International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 16s,2025
https://theaspd.com/index.php

Comparative Study on Influence of Regular Breathing Exercises on Obesity Indices and Blood Sugar Level in Young Individuals

Hifzurrehman[1*], Amrit Podder[2], Deepika Puri[3], Jayballabh Kumar[4]
[1],[2,3,4]Department of Physiology, Teerthanker Mahaveer Medical College & Research Centre, Teerthanker Mahaveer University, Moradabad, India
*hifzurrehman80579@gmail.com

Abstract

Introduction: *Obesity is a recognized underlying risk factor for the development of numerous endocrine illnesses, including diabetes mellitus and thyroid problems. Diabetes is a discreet health problem and is now recognized as one of the main causes of mortality rate across the world. Diabetes is an epidemic in India, as evidenced by 2012 indicated that nearly 60% of deaths in the country are caused by non-communicable disorders.*

Materials and Methods: *We have examined 365 males between the ages of 18 and 25 and identified 84 who used regular breathing exercises. After receiving approval from the Institutional Ethics Committee and the College Research Committee, this study was carried out for a year. The participants were assigned to two groups: Group-1 consisted of individuals who did not engage in any kind of breathing exercises, and Group-2 consisted of those who had been doing regular breathing exercises for a minimum of three months. To accomplish to assess the differences in blood sugar levels and obesity indices between participants who regularly performed breathing exercises and those who did not, our current study involved 365 healthy young males between the ages of 18 and 25. The analysis were conducted using SPSS software v27 and p <0.05 was considered significant statistically.*

Results: *We concluded that 84 of the 365 males in our study, aged 18 to 25, were regularly performing breathing exercises. The data also shows that obesity indices do not differ significantly between the study groups. The levels of serum RBS do not differ considerably amongst the research groups.*

Conclusion: *We found that regular breathing exercises did not influence the blood sugar levels of the participants. Therefore, we get the conclusion that, when compared to people of the same age who participate in regular breathing exercises, young males' obesity indices and blood sugar levels are not impacted by their lack of exercise. To spread further light on the potential association, we propose conducting additional research with a larger sample size in this area.*

Keywords: *breathing exercises, diabetes, obesity, young individuals.*

INTRODUCTION

The socioeconomic burden of diabetes is preventing our nation from reaching its human development goals. An underlying issue in the development of many endocrine illnesses, including diabetes mellitus and thyroid problems, is obesity. Additionally, it is regarded as a primary contributor to the emergence of non-communicable illnesses.[1]

Researchers say that diabetes is a major health issue and that it is now one of the leading causes of mortality worldwide. Given that non-communicable diseases accounted for almost 60% of fatalities in India in 2012, diabetes is a serious issue in that country. 26% of fatalities from various non-communicable diseases are attributable to heart disease, 18% to chronic respiratory conditions, 7% to cancer, and almost 2% are related to diabetes.[2]

Type-2 diabetes mellitus is the most significant of the health problems that may result from obesity, irregular eating patterns, and a stressful lifestyle. Increased obesity causes fat cells to become resistant to insulin, which causes the body to secrete less insulin. As a result, the insulin cannot reach the fat cells, and blood glucose levels rise. Those who exercise have balanced blood glucose levels because exercise forces their muscles to use blood glucose.[3]

Diabetes is currently a severe health issue that is almost killing the majority of people in India due to the country's expanding population. Approximately 65.1 million individuals had diabetes in 2013, and by 2035, that figure is predicted to rise to 109 million. India has more diabetics than any other country, second only to China. If we consider the burden, the prevalence of diabetes is 9.1% in India compared to 8.3% worldwide.[4]

More than one million new cases of diabetes are reported annually, despite many recommendations from scientific bodies and groundbreaking government programs to avoid the condition. Previous research has shown the link between various obesity indices and middle-aged people's early ageing, which has led to morbidity and death from several cardiovascular and cerebrovascular conditions, including myocardial infarction, stroke, etc. [5]

Along with diabetes and its associated conditions, obesity is a huge worldwide concern that is becoming a big health issue for people all over the world. [6]

Changes in blood glucose levels are linked to increased vascular load because they affect vascular physiological dynamics, which causes early ageing and the emergence of several non-communicable illnesses. [7] Our study was aimed to investigate how frequent breathing exercises affect blood sugar levels and obesity indices of young male individuals to provide an insight in the mechanistic pathways involved in the observed findings.

