

Efficacy of Alternate Nostril Breathing for Controlling Blood pressure, Anxiety and Heart rate among Egyptian Hypertensive Patients - An interventional one arm Study

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Abstract

Objective: The study examined the effect of Alternate Nostril Breathing exercise (ANB) on blood pressure, anxiety, and heart rate among Egyptian hypertensive patients. **Methods:** A quasi-experimental one group pretest and Post-test design was used. Conducted at outpatient's clinic in specialized medical hospital university of mansoura-Egypt. Sixty essential hypertensive patients were selected according to the study's' inclusion criteria. Intervention included continuous ANB exercise for four weeks, 2 times a day for 10 minutes in each therapy. The patient was assessed pre, on the 6th day, and at the end of 4 weeks. Tools included the State-Trait Anxiety Inventory, a mercurial sphygmomanometer, and a stethoscope were used to measure blood pressure and radial artery for measuring a pulse. **Results:** The data were analyzed using one ANOVA and Wilcoxon test. Showed that there was a significant decrease in blood pressure readings, heart rate, and anxiety level post the intervention, $P < 0.0001$ showed a marked significant change in pre-post-assessment on the 6th day and at the end of 4 weeks. **Conclusion:** Overall, alternate nostril breathing exercise was effective in reducing hypertension, anxiety level, and heart rate. It's a safe, society accepted, easily performed, and does not require preparation or training. **Recommendation:** Alternate nostril breathing highly recommended for the nursing staff to incorporate it in the routine nursing care to all hypertensive patients.

Keywords: Alternate Nostril Breathing, Anxiety, Blood pressure, Heart rate, and Egyptian Hypertensives.

Introduction The problem of hypertension

Hypertension (HTN) is one of the main public health problems in both developing and developed countries and an important risk factor for coronary, cerebrovascular, and renal diseases. Increasingly, high blood pressure is the common denominator in premature deaths and serious complications in adults. It's responsible for nearly 20% of all death worldwide. By the year 2025, 29% of the world's adult population projected to suffer from hypertension (Gadallah, Abd elMegid, Mohsen & Kandil, 2018).

Based on the 2020 international guidelines, HTN can be diagnosed when there is a persistent rise in the systolic and diastolic pressure above the normal range $\geq 140/ \geq 90$ mmHg. It is also categorized as Class 1 when blood pressure value is $140 -159 / 90-99$ mmHg and Class 2 when systolic and diastolic blood pressure reading is $\geq 160/ \geq 100$ mmHg

(Dhingra, Mugdha, Jungari & Shrivastava, 2020).

Alternate Nostril Breathing (ANB) exercise for -hypertension and anxiety

Conscious guiding of breath enhance vitality, physical detoxification, relaxation, it further strengthens the body's defense against diseases (Jennifer, 2000). Studies have shown that ANB exercises improves relaxation of the body and calm the mind by stimulating the parasympathetic nervous system and suppressing sympathetic activity in client with hypertension which helps to decrease the pulse rate, and control blood pressure (Janet & Gowri, 2017 ; Ttryambake , 2013).

D'Silva, Vinay and Muniarayanappa (2014) findings emphasized on effectiveness of deep breathing exercise in alleviating HR, anxiety level, and blood pressure readings.

Interestingly, Kalaivani, Kumari, and GK Pal (2019) stated that ANB exercise was

effective in decreasing systolic BP (SBP), diastolic Bp (DBP), pulse, and anxiety

Significance of the study

High blood pressure is a chronic and common disease among Egyptians, with a prevalence rate of 26.3 % in adults. Its incidence accelerates with aging, around fifty percent of elderly Egyptians have hypertension. Furthermore, noncompliance to the anti-hypertensive regimen is high (Doaa et al., 2014).

About two-thirds of hypertensive patients are at risk of cardiac diseases. Not surprisingly, when called “silent killer”. Hypertension has no overt manifestations that may be easily detected & over fifty percent of hypertensive patients ignore that they have the disease until organ damage has been established to heart, brain, and kidney (Ibrahim, 2013).

