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A study to assess the effectiveness of yogasanas and pranayama practices on blood glucose levels (RBS) among polycystic ovarian syndrome women

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Abstract

Polycystic ovarian syndrome is a common endocrine disorder problem caused by an imbalance of reproductive hormones, characterized by menstrual irregularity and elevated serum androgens, and is often accompanied by insulin resistance among females. The hormonal imbalance enhances problems in the ovaries. The etiology of PCOS is still unknown. Yogic practices are recommended for women with PCOS to maintain a proper hormonal balance.

Purpose: To assess the effectiveness of yogasanas and pranayama practices on blood glucose levels (RBS) among polycystic ovarian syndrome women

Methods: This study was conducted in a university-affiliated hospital from January 2023 to June 2023. Anthropometric parameters, random blood sugar levels were analysed. A systematic review of original studies indexed in PubMed that utilized an exercise intervention in women with PCOS and reported random blood sugar values pre- and post-intervention. Studies in which the effects of the yogic intervention could be determined were included.

Results: Fifty PCOS patients were recruited in this study. yogasanas and pranayama practices reduce the levels of the random blood sugar in polycystic ovarian syndrome in women.

Conclusions: Recommended yogasanas and pranayama practices help to reduce the levels of random blood sugar in polycystic ovarian syndrome women.

Keywords: PCOS, yogic practices, pranayama, random blood sugar

Introduction

Polycystic ovary syndrome (PCOS) is a common hormonal disorder that affects women of reproductive age. According to the World Health Organization, it was estimated that 116 million women (3.4%) have PCOS with prevalence ranging from 2.2% to 26% globally. PCOS usually starts during adolescence, but symptoms may fluctuate over a period of time. PCOS can cause hormonal imbalances, irregular periods, excess androgen levels and cysts in the ovaries. Irregular periods, usually with a lack of ovulation, can make it difficult to become pregnant hence PCOS is a leading cause of infertility. The prevalence of PCOS among reproductive-age women has been estimated at 4%-12%. The general characteristics of PCOS are oligo/anovulatory cycles, hirsutism and polycystic ovaries, together with a considerable prevalence of insulin resistance. PCOS is a chronic condition and cannot be cured but symptoms can be managed through regular practice of yogasanas. However, some symptoms can be improved through lifestyle changes, medications and fertility treatments. The cause of PCOS is unknown but women with a family history or type 2 diabetes are at higher risk. Moreover, PCOS patients have a higher risk of metabolic and cardiovascular diseases and their related morbidity, if compared to the general population Menon & Golgeri.

Women with PCOS show high prevalence of glucose intolerance. Research found that women with glucose normal glucose intolerance even after adjusting for age, BMI, waist hypertension, fasting insulin, testosterone and family history of diabetes. Results suggested that androgen excess indicated by high FAI (Free androgen index) levels might serve as an indicator of glucose intolerance, as it might promote insulin resistance and β -cell dysfunction in women with PCOS Zhang *et al.* Hyperinsulinemia was noted in 50% to 70% of PCOS patients and played a central role in the development of further complications.

In spite of hyperinsulinemia, there is an increased prevalence of insulin resistance (IR) in PCOS patients which can lead to increased glucose tolerance and type 2 diabetic mellitus (T2DM). Increased insulin leads to increased androgen production from the ovarian thecal cells and this hyperandrogenemia is responsible for androgenic obesity.

Women with polycystic ovary syndrome (PCOS) need higher levels of progesterone to slow the frequency of GnRH pulse secretion, resulting in insufficient plasma follicle-stimulating hormone (FSH) synthesis and persistent plasma luteinizing hormone (LH) stimulation of ovarian androgens. The body therefore has to produce extra insulin to compensate. High levels of insulin causes the ovaries to produce too much testosterone, which interferes with the development of the follicles (the sacs in the ovaries where eggs develop) and prevents normal ovulation. According to a recent study, yogasanas and pranayama practices may help to reduce the random blood sugar levels in polycystic ovarian syndrome women. More specifically, participants who did a one-hour yoga class six times a week for three months reduced the random blood sugar levels. So the present study is conducted mainly to assess the Effects of yogasanas and pranayama practices on blood glucose levels (RBS) among polycystic ovarian syndrome women.

