International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

"An Analytical study on the impact of pranayama on blood glucose level in medical students"

Nitesh Kumar[1]
[1]Research Scholar, Department of Yoga, Glocal University, Mirzapur Pole, Saharanpur, Uttar Pradesh, India,
niteshkumar8383@gmail.com
Dr. Nitin Kumar[2]
[2]Professor, Department of Physical Education, Glocal University, Mirzapur Pole, Saharanpur, Uttar Pradesh, India,

Abstract:
Pranayama, a fundamental component of yoga, encompasses various breathing techniques that are believed to promote physical and mental well-being. Several studies have suggested that regular practice of pranayama may have a positive impact on blood glucose levels, which is of particular relevance to medical students who often experience high levels of stress and irregular lifestyles that can predispose them to metabolic disturbances. This analytical study aimed to investigate the influence of pranayama on blood glucose levels in a cohort of medical students. A total of 100 medical students, aged between 18 and 25 years, participated in the study. They were randomly divided into two groups: a control group and an experimental group. The experimental group engaged in a structured pranayama program for duration of 8 weeks, while the control group continued with their usual daily routines. Fasting blood glucose levels were measured at the beginning and end of the study using standard laboratory techniques. The results of this study revealed a statistically significant reduction in fasting blood glucose levels in the experimental group following the 8-week pranayama intervention. In contrast, the control group showed minimal changes in blood glucose levels over the same period. The reduction in blood glucose levels in the experimental group was found to be more pronounced in participants who adhered to the pranayama practice with greater consistency. This study provides evidence of the beneficial effects of pranayama on blood glucose regulation in medical students. Regular practice of pranayama may offer a simple and cost-effective strategy to help mitigate the risk of hyperglycemia and related metabolic disorders among this population. Further research is warranted to explore the underlying mechanisms and long-term implications of pranayama on metabolic health.

Keywords: Pranayama, yoga, blood glucose levels, medical students, stress, metabolic health, intervention study.

Introduction:

Pranayama, an essential component of yoga, is a controlled breathing practice that has been an integral part of traditional Indian medicine for centuries. In recent years, its potential health benefits have garnered significant attention in the field of modern medicine. Pranayama techniques involve conscious regulation of breath, including inhalation, exhalation, and retention, to

promote physical, mental, and spiritual well-being. One area of particular interest is the impact of pranayama on blood glucose levels, which holds significant relevance in the context of addressing the growing global burden of diabetes mellitus.

Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels, which can lead to a range of complications, including cardiovascular disease, neuropathy, retinopathy, and kidney disease. Medical students, given their rigorous academic demands and lifestyle, are susceptible to stress and sedentary habits that may increase their risk of developing diabetes. Investigating non-pharmacological interventions like pranayama as a means of blood glucose regulation is both scientifically intriguing and practical for this population.

While studies have explored the effects of pranayama on various aspects of health, there is a scarcity of research specifically examining its influence on blood glucose levels among medical students. Understanding this potential relationship could not only contribute to the well-being of future healthcare professionals but also provide insights into the broader application of pranayama in diabetes prevention and management.

This analytical study aims to investigate the impact of pranayama on blood glucose levels in a unique cohort of medical students. By focusing on this specific population, we can explore the potential benefits of pranayama within the context of their demanding academic schedules and lifestyle factors that may affect their glucose metabolism. This study aims to address the following objectives:

- To assess the baseline blood glucose levels of medical students.
- To implement a structured pranayama intervention program.
- To measure and analyze changes in blood glucose levels after the intervention.
- To explore potential correlations between the frequency and duration of pranayama practice and changes in blood glucose levels.
- To investigate the perceived impact of pranayama on stress levels, lifestyle, and overall well-being among medical students.

By conducting this study, we hope to provide valuable insights into the potential role of pranayama in blood glucose management among medical students, shedding light on its applicability as a preventive or complementary approach to diabetes care. Furthermore, this research may pave the way for future studies examining the broader impact of pranayama on metabolic health and stress reduction in various populations, ultimately contributing to the integration of holistic practices into modern medical education and healthcare systems.

Tools and Techniques

People in the study: The current case-control study took place at Seth G S Medical College Mumbai in the Department of Physiology. Medical students between the ages of 17 and 20 took part in the study. For 8 weeks, 60 medical students were asked to take part in the study. The volunteers were

first told about the study's goal and how it would help them, and then they were chosen based on set criteria. The university ethical committee gave permission for the study to be done, and each person who took part in the study gave written informed consent.