MATERIALS AND METHODS

Study design: The research was conducted for one year after getting consent from the College Research Committee (CRC) and the Institutional Ethics Committee (IEC). We conducted a cross-sectional study involving male subjects of 18 to 25 years in 'The Yoga Lab' of The Department of Physiology of the Teerthanker Mahaveer Medical College & Research Centre, Teerthanker Mahaveer University, Moradabad (UP). Participants were classified into two groups (group-1: non-performing breathing exercises, n=84; group-2: performing breathing exercises, n=281). Obesity-related parameters such as height (cm) were measured by using a standard stadiometer, weight (kg) was estimated by a calibrated digital weighing machine, and WC (cm) and HC (cm) were measured by a flexible measuring tape. Serum random blood sugar (RBS) level was determined by an automated glucometer. The results were indicated as mean ± standard deviation (SD). We included male individuals[8] from Teerthanker Mahaveer University who were between the ages of 18 and 25. Breathing exercises were considered regular if practiced for at least last three months for at least 15 minutes in a day for at least 5 days in a week.[9] We excluded patients of any form of vascular disorder,[10] subjects taking any drugs that have the potential to alter blood sugar levels.[11], alcoholics, tobacco chewers, and smokers.[12, 13]

RESULTS

Descriptive analysis of parameters:

We observed that 84 of the 365 males in our study, who were between the ages of 18 and 25, were found to be regularly engaging in breathing exercises. The comparison of all the parameters in the study between the groups is shown in Table 1. None of the evaluated parameters showed any noticeable variations between the groups. The fact that there was no apparent difference in age between the groups suggests that the suggested research design was appropriately implemented. The chart also makes clear that none of the obesity indices show a significant difference between groups. The levels of serum RBS do not significantly differ across the groups. Since there was no distinction between our study groups, as shown in Table 1, the establishment of a correlation is no longer significant.

The proportion of adolescent males who regularly practice breathing exercises is shown in Table 2, which it is almost evident that 77% of young boys who do not practice any breathing exercises, we observed that around 23% of people regularly perform breathing exercises. The stated figures are based on the fact that we did not include research participants who sometimes practice breathing techniques. With the assistance of a pie-chart, Graph-1 provides a graphical depiction of the same. It is clear that a much lower number of males

in the young age group regularly conduct breathing exercises than those who do not. The diagrammatic representations of all the values for each participant in groups 1 and 2 are shown in graphs 2 and 3.

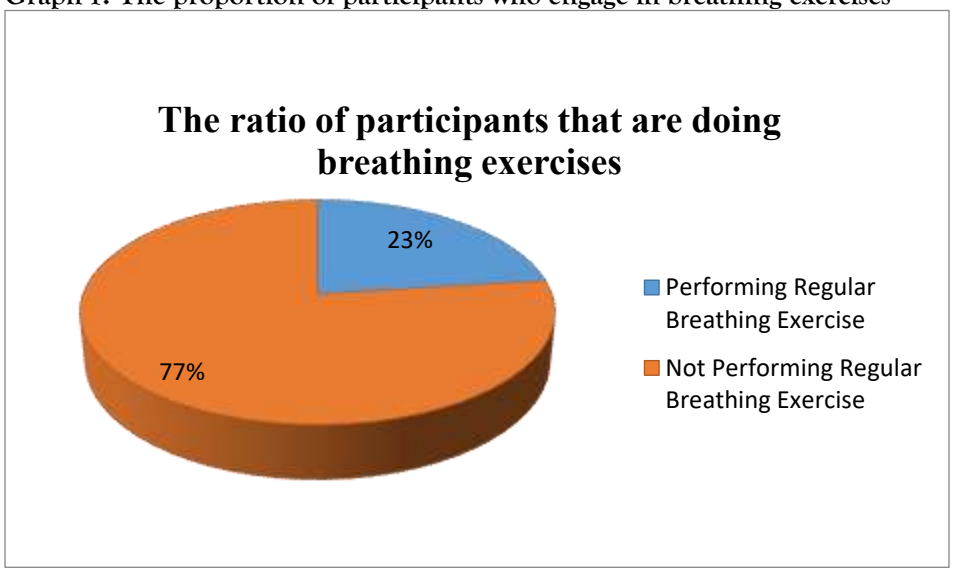
Table-1: All parameters are compared between the groups