Hypertension is treated through the use of anti-hypertensive medications, and lifestyle modification, the ANB has been shown to be the most efficient in decreasing blood pressure in hypertensive subjects (Amandeep, Preksha & Divya, 2015). Additionally, Gilbert (2003) and Telles, Yadav, Kumar, Sharma, and Visweswaraiyah (2013) confirmed that breathing exercises were widely used to decrease anxiety rates and were effective in controlling pulse and blood pressure. In Egypt, until now few works are conducted to investigate the effect of ANB exercise on anxiety, pulse, and blood pressure in hypertensive patients.

Aim of the study

This study examined the efficacy of ANB exercise on anxiety, pulse, and blood pressure of Egyptian hypertensive patients.

Research Hypotheses

- H1.** There is a significant change in blood pressure readings post practicing Alternate Nostril Breathing exercise among hypertensive patients.
- H2.** There is a marked improvement in anxiety level post practicing Alternate Nostril Breathing exercises among hypertensive patients.

- H3.** There is a significant reduction in pulse (heart rate) post practicing ANB exercise among hypertensive patients.

Variables of the study

Dependent variables dependent variables used in the current research study were blood pressure (SBP & DBP) reading, Anxiety levels, and Heart rate (HR).

Independent variable the independent variable used during the current study was Alternate Nostril Breathing exercises (ANB).

Subjects and Methods

Research design

A quasi-experimental using the one group pre- post-test design approach was utilized to implement this study. These designs like experimental design and test casual hypothesis. Usually, it uses to evaluate the effect of an ongoing program on one or more indicators of output or outcome. It possesses two characteristics pre- post-test and, they compare outcomes at a time (Corbin & Strauss, 2009).

Setting

This study was implemented in an outpatient's clinic in Specialized Medical Hospital University of Mansoura-Egypt from April 16 to November 10, 2019.

Sample

A purposive sample of 36 female and 24 male patients were involved in this study. Sixty essential hypertensive patients who were admitted to the previous setting were selected according to the study's' inclusion criteria.

Inclusion criteria adult patients of both sexes, age starting from 20 to 60 years, attending hypertension clinic, diagnosed as primary hypertension, willing to be involved as a participant in the study. Patients with BP as Class 1 when blood pressure value is 140 – 159 / 90–99 mmHg, and Class 2 when systolic and diastolic blood pressure reading is $\geq 160 / \geq 100$ mmHg in line with 2020 international guidelines (Dhingra et al., 2020).

The exclusion criteria subjects who were previously involved in a breathing exercise program, and smokers, those with comorbidity affecting mental or physical health.

People with extreme age groups > 60 yrs. or < 20yrs. Drugs and alcohol abuser, whose SBP was less than 140 mm Hg with medication. Participants with a renal, eye and neurologic problems were excluded from the study.

Sample size calculation the sample size for studying the effect of left NB in hypertensive patients was calculated using DSS research.com software. At alpha error 1% (significance 99%) and β error 1% (study power 99%) and SBP = 144.5 ± 3.68 mmHg before intervention (Naik et al., 2012). with 2% expected improvement (decrease) in systolic blood pressure after the intervention. The sample size was 55 by adding (10%) to catch up on drop out. Thus, the calculated sample size was 60 patients.

Data collection tools

- Sociodemographic and health-relevant datasheet** this tool was constructed after a comprehensive review of relevant national and international references, include age, gender, marital status, residence, educational level, and occupation, etc.
- The Korean version of the State-Trait Anxiety Inventory, Trait Version (KSTAIT)** Clearly, K - STAI - T is a valid scale for measuring anxiety, it consists of elements that are highly internally consistent and suitable for psychometrics. It appeared in more than 3000 studies around the world that the Korean Anxiety Scale is the most widely used and popular (Spielberger, 1983). The STAI-T has a stock of 20 items Likert scale and each item is rated from 1 to 4. The thirteen items are formulated in a way that higher scores indicate more anxiety. The remaining 7 items are negatively loaded and must be inverted to reduce the effect of compliance.

