., Yap, K., Lam, K. and Wong, C. (2023).** Virtual Reality–Based Intervention to Reduce Preoperative Anxiety in Adults Undergoing Elective Surgery: A Randomized Clinical Trial. *JAMA network open*, 6(10):e2340588. doi:10.1001/jamanetworkopen.
- Di Buono, G., Romano, G., Galia, M. and Maienza, E. et al (2021).** Difficult laparoscopic cholecystectomy and preoperative predictive factors. *Scientific reports*, 11(1), 2559, doi: 10.1038/s41598-021-81938-6.
- Eberhart, L., Aust, H., Schuster, M. and Sturm, T. et al (2020).** Preoperative anxiety in adults-a cross-sectional study on specific fears and risk factors. *BMC psychiatry*, 20(1):140,doi: 10.1186/s12888-020-02552-w.
- Engda, A., Yigzaw, H., Engdaw, N., Basha, E. and Belew, M. (2022).** Magnitude of preoperative anxiety and associated factors among adult surgical patients in Debre Berhan Comprehensive Specialized Hospital. *International Journal of General Medicine*, 5(15):5999-6007. doi: 10.2147/IJGM.S369921.
- Gouda, A., Saadoon, O., Abd Algany, M. and Elmashad, H. (2024).** Effect of Alternate Nostril Breathing Exercise on Reducing Anxiety and Blood Pressure among Pre-eclamptic Women. *Egyptian Journal of Health Care*, 15(1), 1698-1711,doi: 10.21608/ejhc.2024.350651.
- Govind, S. (2022).** Perioperative Phases of Surgery Management. *Journal of Perioperative Medicine*,5(135):1-1,dio: 10.35248/2684-1290.22.5.135.
- Ibrahim, B., Abd Elkhaliq, E., Saad, M., Amein, N. and Abd El-Fatah, S. (2022).** Efficacy of Acupressure on Post-Operative Pain, Anxiety Level and Sleep quality for Abdominal Surgical Patients. *Egyptian Journal of Health Care*, 13(4): 1880-1891,dio: 10.21608/ejhc.2022.311740
- Jiwanmall, M., Williams, A., Kamakshi, S., Sugirtharaj, L., Poornima, K. and Jacob,**

- K. (2020).** Preoperative anxiety in adult patients undergoing day care surgery: prevalence and associated factors. *Indian journal of psychological medicine*, 42(1):87-92. doi: 10.4103/IJPSYM.IJPSYM_180_19.
- Keshvari, M., Yeganeh, M., Paryad, E., Roushan, Z. and Pouralizadeh, M. (2021).** The effect of virtual reality distraction on reducing patients' anxiety before coronary angiography: a randomized clinical trial study. *The Egyptian Heart Journal*, 73(1):1-8. doi: 10.1186/s43044-021-00224-y. 73, 1-8.
- Khairy, A., Hassanein, A. and Abdelkhalek, W. (2022).** Effect of Nadi Shodhana Pranayama Exercise on Blood Pressure and Anxiety among Preoperative Patients. *Mansoura Nursing Journal*, 9(2), 375-386, doi: 10.21608/mnj.
- Khalili, N., Karvandian, K., Ardebili, H., Eftekhari, N. and Nabavian, O. (2020).** predictors of preoperative Anxiety Among Surgical Patients in Iran: An Observational Study. *Archives Of Anesthesia And Critical Care*,6(1):17-22 doi:10.18502/aacc.v6i1.2044
- Maiye, S., and Dal Yilmaz, Ü. (2022).** Assessment of preoperative anxiety among surgical patients. *Midwifery*, 2(2):53-61,dio:10.5152/MNM.2022.225072
- Oyediran, O., Fwacn, A., and Ayandran, E.(2022).** Preoperative Anxiety, Expectations and Challenges of Surgical Patients in a South Western State's Hospitals, Nigeria. *International Journal of Nursing*, 9(1): 32-41, DOI:10.15640/ijn.v9n1a4
- Pardede, J., Simanjuntak, G., and Manalu, N. (2020).** Effectiveness of deep breath relaxation and lavender aromatherapy against preoperative patient anxiety. *Diversity and Equality in Health and Care*, 17(4): 168-173, dio:https://doi:10.36648/2049-5471.17.4.209.
- Quintao, S., Delgado, A. and Prieto, G. (2013).** Validity study of the beck anxiety inventory (Portuguese version) by the rasch rating scale model. *Psicologia: Reflexão e Crítica*, 26(2), 305–310, doi.org/10.1590/S0102-79722013000200010
- Rashid, H., Hamad, K. and Ahmed, B. (2023).** Pre-Operative Anxiety and Health Problems of Patients Attending Hospitals of Kirkuk, Iraq: Pre-Operative Anxiety. *International Journal of Medical Sciences*, 6(3): 16-26, doi: https://doi.org/10.32441/ijms.
- Raslan, H., Salem, E., AbdElaal, A., Mahmoud, O. and Almanzlawi, H. (2021).** Preoperative anxiety level and fear of covid 19 among adult patients undergoing elective surgery. *Egyptian Journal of Health Care*, 12(2): 693-704,doi 10.21608/ejhc.2021.169600
- Ruiz Hernández, C., Urquiza, J., Pradas, L. and Vargas, K. et al (2021).** Effectiveness of nursing interventions for preoperative anxiety in adults: A systematic review with meta-analysis. *Journal of advanced nursing*, 77(8):3274-3285. doi: 10.1111/jan.14827.
- Shah, M. and Kothari, P. (2019).** Effects of nadi-shodhana pranayama on depression, anxiety, stress and peak expiratory flow rate in post CABG patients: experimental study. *International Journal of Health Sciences and Study*, 9(10): 40-45.
- Sefidkar,R. &Madadzadeh,F.,(2022).** A Tutorial on Quasi -Experimental Designs, *Journal of Community Health Research*; 11 (1): 3 – 4.
- Sukumaran, S., Asokan, D., Sukesh, N. and Vijayan, V. (2020).** Using pranayama or yoga breathing to mitigate stress and anxiety during the COVID-19 pandemic. *Yoga Phys Ther Rehabil*, 5: 1076. DOI: 10.29011/2577-0756.001076.
- Tadesse, M., Ahmed, S., Regassa, T., Girma, T. and Mohammed, A. (2022).** The hemodynamic impacts of preoperative anxiety among patients undergoing elective surgery:

