



EFFECT OF SUDARSHAN KRIYA YOGA ON STRESS IN ADULTS

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ABSTRACT Nowadays, Stress disorder is arising at an alarming rate all over the world. Improvement in mental morbidities can lead to improvement of sleep quality, thus increasing the importance of better sleep. Sudarshan Kriya Yoga (SKY) is a breathing based, mind-body intervention that has been demonstrated to have multiple physiological and psychological benefits. The study has been conducted to co relate sleeplessness with mental, physical and social well-being on adults (>20 years) enrolled in Sudarshan Kriya yoga (SKY), breathing and relaxation workshop. For assessing the mental well-being, DASS-21 Questionnaire used before and after the breathing and relaxation training workshop. Evaluation of the data revealed that the scores of the Stress parameter of the participants after the interventional programs improved when compared to the same parameters of the participants before the workshop. The result indicated that this low-cost interventional strategy was associated with beneficial role in psychological disorder like stress which eventually can improve physiological parameters to an individual as well..

KEYWORDS : Stress, SKY- Sudarshan Kriya Yoga, DASS-21- Depression, Anxiety and Stress Scale Questionnaire, Mental well-being, HRV-Heart Rate Variability

INTRODUCTION

Mental wellness is a crucial component of overall health, encompassing emotional strength, cognitive abilities, stress management, and psychological equilibrium. The occurrence of mental health issues, such as anxiety, depression, and stress related disorders, is rising alarmingly in today's society¹. Job-related stress, lack of balance in daily life, social disconnection, and excess digital engagement all play a role in the decline of mental health. As a result, there is a growing interest in holistic, non-drug interventions to enhance mental well-being. One such method is yogic breathing (pranayama), which has been practiced for millennia and whose health benefits, both physical and mental, are increasingly acknowledged². Pranayama, derived from Sanskrit words prana and ayama, is a breathing technique that not only calms the mind but also influences the body's autonomic nervous system and brain function, promoting balance between body and mind³.

Research indicates that controlled breathing can affect stress hormones, improve emotional resilience, boost cognitive abilities, and encourage relaxation⁴.Yogic breathing practices, such as Sudarshan Kriya Yoga (SKY), alternate nostril breathing, and diaphragmatic breathing, are linked to reduced cortisol levels, enhanced heart rate variability (HRV), and improved mental clarity⁵.With mental health concerns affecting so many people and traditional medications not always offering complete relief, it's becoming more important than ever to look at other options. Yogic breathing, for instance, shows real promise as a supportive way to help improve mental well-being⁶. Numerous elements, including stress tolerance, physical health, social support, and sleep quality, affect psychological well-being. An individual's general well being depends on the interplay between psychological and physiological stress. Research has demonstrated a direct connection between mental health, immune function, sleep difficulties, and stress⁷.It has been demonstrated that constant 1 strain worsens problems with sleeping, raises the probability of depression, and reduces cognitive function⁸.Furthermore, those with robust social networks frequently experience better outcomes for their mental and physical health⁹.This study uses DASS-21 questionnaire, established psychometric tools, to assess mental health. Numerous facets of psychological stress, overall quality of life, and sleep issues are evaluated using these tools. In order to assess how successfully yogic breathing can enhance psychological well-being, this study will compare these metrics before and after a structured yogic breathing program is implemented¹⁰.

For evaluating negative emotional states, the Depression, Anxiety, and Stress Scale-21 (DASS-21) is a validated psychometric test¹¹.It comprises three subscales: Depression Scale: Assesses dysphoria,

despair, life devaluation, self-devaluation, disinterest, and anhedonia. Anxiety Scale: Assesses autonomic arousal, contextual anxiety, and subjective feelings of anxiety. Stress Scale: The assessment evaluates persistent non-specific arousal, anxiety, difficulty relaxing, irritation, and impatience. Each query is scored on a simple four-point Likert scale, making it easy to understand and respond to. Higher scores denote greater psychological distress².By comparing DASS-21 scores before and after the intervention, researchers will assess whether yoga breathing can reduce symptoms of stress, anxiety, and depression¹².