Reliability and item-level analyses Proved that the K - STAI - T had sufficient internal consistency, with a Cronbach alpha of 0.89 for the entire scale.

- Tool to measure the dependent variables like BP and HR. A mercurial Sphygmomanometer and a stethoscope were used to measure blood pressure. A stethoscope is placed on the artery of the upper right limb by the auscultation method. The measurement of the heartbeats in

the right radial artery by palpation for one minute.

Validity and reliability of tools the content validity of tools was validated by a panel of seven experts in the field of the study (six were nurse professors acting at faculty of nursing and one medical professor who had expertise in developing such instruments and also the necessary modification was done accordingly. The tool was tested for its reliability by test-retest measurements and Cronbach alpha. ranged from $r = 0.90 - r = 0.97$ and Cronbach alpha (r.alpha) = .878.

Pilot Study

A pilot study was implemented on (10%), to examine the clarity and applicability of the instruments and to detect the time needed to fill in the tools. Modification were done according to the results of the pilot. Patients participating in the pilot trial were excluded from the research sample.

Procedure

The official written statements to implement the study were derived from the ethical research committee of the faculty of nursing university of mansoura. The administrative approval was taken from the director of the specialized medical hospital, as well as director of the follow-up outpatient clinic of specialized medical hospital, University of Mansoura, Egypt. This was done after clarifying the purpose and nature of the study.

Oral consent was obtained from the study sample before their inclusion. The study was conducted inside the previously mentioned settings from 4th February to tenth September 2019. The sample was taken by using a simple experimental calculation formula: 55 respondents, added 10% of the whole sample to compensate dropouts, therefore the total sample was sixty participants. The initial assessment conducted by a specialized health care provider, to determine patients with primary hypertension were directed to the researcher as appropriate for the study inclusion criteria.

Intervention

The data collected during this study were measurement of BP, pulse, and anxiety (pre-test phase). The study sample was advised to sit in a comfortable semi-sitting position in a quiet room and erect the head, neck, and trunk during ANB, then measure and record the study variables, (1) blood pressure by using a mercurial sphygmomanometer and a stethoscope placed in the systemic artery of the upper right limb by the auscultation method. (2) the measurement of the pulse in the right radial artery by palpation for one minute.

The ANBE therapy was given for four weeks, 2 times a day/ for 10 minutes in each therapy. Then, the patients were instructed to shut his right nostril by their thumb and slowly take deep inspiration, through the left nostril. The subjects were instructed to shut their other nostril (left) and open the right nostril to expiate slowly. Then, they were asked to inspire also through the right nostril (close left nostril) then to open the left nostril and exhale as learned previously.

Pulse and blood pressure were measured by the researchers after the ANB. An instruction has been given to repeat ANB twice a day for ten minutes, every session for four weeks. For the duration of the study, the researcher monitored and made sure that there were no changes in antihypertensive drugs and motivated the participants to practice breathing exercises. During the second assessment, on the 6th day of ANB, subjects were directed to sit in a comfortable semi-sitting position. Patients' anxiety, pulse, and blood pressure were assessed, and so they were advised to practice the learned ANB exercise. Measurements of the study variables were recorded in the evaluation form. These measurements were repeated post 4 weeks.

Ethical considerations and human rights

The approval of the scientific research ethics committee was obtained. Oral consent was obtained from hypertensive participants who agreed to participate before their inclusion in the study post clarification of intervention and aims of the research. Anonymity and confidentiality were absolute to participants. The researcher stressed that participation is

totally voluntary and confidential. Anonymity, privacy, rights, the safety of participants were fully assured from the beginning of the study, and only the researcher had access to the participant's data. Study participants can withdraw at any time.

Conceptual framework

Conceptual framework of this study was created on five- steps nursing process model. The nursing process is a systemic, rational technique of planning and implementing nursing care. Its purpose is to determine the client's health care situation and actual or risk health problems to create a plan to meet the identified need and to provide specific nursing interventions to meet those needs.