Variables	Category-1 Number=281)	Category-2 (Number= 84)	Significance (p) Value
Age (Years)	21.80 ± 1.360	20.20 ± 1.40	0.320
Weight (Kg)	67.30 ± 8.50	68.0 ± 9.70	0.560
Height (cm)	172.010 ± 6.70	172.30 ± 6.20	0.680
WC (cm)	74.20 ± 7.40	76.70 ± 8.10	0.120
HC (cm)	88.90 ± 7.10	89.10 ± 6.80	0.180
RBS (mg/dl)	108.80 ± 10.80	109.50 ± 10.50	0.630
BMI (kg/m^2)	23.80 ± 2.60	24.90 ± 2.70	0.750
WH- Ratio	0.840 ± 0.050	0.840 ± 0.060	0.440

Table-2: The proportion of participants who engage in breathing exercises

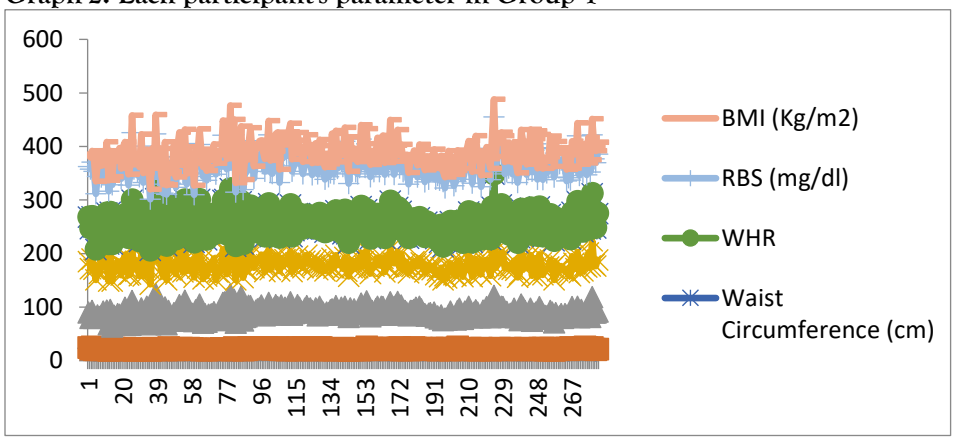
Total participants	365	100%
The number of people who don't do any breathing exercises	281	76.99%
The number of people who regularly use breathing exercises	84	23.01%

Graph-1: The proportion of participants who engage in breathing exercises

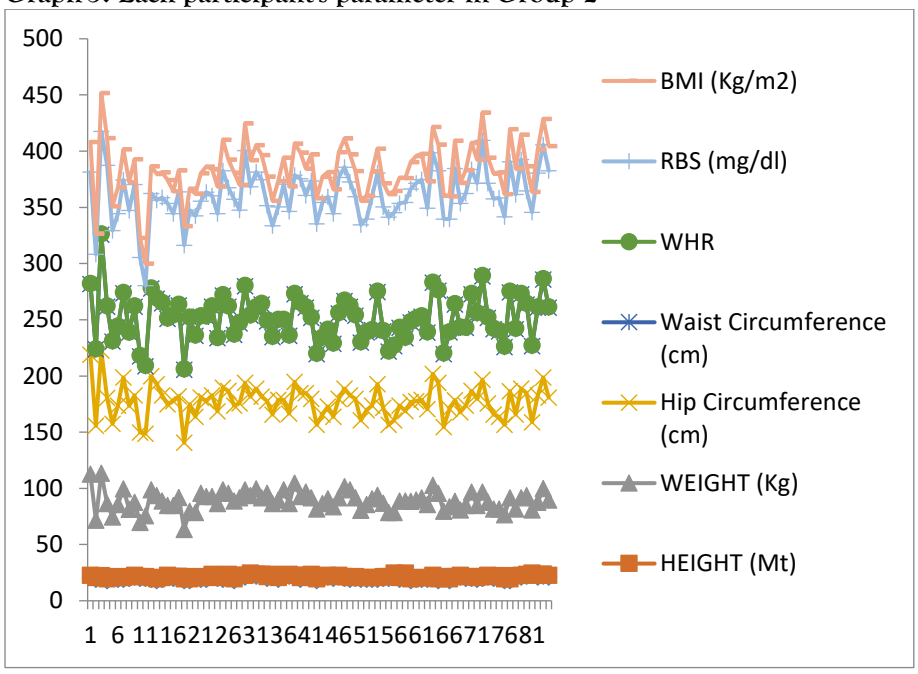


International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 16s,2025
https://theaspd.com/index.php