Workplace stress has become a major health concern worldwide, especially in high-pressure work environments¹³.Research shows that when employees are under too much stress at work, it can really take a toll on their motivation and how connected they feel to their job, productivity and mental well-being¹⁴.The lines between work and personal life have become increasingly hazy due to growing digitization, and stress levels have gone up¹⁵.Yogic breathing exercises (pranayama) offer a non-pharmacological, cost-effective, and accessible approach to mental wellbeing¹⁶.

METHODS**Statistical Analysis- Prospective Interventional Study Design**

Aim of the study is to observe the effect of breathing and relaxation technique on mental health and sleep quality. We hypothesized that combined yogic breathing technique helps in improving mental health and sleep quality in adults. The primary objective is to assess mental health status of each study participants before and after interventional breathing and relaxation workshop. Prospective Interventional Study design was used under proper consent form was taken from the participants. Duration period January 2024 to January 2025. Sample size ≥ 59 .Yoga centres from where subjects were taken E-1302 Shalimar Gallant , Mahanagar (Lucknow) , Hari Hostel Kakadeo (Kanpur) Adults aged 21–70 years ,willingness for participation in Sudarshan Kriya Yoga (SKY) training and practice sessions, physical and mental stability (through per clinical evaluation) and consent for participating in both pre- and post-intervention assessments all these were factors included .Uncooperative individuals, individuals not providing signed informed consent, Acute psychiatric or medical emergencies and participation in any concurrent intervention involving yoga or psychological therapy were considered criterias which needs to be excluded.

Participants were recruited voluntarily through outpatient services and institutional advertisements. All participants received standardized Sudarshan Kriya Yoga (SKY) training conducted by certified instructors over a 4-day workshop (2 hours/day), followed by daily home-based practice for a period of 6 weeks. The SKY protocol has been discussed in (Table-1).

Table – 1 Sky Protocol

Serial no	Practice	Description	Posture
1	Three-stage, Kanishk Pranayam	Ujjayi breath in 3 rounds	Vajrasana or sitting cross-legged on the floor or chair
	Relaxation	12 seconds (Both palms on the knees, open to the sky/ceiling)	Same
2	Bhastrika Pranayam	Three rounds in forceful breath	Same
	Relaxation	15 seconds (Both palms on the knees, open to the sky/ceiling)	Same
3	Om Chant	Three times	Cross-legged on the floor or chair
4	Cyclic Breathing	In 3 speeds – slow, medium, fast	Same
	Relaxation	5 minutes	Same
5	Yog Nidra Meditation	Continuation	Lying down on the floor or in Shavasana
6	Rest	10 minutes	Same

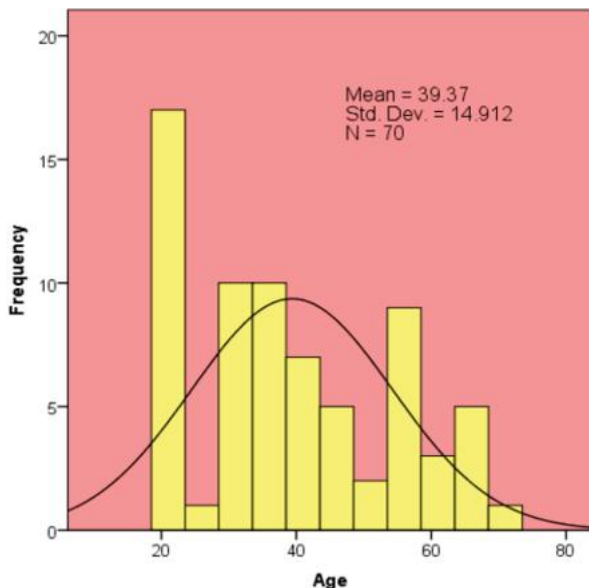
Pre- and Post-intervention Assessments

The following validated tools were used: DASS-21 (Depression, Anxiety, and Stress Scale – 21 items) It is for psychological assessment containing 7 items each to measure the depression, anxiety and stress. The subject answer each question which is actually an open ended question on the scoring of 0-3. There are 7 questions for 3 domains depression, anxiety and stress. The total scoring is multiplied by 2 and is measured by given 3 domains in Mild, Moderate, Severe, Very Severe (11) Depression Anxiety Normal 0-9 0-7 Stress Mild 0-14 10-13 8-9 Moderate 15-18 14-20 10-14 Severe 19-25 21-27 15-19 Very Severe 26-33 28+ 20+

RESULTS

Age of participants enrolled in the study ranged between 21 & 70 years, mean age of participants was 39.37 ± 14.91 years. Most common age group was 25-40 years (32.9%) and 41-60 years (32.9%). Only 6 (8.6%) participants were aged ≥ 60 years of age, 18 (25.7%) were aged 21-25 years (Table 2 and Figure 1).