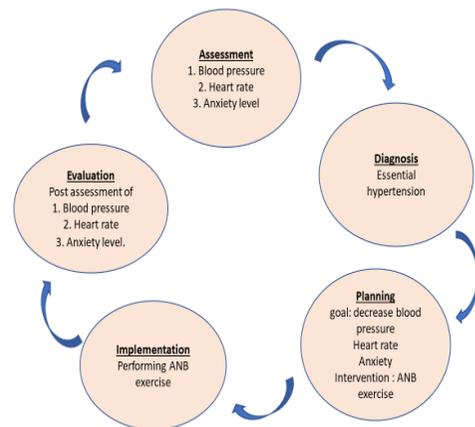


Figure1. Conceptual framework established on five -steps nursing process model

Statistical analysis

The data of 59 subjects were analyzed due to the exclusion of one patient who was moved to another hospital. The collected data were coded, processed, and analyzed using the SPSS (Statistical Package for Social Sciences) version 15 for Windows® (SPSS Inc, Chicago, IL, USA). Qualitative data were presented as numbers and percentages. Comparison between groups was done by Chi-Square test. Quantitative data were tested for normality by the Kolmogorov-Smirnov test. Normally distributed data were presented as mean \pm SD.

A paired t-test was used for comparison within groups. F-test (One Way ANOVA) was used to compare between more than two

groups. Wilcoxon signed ranks test was used for comparison within the group. Pearson's correlation coefficient was applied to test the correlation between variables.

A statistical index of the degree of linear dependence between the pair of values taken by the observation of two variables. By definition,

this must lie between +1 and -1, being positive if the two variables increase or decrease together. A zero-correlation coefficient (r) implies a total absence of correlation. $P < 0.05$ was considered to be statistically significant.

Results

Table 1 shows that of the 59 patients with primary hypertension, women represented 36 and 23 constituted males' number. About three-quarters of the patients ranged in age from 41 to 60 years. Most of the participants were married and lived in rural areas. Thirty-seven percent of the patients had terminated the elementary level of education. Nearly 49.2% of participants were housewives. Approximately half of the participants 55.9% and 40.7 % had a family history of hypertension and diabetes respectively.

Table (1): Characteristics of the study participants N = 59

	No	%
Age		
20 – 40y	16	27.1
41 – 60y	43	72.9
Sex		
Male	23	39.0
Female	36	61.0
Marital status		
Single	1	1.7
Married	46	78.0
Divorced	2	3.4
Widow	10	16.9
Living status		
with my family	49	83.1
I live alone	10	16.9
Residence		
Rural	44	74.6
Urban	15	25.4
Family number		
3	22	37.3
5	27	45.8
7 or more	10	16.9
Room number		
1	4	6.8
3	44	74.6
5 or more	11	18.6