Graph-2: Each participant's parameter in Group 1



Graph-3: Each participant's parameter in Group 2



DISCUSSION

According to our findings, there was no discernible difference in the obesity indices between the research groups, suggesting that the body has a robust homeostatic system that shields males in this age range from hardship. Furthermore, we can state that the homeostatic systems in young people's age group are so robust that frequent breathing exercises have no effect on physiological parameters.[14] Young age plays a defensive role in blood glucose homeostasis, so not doing regular breathing exercises cannot speed up the pathogenic process of molecular alteration that could cause a significant change in the serum blood glucose level. However, we did not find any significant differences in serum blood glucose levels between our study groups. Additionally, we cannot ignore the role that endocrine variables play in this protective mechanism.[15].

Below is a discussion of several potential causes for the present research's observed results:

Role of endothelial function[16]

By altering artery design and generating serum nitric oxide (NO), which supports physiological vascular activity, regular breathing exercises are essential for maintaining normal endothelial function. This is the reverse of oxidative stress, which may change blood glucose homeostasis and is caused by an accumulation of reactive oxygen species (ROS). Younger people may contribute significantly to preserving ideal vascular endothelial function, which would improve blood glucose homeostasis without having a major negative impact from frequent breathing exercises.

The effect of Inflammation[17]**:**

Tumor necrosis factor α (TNF-α) and interleukin 6 (IL-6) work as triggers for endothelial dysfunction, which raises oxidative stress and speeds up the ageing process of the blood vessels. Consequently, the blood glucose level's equilibrium is changed. This process is aided by the supportive mechanisms resulting from the over activity of anti-inflammatory substances at this early age.

Modulation's Function in Vessel Stiffening[18, 19]**:**

The fundamentally changed vascular morphology known as stiff vessels speeds up molecular processes that change the homeostasis mechanisms of ideal blood glucose levels and fat. The changed levels of different proteins and enzymes that are in charge of maintaining a homeostatic environment are one of the potential processes. Since obesity and vascular stiffness are negatively correlated with ageing, it is clear that a person's early serum blood glucose levels and obesity levels are unaffected by their habit of engaging in any kind of breathing exercises.

CONCLUSION

In order to assess the differences in blood sugar levels and obesity indices between participants who regularly performed breathing exercises and those who did not, our present research included 365 healthy young males between the ages of 18 and 25. We found that frequent breathing exercises had no influence on participants' blood sugar levels. Therefore, we draw the conclusion that, when compared to people of the same age who engage in regular breathing exercises, young males' obesity indices and blood sugar levels are unaffected by their lack of exercise. In order to shed further light on the potential association, we advise doing more research with a bigger sample size in this area.