Before intervention, stress score of subjects on DASS-21 ranged from 4 to 42, mean score was 26.31 ± 8.41 , majority of the patients had extremely severe to severe stress levels (55.7%; 25.7% & 30.0% respectively), approximately one-fourth of the subjects had moderate level of stress (25.7%) and 11.4% had mild level of stress. Only 5 (7.1%) had normal stress levels (Table 3; Table 4; Fig. 2)

**Figure 1: Histogram Showing Dispersion of Age of Study Population****Table – 2 Age Profile of Study Population (n=70)**

Age Group	Number	Percentage
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1	21-25 years	18	25.7
2	26-40 years	23	32.9
3	41-60 years	23	32.9
4	>60 years	6	8.6
5	Mean age $\pm$ SD (Range) in years	39.37 ± 14.91 (21-70)	

Table – 4 Difference Between Pre and Post Intervention Stress Levels

Stress	Pre	Post
Subjects in Normal category (0-14)	5	40
Percentage	7.1	51.7
Subjects in Mild Category	8	11
Percentage	11.4	15.7
Subjects in Moderate Category	18	16
Percentage	25.7	22.9
Subjects in Severe Category	21	3
Percentage	30.0	4.3
Subjects in Extremely Severe Category	18	0
Percentage	25.7	0.0
Wilcoxon Signed Rank Test	Z = -6.936 ; p < 0.001	

Following the intervention, participants experienced a noticeable relief in stress, with the average score falling to 14.43 ± 6.73 , reflecting a meaningful improvement. This reflects a mean reduction of 11.89 ± 6.90 points, amounting to a 45.17% improvement from the baseline stress scores. The change was statistically significant, indicating that the intervention had a measurable effect on alleviating stress. (Fig 3.3)

The severity distribution also shifted considerably post-intervention. Notably, no participants remained in the extremely severe stress category, and those with severe stress dropped significantly from 30.0% to just 4.3%. The proportion of individuals with moderate stress decreased slightly from 25.7% to 22.9%, while mild stress levels increased from 11.4% to 15.7%. What stood out the most was the remarkable shift in stress levels—while only 7.1% of participants had normal stress before the intervention, this number jumped to 51.1% afterward, showing a meaningful improvement in their well-being. (Fig 6)

Kanchibhotla et al. 2021 conducted a cross-sectional observational survey to observe the effects of Sudarshan Kriya Yoga on stress. Subjects were divided into case & control group Perceived Stress Scale score in the SKY group was improved to 15.36 ± 4.9 & control group having statistically significant ($p < 0.01$) 83, which supports the scoring of the DASS-21 stress domain of the current thesis. In another study done by Yadav S.S. et al. (2024) on 63 subjects, 32 were kept in core group doing yoga and 31 were control. All domains in DASS-21 questionnaire were improved in yoga group as compared to control group 101

According to research, adding mental and physical exercises like yoga to corporate wellness initiatives can help employees feel better and experience less stress at work¹⁶. Yogic breathing has been shown in scientific studies to be beneficial for mental health. It has been demonstrated that slow breathing techniques, particularly diaphragmatic breathing and SKY, are useful in controlling autonomic functions and reducing depressive and anxious symptoms¹⁷. The polyvagal hypothesis states that vagal tone, as measured by heart rate variability (HRV), is a fundamental factor influencing emotional and cognitive resilience¹⁶.

DISCUSSION

In this study, participants showed a significant drop in stress levels after the intervention, as measured by the DASS-21 scale. At baseline, participants exhibited notably elevated stress scores, with a mean pre-intervention score of 26.31 ± 8.41 . The stress levels were predominantly in the severe to extremely severe range, affecting a total of 55.7% of participants (25.7% with extremely severe stress and 30% with severe stress). Additionally, 25.7% exhibited moderate stress, 11.4% had mild stress, and only 7.1% ($n = 5$) were within the normal range prior to the intervention. (Table. 3), (Fig 2), (Fig 3).