Table (1) cont. Characteristics of the study participants N = 59

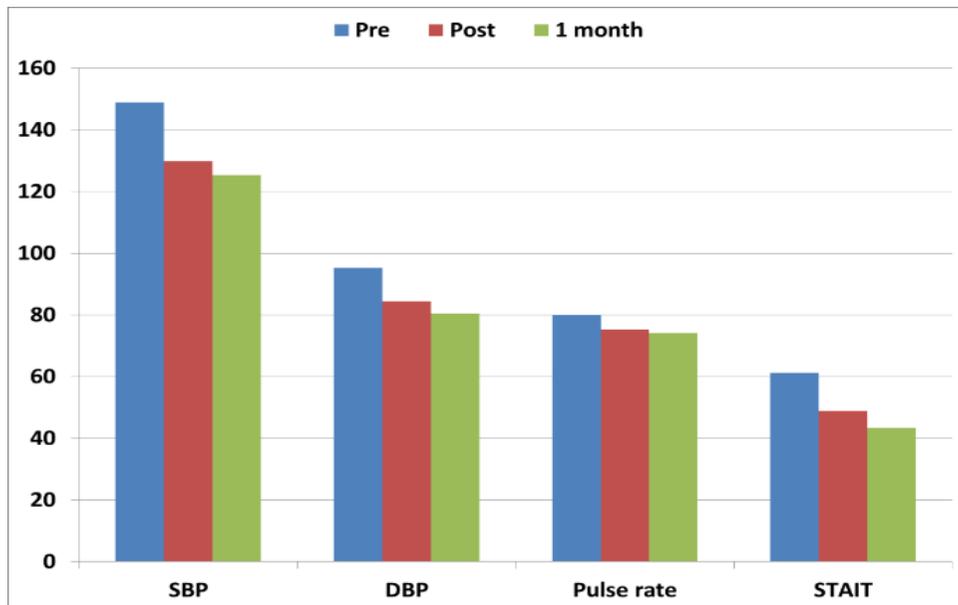
Income	No	%
Less than average	23	39.0
Average	35	59.3
High	1	1.7
Living type		
Rent	17	28.8
Titling	33	55.9
Independent	8	13.6
Mutual	1	1.7
Education		
Illiterate	16	27.1
Read & Write	22	37.3
High	16	27.1
University	5	8.5
Current job		
Governmental	16	27.1
Private	6	10.2
Housewife	29	49.2
Pensioner	5	8.5
Other	3	5.1
Disease family history		
Hypertension	33	55.9
DM	24	40.7
Brain hemorrhage	9	15.3
None	1	1.7
Duration of hypertension		
Mean ± SD	9.36 ± 7.92	
Range	0 – 35	

When we analyze the continuous effects of ANB on blood pressure readings, pulse, and anxiety level pre, post 6 days and after four weeks of breathing exercise, we find the results of the study in a table (2) and figure (2) confirmed that, there has been a significant change in the average value before and after 4 week-assessment in systolic BP (148.81 ± 19.75 and 125.25 ± 11.5), diastolic BP (95.17 ± 22.72 and 80.34 ± 7.42), heart rate (79.95 ± 12.11 and 74.19 ± 7.57), and anxiety level (61.24 ± 8.77 and 43.42 ± 9.46) after continuous 4-week intervention. By using the paired “t-” test to detect the differences between study variables at a different point. The test indicated that there were highly statistically significant changes in systolic and diastolic blood pressure readings as well as anxiety level pre versus post 6 days additionally post 6 days versus 4 weeks respectively where $P < 0.001^{**}$. It appears that there has been a significant decrease in the systolic and diastolic BP and anxiety levels after the continuous 4-week ANB. Interestingly its effect on heart rate showed statistically significant differences between measurements before and after six days and at the end of 4 weeks where $P < 0.001^{**}$. The study findings as showed in table 2 & figure 2 proved that alternate nostril breathing exercises had a better effect on the reduction of BP, anxiety level and heart rate among essential hypertensive patients.

Table (2): Effect of alternate nostril breathing on blood pressure readings, pulse rate and anxiety pre, post 6 days and after four weeks of breathing exercise N= 59

	Pre	Post 6 days	Post 4 weeks	Pre vs post 6 days	Pre vs 4 weeks
SBP	148.81 ± 19.75	129.88 ± 13.75	125.25 ± 11.5	P<0.001**	P<0.001**
DBP	95.17 ± 22.72	84.49 ± 22.35	80.34 ± 7.42	P<0.001**	P<0.001**
Pulse rate	79.95 ± 12.11	75.37 ± 8.6	74.19 ± 7.57	P<0.001**	P<0.001**
STAI	61.24 ± 8.77	48.86 ± 9.94	43.42 ± 9.46	P<0.001**	P<0.001**

Paired t-test SBP= Systolic Blood Pressure, DBP= Diastolic Blood Pressure, STAI=Stat Trait Anxiety Inventory
Vs=. Versus P < 0.05* statistically significant P<0.001** highly statistically significant

Figure (2) Effect of alternate nostril breathing on blood pressure readings, heart rate and anxiety pre, post 6 days and after four weeks of breathing exercise N= 59

When comparing the level of anxiety among essential hypertensive participants pre, post 6 days, and after 4 weeks of alternate nostril breathing. Table (3) and figure (3) emphasized that there were highly statistically significant differences between anxiety level pre versus post 6 days of intervention as well as post 6 days versus 4 weeks of alternate nostril breathing where $p < 0.001^{**}$.