Materials and Methods

The purpose of the study, fifty women who were suffering from Polycystic Ovarian Syndrome were volunteered as subjects. Their age ranged from 20 to 35 years. The purposive sampling technique was employed to pool the subjects from PM Santosha Multi Speciality Hospital, Kengeri, near Mahaveer Lakes Apartment, Sunkalpalya, Bengaluru 560060, Karnataka, India. Before the group were divided for experimental treatment, all the subjects were screened medically with the help of professionally qualified obstetricians and gynaecologists. Keeping the above concepts, the following blood glucose levels (RBS) selected as criterion variable. The yogasana and pranayama practices were selected as independent variables. Pre-test and post-test have been done. For pre-test the following data will be conducted. Fasting sample of venous blood (10ml) was drawn in the morning (6:00-8:00am) at the Plexi Health Lab. Random blood sugar levels (RBS) was done by End point trinds method Fully Automated machines by selectra pro s.

Yoga intervention

Psycho-neuro-endocrine and immune mechanisms are involved in the beneficial effects of yoga on diabetes. Incorporation of yoga practice in daily life helps to attain glycaemic control and reduces the risk of complications in people with diabetes. Increasing evidence suggests that yoga practice tackles the pathophysiological mechanisms of diabetes and helps in controlling diabetes and its complications.

The concepts for the intervention were taken from traditional yoga scriptures (Patanjali yoga sutras, Upanisads and Yoga Vasishtha) that highlight a holistic approach to health management at physical, mental, emotional and intellectual

levels (Nagarathana R and Nagendra HR 2001). The practices consisted of āsanās (yoga postures), prāṇāyama, relaxation techniques, meditation, and mudras. The physical practices progressed from Suryanamaskāra to final yoga postures āsanās of four categories (prone, standing, supine, twisting and sitting) to provide activation followed by deep rest to mind body complex based on scriptural reference (Nagendra 2007). Prāṇāyama included yogic breathing practices to bring about a slow rhythmic breathing pattern with exhalation longer than inhalation. (Nagendra HR and Nagarathna R 2004). An attempt was made to elicit suggestions regarding the feasibility and applicability of each of the practices selected as the yoga intervention for PCOS. Slow pranayama, anulom vilom, chandrabhedan, sitkari, and bhrumari helps in augment cerebral blood flow and oxygenation, improving neuronal activities in the brain centres, including those present in the limbic areas, hypothalamus, and medulla, and improve sympathovagal outflow

The integrated approach of yoga therapy practice is prepared with following basic structure:

1. First 10 minutes of the sessions was lectures focusing on management of PCOS topics described below
2. 10 minutes – Loosening Exercises
3. 30 minutes – Yogasana (prone, standing, supine, twisting and sitting)
4. 20 minutes – Pranayama Practice

The daily yoga session begins with interactive session and awareness talks which included the below listed topics that ensured the right understanding of yoga as a tool for body and mind management and notional correction.

Results

A “probable diagnosis” of PCOS was found among 50 women identified to have oligo/amenorrhoea and/or clinical hyperandrogenism. All the 50 subjects asked to come for blood test. Pre-test and post-test is done. After 12 weeks of intervention, changes in testosterone were significantly different between the two groups.

In a study, it was observed that optimum control of diabetes was achieved by practicing dhanurasana and ardhmatsayendrasana. Halasana, vajrasana, bhujangasana, Vakrasana and naukasana were also found to be effective. Increased sensitivity of the β -cells of the pancreas to the glucose signal was observed, which appeared to be a sustained change resulting from a progressive long-term effect of the asanas. Abdominal stretching during yoga exercises is believed to result in the regeneration of pancreatic cells. The various postures during yoga practice help to improve the sensitivity of β -cells to glucose, thereby improving insulin secretion, and increase the blood supply to the muscle and muscle relaxation, thereby improving glucose uptake. Improvements in hormonal homeostasis also improve glycaemic control in people with diabetes mellitus.