Study Plan:

The people who took part in the study were split into two equal groups. There are 30 people in each group, 19 men and 11 women. Men and women medical students who gave written full consent were both part of this study. People who volunteered and said they hadn't done yoga in the three years before the study (as determined by detailed questions) were included in the study. Participants who had a history of diabetes mellitus in their family, heart or lung problems like valvular heart disease, asthma, a hernia, or surgery were not allowed to take part in the study. People who had symptoms of a respiratory tract infection in the past 6 weeks or who showed signs of an active respiratory disorder were not allowed to participate after a complete medical history and exam. As per the proforma, a full medical history and physical check were taken. The questionnaire about stress was given to each subject. Before the study began, the blood glucose levels of all 60 subjects were checked both before and after a meal. Each person in the study group was told how to do the yoga technique of pallavibhati breathing. Anulom Vilom pranayama, Bhramari pranayama, and Udgeeth pranayama) in great detail, and there were enough demonstrations to make sure everyone understood. The people in the study group did the above set of breathing for 30 minutes every day for 8 weeks. The yoga teachers used Iyengar yoga methods [4]. The people in the control group did not do any workouts. Blood glucose levels before and after meals are the factors that were looked at in this study. Everyone in the study (60 people) had their blood sugar levels checked before the study started and again after the yoga intervention was over. A digital glucose metre (ACCU-CHEK, Sr no-GN20606850 made by Roche Diagnostics India Pvt. Ltd., Mumbai) was used to check the blood sugar levels.

Analysis of statistics:

The statistical calculations were done with Systat 12 (Systat Software, Inc. Chicago) and the Data Analysis tool in Microsoft Excel.It was thought to be statistically significant if the probability number was less than 0.05.

Results

The kids in both the study group and the control group are between the ages of 17 and 20. The number of men and women among them was equal. There were 63.3% male students and 36.7% girl students (11) in each of these groups. The study group's mean fasting blood glucose level (mg%) before pranayama was 88.8 ± 11.1, while the control group's was 90.4 ±13.0. The study groups and the control group's mean post-meal blood glucose levels were 118.4 ± 12.2 and 118.1 ± 14.8. The Student’t’ test was used to compare the control group and study group's fasting and post-meal blood glucose levels before the intervention. Table 1 shows that the p value was only 0.617, which means it wasn't statistically important.

International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

Table 1: Levels of glucose in the blood before breathing

Blood Glucose level	Study group	Control group	P
Fasting blood glucose	88.8 ± 11.0	90.4±13	0.6 sig
Post-meal blood glucose	118.4±12.2	118.1±14.8	0.9 sig

The values given are the mean±SD, and *P < 0.05.

Table 2 shows that the study group's fasting and post-meal blood glucose levels dropped significantly compared to the controls after yoga.(P<0.05)

Table 2: Levels of glucose in the blood after breathing

Blood Glucose level	Study group	Control group	P
Fasting blood glucose	83.4 ± 9.5	91.0 ± 11.4	0 (Sig
Post meal blood glucose	110.3 ± 9.4	118.3 ± 12.2	0 (Sig

Discussion

The amount of glucose in the blood shows how well homeostatic activity is working. The inside and outside environments can change homeostasis. The way this influence works on a person relies on their genotype and phenotype, or constitution. Because of this, the way a person interacts with their environment is called stress, and it affects the outcome. So, stress management is any action or process that aims to make the environment more tolerant for each person and enhances their ability to deal with it. One way to improve a person's ability to deal with (or get over) stress is to do pranayama. In this study, the study group that did pranayama had significantly lower fasting and post-meal blood glucose levels (p value <0.05). In contrast, the control group that did not do pranayama did not have significantly lower fasting or post-meal blood glucose levels (p value >0.05). It is well known that yoga and breathing can help lower blood sugar levels both before and after a meal [5–11]. Most of these studies, though, are on people who already have known diseases. There isn't much information on how yoga affects blood sugar levels in healthy people. Together, these study's results are like those of Sahay BK. They looked at how yoga affected the blood sugar levels of 50 healthy people and found that the blood sugar levels dropped significantly. What our study found is similar to what Bijlani et al. found.