Table (3) Comparing anxiety level pre, post 6 days and after four weeks of

Anxiety level	Pre		Post 6 day		Post 4 weeks		Pre vs post 6 days	Pre vs 4 weeks
	No	%	No	%	No	%		
Low	1	1.7	12	20.3	17	28.8	Z= 5.291	Z= 5.746
Moderate	24	40.7	42	71.2	41	69.5	P<0.001*	P<0.001
High	34	57.6	5	8.5	1	1.7		

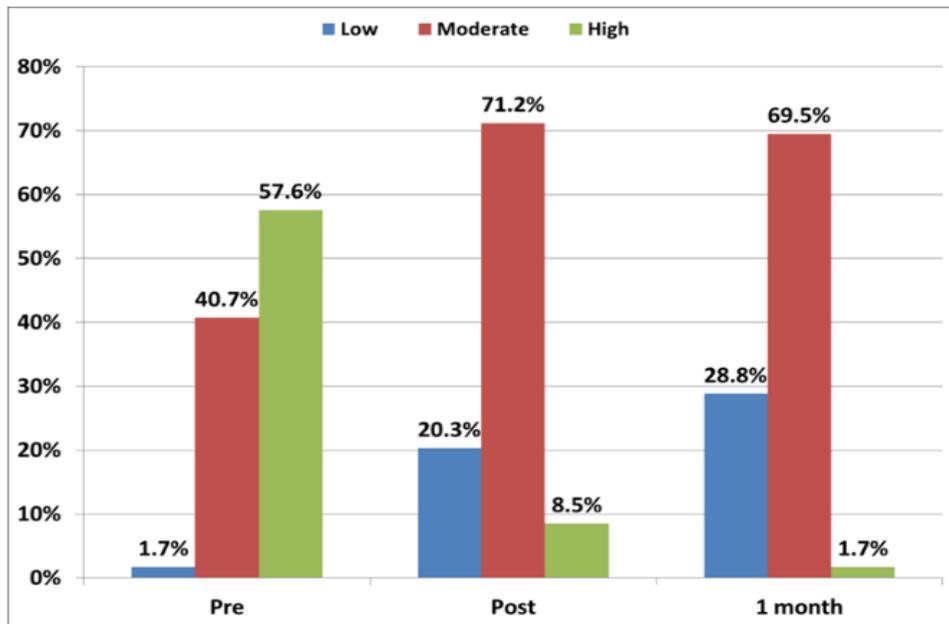
alternate nostril breathing N= 59

Wilcoxon-Sign test KSTAI= Korean Stat Trait Anxiety Inventory

Vs=. Versus P < 0.05* statistically significant

P<0.001** highly statistically significant

Figure (3): Comparing anxiety level pre, post 6 days and after four weeks of alternate nostril breathing N= 59



In light of table 4, we can interpret the relationship between anxiety level, blood pressure readings, and heart rate before and after six days and at the end of the fourth week of alternate nostril breathing. The table clarifies that there was a significant difference between pre-anxiety and SBP, which was high in moderate anxiety (156.67 ± 22) when compared to high anxiety (144.41 ± 15.41), $P = 0.007$. On the other hand, there was no significant difference between pre anxiety and DBP and Pulse rate, $P = 0.535$ & 0.208 respectively. There was a significant difference between post 6 days anxiety and DBP, which was high in low anxiety (135.42 ± 10.76) when compared to high anxiety (124 ± 8.94), $P = 0.007$. On the other hand, there was no significant difference between post 6 days anxiety and SBP and Pulse rate, $P = 0.222$, 0.246 respectively.