Table: 1: Analysis of Co-Variance of The Pre-Test And Post Test Means of The experimental and control Group based on RBS Mg/dl

Group	Experimental	Control	Source of variance	Sum of squares	df	Mean square	'F' Ratio
Pre Test Mean	130.20	125.44	Between	283.220	1	283.220	0.345 NS
SD	25.67	31.3	Within	39360.160	48	820.003	
Post test Mean	115.80	134.20	Between	4232.000	1	4232.000	5.703*
SD	19.77	33.06	Within	35618.000	48	742.042	
Adjusted Post test mean	123.0	129.82	Between	3287.32	1	3287.32	6.240*
			Within	36420.89	48	784.87	

S – Significant

NS – Not Significant

It is inferred from the above table the pre-test mean score on experimental group is 130.20, experimental group is 125.44. Therefore, it is evident that the obtained 'F' value 0.345 for Pre-Test mean score. Therefore, the framed research hypothesis is rejected. However, the Post test mean score on experimental group is 115.80, control group is 134.20. Therefore, it is evident that the obtained 'F' value 5.703 for Post-Test mean score. As a result the framed research hypothesis is accepted. It is inferred that there is a significant difference between the post test means of the Yogasanas and

Pranayama practices on blood Glucose level among RBS Mg/dl Test. Further, the above table taking into consideration of the adjusted post test mean score on experimental group is 123.0, control group is 129.82. Consequently, it is evident that the obtained 'F' value is 6.240. Therefore, the framed research hypothesis is accepted. It is inferred that there is a significant difference between the adjusted post-test means of the Yogasanas and Pranayama practices on blood Glucose level among RBS Mg/dl Test t.

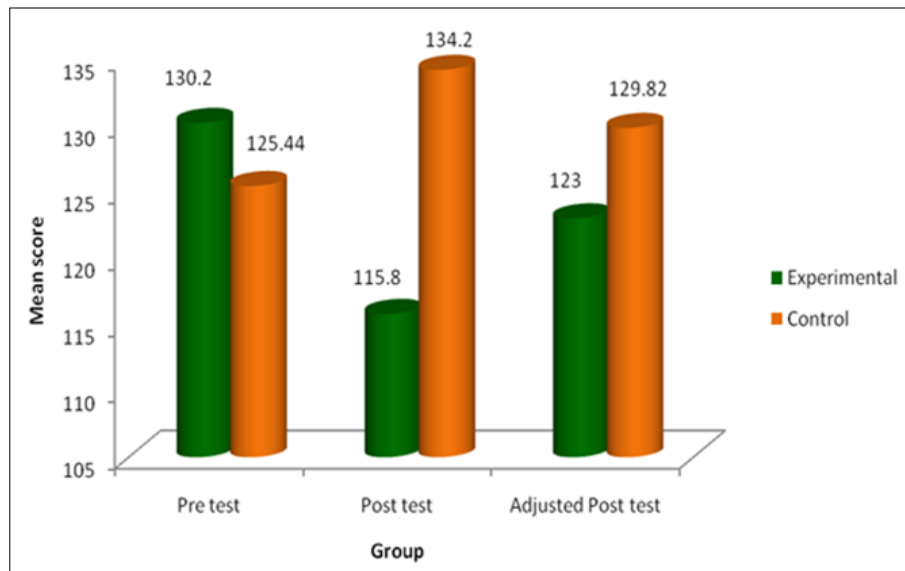


Fig 1: Show the Mean score and group of Experimental and controls

Conclusions

The latest scientific evidence suggests the potential role of yogasanas and pranayama practices in the management of reducing random blood sugar levels type 2 diabetes and its associated risk factors. It is suggested that psychoneuro-endocrine and immune mechanisms have holistic effects in diabetes control. Parasympathetic activation and the associated anti-stress mechanisms improve patients' overall metabolic and psychological profiles, increase insulin sensitivity, and improve glucose tolerance and lipid metabolism. In the present study, a 12 week yoga intervention showed a significant 115.80, as compared to another control study. Yogic practices are beneficial in minimizing PCOS risk and helps to reduce the levels of random blood sugar. It may be considered evidence for the yoga intervention's efficiency in reducing levels of random blood sugar in the case of PCOS women.

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