REFERENCES

1. Verma S, Hussain ME. Obesity and diabetes: An update. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2017; 11(1): 73-9. PMID: 27353549 DOI: 10.1016/j.dsx.2016.06.017.
2. Seravalle G, Grassi G. Obesity and hypertension. Pharmacological Research. 2017 Aug;122(122):1–7. PMID: 28532816, DOI: 10.1016/j.phrs.2017.05.013.
3. Yesudian CA, Grepstad M, Visintin E, Ferrario A. The economic burden of diabetes in India: a review of the literature. Global Health. 2014; 10: 80. PMCID: PMC4279984 PMID: 25443136
4. Podder A, Patil SM, Kanthe PS, Patil SM, Khodnapur JP, Badiger S, et al. Physical Anthropometry Influences Arterial Stiffness in Hypertensive Patients of North Karnataka. Biomed. & Pharmacol. J. 2023; 16(4): 2439-42. DOI: 10.13005/bpj/2818
5. Verma S, Hussain ME. Obesity and diabetes: An update. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2017; 11(1): 73-9. PMID: 27353549 DOI: 10.1016/j.dsx.2016.06.017
6. Dashoundhi V, Khodnapur GP, Podder A, Patil SM, Khodnapur JP. Assessment of Arterial Stiffness in Patients Recovered from Mild COVID-19 Diseases using Pulse Wave Velocity: A Cross Sectional Study. Journal of Clinical and Diagnostic Research. 2023; 17(8): 5-8. DOI: 10.7860/JCDR/2023/64250.18348
7. Dashoundhi V, Khodnapur GP, Podder A, Patil SM, Khodnapur JP. Assessment of Arterial Stiffness in Patients Recovered from Mild COVID-19 Diseases using Pulse Wave Velocity: A Cross Sectional Study. Journal of Clinical and Diagnostic Research. 2023; 17(8): 5-8. DOI: 10.7860/JCDR/2023/64250.18348
8. Kwissa M, Krauze T, Mitkowska-Redman A, Banaszewska B, Spaczynski RZ, Wykretowicz A, et al. Cardiovascular Function in Different Phases of the Menstrual Cycle in Healthy Women of Reproductive Age. J Clin Med. 2022 Oct 3;11(19):5861. PMID**:** 36233728 PMCID: PMC9572726 DOI: 10.3390/jcm11195861
9. Naik GS, Gaur GS, Pal GK. Effect of Modified Slow Breathing Exercise on Perceived Stress and Basal Cardiovascular Parameters. Int J Yoga. 2018;11(1):53–8 PMID: 29343931 PMCID: PMC5769199DOI: 10.4103/ijoy.IJOY_41_16

10. Podder A, Patil SM, Kanthe PS, Patil SM, Khodnapur JP, Badiger S, et al. Physical Anthropometry Influences Arterial Stiffness in Hypertensive Patients of North Karnataka. Biomed. & Pharmacol. J. 2023; 16(4): 2439-42. DOI: org/10.13005/bpj/2818
11. Kwissa M, Krauze T, Mitkowska-Redman A, Banaszewska B, Spaczynski RZ, Wykretowicz A, Guzik P. Cardiovascular function in different Phases of the menstrual cycle in healthy women of reproductive age. J Clin Med. 2022 Oct 3;11(19):5861. DOI: 10.3390/jcm11195861. PMID: 36233728; PMCID: PMC9572726.
12. Dandekar PD. Impact of short-term training of anulom vilom pranayam on blood pressure and pulse rate in healthy volunteers. Int. J. Res. Ayurveda Pharm. 2013;4(2): 253-6. DOI: 10.7897/2277-4343.0423.
13. Dhatt S, Agarwal M. Performance of the Roche Accu-check active glucose meter to screen for gestational diabetes mellitus using capillary blood. PMID:21864017; DOI:10.1089/dia.2011.0097
14. Jura M, Kozak LeslieP. Obesity and related consequences to ageing. AGE. 2016 Feb;38(1). PMID: 26846415, DOI: 10.1007/s11357-016-9884-3
15. Wittert GA, Grossmann M. Obesity, type 2 diabetes, and testosterone in ageing men. 2022 Jul 14;23(6):1233–42. PMID: 35834069, PMCID: PMC9789005, DOI: 10.1007/s11154-022-09746-5.
16. Nazim S, Podder A, Sharma A, et al. (July 09, 2025) Influence of Regular Breathing Exercises on Blood Pressure: A Cross-Sectional Study on Young Male Indian Population. Cureus 17(7): e87641. DOI:10.7759/cureus.87641
17. Ye Y, Wan M, Lin H, Xia R, He J, Qiu P, et al. Effects of Baduanjin exercise on cognitive frailty, oxidative stress, and chronic inflammation in older adults with cognitive frailty: a randomized controlled trial. Frontiers in Public Health. 2024 May 23;12. PMID: 38846613, PMCID: PMC11153822, DOI: 10.3389/fpubh.2024.1385542.
18. Lee BC, Lee J. Cellular and molecular players in adipose tissue inflammation in the development of obesity-induced insulin resistance. Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease. 2014 Mar;1842(3):446–62. PMID: 23707515, PMCID: PMC3800253, DOI: 10.1016/j.bbadis.2013.05.017.
19. Kumar J, Sharma A, Dasgupta A, Podder A, Naregal G, Iqbal MK, Nazim S, Rehman H. Unraveling the Relationship Between Vitamin D and Oxidative Stress: A Cross-Sectional Study. Cureus. 2024 Aug 26;16(8):e67818. DOI: 10.7759/cureus.67818. PMID: 39323715; PMCID: PMC11423786.