Table (4): Correlation between anxiety level, blood pressure readings and pulse rate pre, post 6 days and after four weeks of alternate nostril breathing N= 59

Pre	Low (n = 1)	Moderate (n = 24)	High (n = 34)	F	P
SBP	110 ± .	156.67 ± 22	144.41 ± 15.41	5.380	0.007*
DBP	70 ± .	96.25 ± 22.81	95.15 ± 22.91	0.632	0.535
Pulse rate	78 ± .	83.33 ± 12.5	77.62 ± 11.6	1.615	0.208
Post 6 days	Low (n = 12)	Moderate (n = 42)	High (n = 5)	F	P
SBP	135.42 ± 10.76	129 ± 14.64	124 ± 8.94	1.546	0.222
DBP	102.08 ± 39.28	79.76 ± 13.3	82 ± 4.47	5.397	0.007*
Pulse rate	71.67 ± 5.4	76.24 ± 9.08	77 ± 9.75	1.436	0.246
Post 4 weeks	Low (n = 17)	Moderate (n = 41)	High (n = 1)	F	P
SBP	127.06 ± 12.13	124.63 ± 11.42	120 ± .	0.365	0.696
DBP	82.35 ± 5.62	79.51 ± 8.05	80 ± .	0.878	0.421
Pulse rate	73.59 ± 6.49	74.29 ± 8.08	80 ± .	0.344	0.710

One-Way ANOVA

SBP= Systolic Blood Pressure, DBP= Diastolic Blood Pressure, STAI=Stat Trait Anxiety Inventory

Table 4.1 revealed that ,there was insignificant negative correlation between pre anxiety and SBP, pulse rate ($P > 0.05$) and insignificant positive correlation between pre anxiety and DBP ($P > 0.05$).There was significant negative correlation between DBP and post anxiety ($r = -0.290$, $P = 0.026$) and no significant negative correlation between post 6 days anxiety and SBP, also it was insignificant positive correlation between post 6 day anxiety and pulse rate. There was insignificant negative correlation between post 4 weeks anxiety and SBP & DBP ($P > 0.05$) and insignificant positive correlation between post 4 weeks anxiety and pulse rate ($P > 0.05$).

Table (4.1): Correlation between anxiety level, blood pressure readings and pulse rate pre, post 6 days and after four weeks of alternate nostril breathing N= 59

	Pre anxiety		anxiety post 6 days		anxiety post 4 weeks	
	r	P	r	P	r	P
SBP	-0.115	0.387	-0.136	0.306	-0.130	0.326
DBP	0.002	0.991	-0.290	0.026*	-0.142	0.283
Pulse rate	-0.078	0.556	0.071	0.591	0.010	0.939

Pearson's Correlation Co-efficient

SBP= Systolic Blood Pressure, DBP= Diastolic Blood Pressure, STAI=Stat Trait Anxiety Inventory

Discussion

This study aimed to determine the effect of the ANB exercise on blood pressure, anxiety, and heart rate in Egyptian hypertensive patients. The current study attempted to highlight the beneficial effects of the ANB in patients with primary hypertension. It provided logical evidence for the effectiveness of continuous breathing exercise by testing research hypotheses.

Based on the characteristics of the respondents, about three-quarters of the respondents were 41-60 years old, and most of them were female. This finding comes in accordance with Saraswati Devi (2018) who clarified that, hypertension is a condition that is common among people over the age of 35. Schultz et al. (2013) also found that the highest average age of respondents was 57.9 years old and women were more than men.

When considering the impact of ANB on systolic and diastolic blood pressure, the finding of the present study revealed that there were highly statistically significant changes in systolic and diastolic blood pressure readings post 4 weeks of continuous breathing measured at baseline, post 6 days, and at the end of 4 weeks $p < 0.001^{**}$

The current research results come along with those of Isaac and Indu (2016) who concluded that regular breathing exercise was beneficial in decreasing the blood pressure and heart rate in hypertensive patients where there was a significant decrease in systolic BP,

diastolic BP and pulse after a 5-day continuous ANB exercise. $P < 0.0001^{**}$

The findings also confined with Priya Kumari, Bansal, Sharma and Birendra (2020) who conducted a study on the effectiveness of ANB exercise on SBP&DBP readings, and heart rate, it indicated that there was a significant decrease in systolic blood pressure (BP), diastolic BP after a 5-day continuous ANB exercise. $P < 0.0001^{**}$

Sandeep, Maninder, and Lakhwinder (2015) revealed the same results from other work on the impact of ANB exercise on vital signs among hypertensive patients. It confirmed that there were marked changes in the before- and after-blood pressure reading where $p < 0.05^*$.