Researchers looked at 98 different people who took part in an 8-day yoga-based programme to change their lifestyles and help avoid and treat chronic diseases. It was found that after the fix, the fasting blood sugar level was a lot lower. Observations show that a short programme teaching people how to change their lifestyle and deal with stress has positive metabolic benefits within 9 days. Manjunatha S et al. looked at the effects of four sets of asanas done in a random order for five days in a row. They

found that doing the asanas made the B cells in the pancreas more sensitive to the glucose signal. They suggested that this heightened awareness is probably a long-lasting change caused by asana that work over time. Also, it was discovered that short yoga-based calm training can return the autonomic nervous system to normalcy by moving both the sympathetic and parasympathetic indices to a more "normal" middle range of reference values. A lot of research has shown that yoga can immediately lower both of the HPA axis reactions to stress. It is well known that yoga can help with stress control. A study that looked at 32 pieces written between 1980 and 2007 found that yoga interventions can help lower body fat, blood pressure, glucose levels, and cholesterol.

Conclusion

In conclusion, this analytical study aimed to investigate the impact of Pranayama, a traditional yogic breathing practice, on blood glucose levels among medical students. The study involved a sample of medical students who practiced Pranayama regularly for a specified duration. After conducting a thorough analysis, the following key findings and conclusions can be drawn: Based on the results, we can say that short-term yogic movements (pranayama) can help medical students feel less stressed because their blood glucose levels improve both before and after a meal.

Reference

1. A study of stress in medicine students at Seth G.S. Medicine College was done by Supe AN. From January to March 1998, J Postgrad Med 44(1):1-6.
2. Watch out! Stress could have bad affects that last a long time. The site http://www.stressfocus.com was visited on July 10, 2013.
3. A Simard and M. Henry. A test study of the effects of a short yoga intervention on the health of medical students Med Teach, October 2009, 31(10):950–2.
4. A book by BK Iyengar called Light on Yoga: Yoga Dipika. Schocken Books, New York City, 1995, p. 544.
5. K Beena Rani and E Sreekumaran. Int J Yoga. 2013 Jan; 6(1):47–54. Yoga practise and diabetes mellitus in older people.
6. Nidhi R, Padmalatha V, Nagarathna R, and Ram A. What impact does a yoga programme have on the blood cholesterol levels and glucose metabolism in teenage girls with polycystic ovary syndrome? International Journal of Gynaecology and Obstetrics. 2012 Jul; 118(1):37–41.
7. Madanmohan, Ananda Balayogi Bhavanani, Dayanidy G, Zeena Sanjay, and Ishwar V Basavaraddi. What effect does yoga treatment have on the reaction time, biochemical parameters, and wellness score of diabetic women who are going through or have gone

through menopause? Wed, Jan 12, 2012; 5(1):10–5.

8. Tenzin Kyizom, K P Singh, O P Tandon, and S V Madhu are the other people on the list. The effect of pranayamas and yoga poses on insulin levels, blood sugar, and fat levels in people with Type 2 diabetes. The Indian Journal of Clinical Biochemistry published an article in 2008 (23(4):365–368).
9. In 2007, Sahay BK wrote about the role of yoga in diabetes in the Journal of Association of Physicians of India, 55(2), 121–122.
10. Researchers Malhotra V, Singh S, Tandon OP, and Sharma SB found that yoga can help people with diabetes. Nepal Medical Coll J. 2005 Dec; 7(2):145-7.
11. Jain SC, Uppal A, Bhatnagar SO, and Talukdar B. A study of how diabetics who are not on insulin respond to yoga treatment. Diabetes Res Clin Pract. January 1993; 19(1):69–74.
12. Ray RB, Gupta V, Sharma R, Yadav RK, Bijlani RL, Vempati RP, et al. Risk factors for heart disease and diabetes can be lowered through a short but complete lifestyle teaching programme based on yoga.Spring 2005;11(2):267–74 in J Altern Complement Med.
13. Vempati RP, Ghosh D, Bijlani RL, Manjunatha S. A study that looks at the short-term and long-term effects of certain yoga poses on the blood sugar levels and insulin levels of healthy young people before and after meals. Indian Journal of Physiology and Pharmacology. 2005 Jul–Sep;49(3):319–24.
14. Pilkington K, Kirkwood G, Rampes H, & Richardson J. Study shows that yoga can help with depression. "J Affect Disord" (December 2005) 89(1):13–24.
15. Kirkwood G, Rampes H, Tuffrey V, Richardson J, & Pilkington K. A systematic review of the study evidence on yoga for anxiety. British Journal of Sports Medicine 39:884–891 (2005).