Table – 3 Post Intervention Stress Score

Stress Score	Age Group	Percentage
Normal (0-14)	40	57.1
Mild (15-18)	11	15.7
Moderate (19-25)	16	22.9
Severe (26-33)	3	4.3
Extremely severe (34+)	0	0.0
Mean stress score $\pm$ SD (Range)	14.43 ± 6.73 (2-32)	

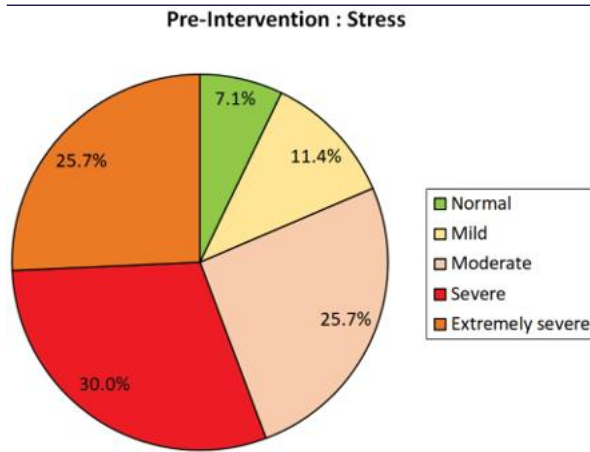


Figure 2: Pre Interventional Stress Score

CONCLUSIONS

By practicing SKY, participants had noticeably lower levels of stress assessed through the DASS-21 scale. Following the intervention, participants exhibited a marked reduction in stress levels as seen in the DASS-21 scale. The proportion of individuals with alarming levels of stress significantly declined, while those with normal or mild levels increased notably.

Subgroup analysis revealed that both younger (≤ 40 years) and older (> 40 years) participants benefitted significantly, with younger individuals showing a greater improvement in mental health parameters as compared to older individuals. Gender-wise analysis showed females experienced greater improvement in mental health and sleep quality, while males showed higher improvements in cardiovascular parameters. It can be used as adjunct therapy.

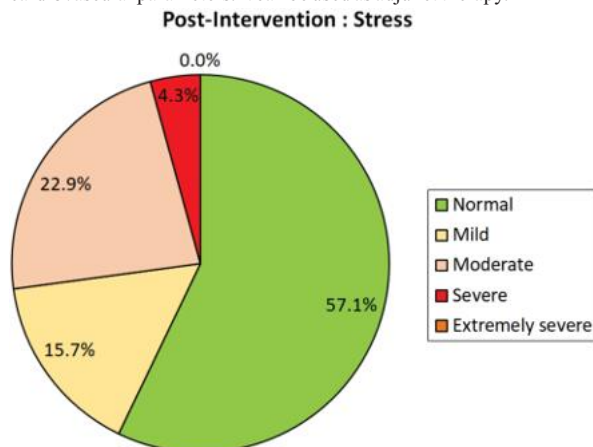


Figure 3: Post Interventional Stress Score

Breathing exercises decrease sympathetic overactivity, enhance parasympathetic dominance, and stimulate vagal afferents.¹⁸ Furthermore, it has been demonstrated that breathing techniques affect brain wave activity and enhance synchronization among different brain regions¹⁹. Slow breathing is associated with improved attentional control, enhanced emotion management, and increased prefrontal brain activity in long-term meditators²⁰. Scalable therapies like yogic breathing could be helpful tools for boosting psychological resilience in light of the growing worldwide mental health issue²¹. This study aims to address stress, anxiety, and mental health issues among adults due to modern lifestyle Challenges

Limitations

Despite being adequate, the sample size of 70 participants may not accurately represent the general population. The findings might not fully apply to everyone, especially those with more complex health needs. Since there was no control group in the study, it's a bit challenging to say for sure whether the improvements were entirely because of the intervention or if other factors may have played a role. Also, because the study was conducted over a short period, it might not show the full picture of how yogic breathing could help in the long run.

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