The findings are similar to the results of the study done by Tiurmaida, Honesty, and Puteri (2020) who examine the effect of deep breathing exercise on blood pressure, the study revealed that both SBP and DBP were markedly decreased, whereas the blood pressure reduction was more in the study group who under treatment deep breathing than in the control group. Hence hypothesis one was accepted, "there is a significant difference in blood pressure readings post practicing alternate nostril breathing among hypertensive patients".

As regards the impact of ANB on the pulse the current study showed statistically significant differences between heart rate measurements before and after six days and at the end of 4 weeks where $P < 0.001^{**}$.

The present study findings were supported by Samiksha, Kirti, Tejal and Anshu (2020), who implemented research work about the effectiveness of practicing breathing exercises on blood pressure, pulse, and oxygen saturation in hypertensive patients. The study findings showed a significant reduction in blood pressure and heart rate following the exercise.

In another study conducted by Priya Kumari et al. (2020), it was shown that blood pressure reading and pulse markedly reduced post practicing breathing exercise which supports our results as well. Yet another study done by Ghiya and Lee (2012) come in accordance with these results. The study investigates the impact of ANB on the pulse, the findings revealed that there were statistically significant changes in the before-and after-heart rate reading where $p < 0.05^*$

The findings were supported with those of Mohamed, Hanafy, and El-Naby (2013) their studies proved that there were statistically significant differences before and after breathing exercises as regards pulse and blood pressure readings in a study conducted on hypertensive patients.

Telles et al. (2013) found that 18 minutes of breathing alternative nostrils reduce SBP and DBP and heart rate in people with essential hypertension controlled by drugs. Interestingly Mullur Lata et al., (2019) emphasized the above-mentioned findings in decreasing BP and HR. So, hypothesis two was accepted" there is a significant reduction in heart rate post practicing alternate nostril breathing among hypertensive patients".

Concerning the effectiveness of ANB on anxiety level. The current study revealed that there were highly statistically significant differences between anxiety levels post practicing alternate nostril breathing measured pre, at day 6, and at the end of 4 weeks, where $p < 0.001^{**}$.

D'Silva, et al. (2014) confirmed the previous findings who implemented a research work on the impact of deep breathing exercise on anxiety, pulse, blood pressure, and depression. The results clarified the beneficial

effect of deep breathing exercise on decreasing anxiety and diastolic blood pressure.

Gilbert (2003) mentioned that breathing exercise was widely used as training methods for decreasing anxiety levels. Our ANB exercise is a simple yet effective tool in reducing the anxiety levels. Therefore hypothesis 3 was accepted, "there is a significant improvement in anxiety level post practicing alternate nostril breathing among hypertensive patients".

The present study results indeed indicate the benefit of simplified ANB exercise in reducing blood pressure, pulse, and anxiety level among hypertensive patients

Conclusion

Alternate nostril breathing exercises proven to reduced pulse, anxiety levels, and blood pressure in adult hypertensives. It does not need any particular supplies or equipment and much training for the staff nurses to apply the breathing exercise to patients. These simple, easy taught breathing techniques can be practiced regularly to decrease the drug dosage also to alleviate the occurrence of long-term complications of hypertension in the future. Nurses should be acquainted with this method and incorporate it into routine care for hypertensive patients.

Relevance to clinical

Alternate nostril breathing is a safe, society accepted, easily performed, and does not require preparation or training, besides it found to be effective and produce many advantages for hypertensive patients so it's highly recommended for the nursing staff to encourage their patients to demonstrate it daily.

Conflict of interest

The author states that there is no conflict of interest.

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