Effect of Alternate Nostril Breathing Exercise on Preoperative Patients' Anxiety, Blood Pressure and Heart Beats

An institution-based prospective cohort study. *International Journal of Surgery Open*, 43(1):100490, doi:10.1016/j.ijso.

Tait, A. and Howell, S. (2021). Preoperative hypertension: perioperative implications and management. *BJA education*, 21(11): 426.-432, doi: 10.1016/j.bjae.2021.07.002.

Tripathy, M. and Sahu, B. (2019). Immediate effect of Nadi Shodhana pranayama on blood glucose, heart rate and blood pressure. *Journal of American Science*, 15(5): 65-70, doi:10.7537/marsjas150519.09.

Udaykumar, K., Ukkirapandian, K., Selvaraj, S. and Kannan, D. (2021). Effect of alternate nostril breathing on cardio respiratory parameters and muscle strength among rotating shift workers. *Bioinformation*, 17(2): 320-325, doi: 10.6026/97320630017320.

Upadhyay, J., Shetty, S., Saoji, A. and Yadav, S. (2023). Effects of Nadishodhana and Bhramari Pranayama on heart rate variability, auditory reaction time, and blood pressure: A randomized clinical trial in hypertensive patients. *Journal of Ayurveda and Integrative Medicine*, 14(4):100774, doi: 10.1016/j.jaim.2023.100774.

Woldegerima, Y., Fitwi, G., Yimer, H. and Hailekiros, A. (2018). Prevalence and factors associated with preoperative anxiety among elective surgical patients at University of Gondar Hospital. Gondar, Northwest Ethiopia, 2017. A cross-sectional study. *International Journal of Surgery Open* 12 (2): 21-29, doi.org/10.1016/j.ijso.

World Health Organization (WHO), (2023). Safe surgery. Available at: <https://www.who.int/about/policies/privacy>. Accessed on 14/3/2023, at 10Am.

World Health Organization. (2022). Preoperative anxiety. Available at: <https://www.medicalnewstoday.com/>. Accessed on 15/1/2024, at 11pm.

Yilmaz, M. (2020). The effect of progressive breathing relaxation training on preoperative anxiety and surgical stress response. *International Journal of Caring Sciences*, 13(2):1287-1296.

Yu, J., Zhang, Y., Yu, T., Mi, W., Yao, S. and Huang, Y. (2022). Preoperative Anxiety in Chinese Adult Patients Undergoing Elective Surgeries: A Multicenter Cross-Sectional Study. *World Journal of Surgery*, 46(12): 2927-2938, doi: 10.1007/s00268-022-06720-9.

تأثير تمرين التنفس الأنفي البديل على القلق وضغط الدم ونبضات القلب لدى مرضى ما قبل الجراحة

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يعتبر القلق قبل الجراحة مصدر خوف حقيقي للعديد من المرضى الذين يخضعون للتخدير والجراحة التي قد تسبب عدم انتظام نبضات القلب وارتفاع ضغط الدم. لذلك هدفت هذه الدراسة إلى تقييم فعالية تمرين التنفس الأنفي البديل على القلق وضغط الدم ونبضات القلب لدى المرضى ما قبل إجراء العمليات الجراحية. وأجريت هذه الدراسة في وحدات الجراحة العامة بمستشفى بنها الجامعي بمحافظة القليوبية وقد تم استخدام تصميم شبه تجريبي يتمثل في إجراء اختبارًا قبليًا وبعديًا على عينة هادفة مكونة من 100 مريض بالغ قبل الجراحة تم تقسيمهم بالتساوي إلى 50 مريض مجموعة الدراسة و 50 مريض مجموعة المراقبة طبقا لمعايير الاشتمال والاستبعاد. أشارت النتائج إلى تحسن ذي دلالة إحصائية في مستوى قلق المرضى، وضغط الدم الانقباضي، وضغط الدم الانبساطي، ونبضات القلب بعد تنفيذ التمرين لذلك تم دعم فرضية الدراسة وتم تحقيق الهدف من الدراسة. وأوصت الدراسة بأنه ينبغي إجراء المزيد من الدراسات البحثية على عينة احتمالية كبيرة من مناطق جغرافية مختلفة.