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**Discussions**

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DISCUSSIONS

8.1 INTEGRAL YOGA

The results of the effect of the integral yoga practices on psychological and health variables showed significant improvement in all measures except the tama which showed significant reduction at (P < 0.01) and sattva guna where improvement did not reach significant level.

8.1.1 COMPARISON WITH EARLIER STUDIES

Gupta et al, 2006 found in their study anxiety scores, both state and trait anxiety were significantly reduced after a Yoga-based lifestyle intervention consisting of āsanas, prānāyāma, relaxation techniques, group support, individualized advice, and lectures and films on various yoga topics. While our study also showed much significant reduction of anxiety and depression in similar type of interventions.

Deshpande et al had measured GHQ in a randomized control trial in normal healthy volunteers in Bangaluru city and found significant (P <0.001) improvement on all the four domains in both Yoga and exercise groups after the intervention in a non-residential set up with daily one hour classes for 8 weeks (Deshpande et al, 2008).

The results after intervention were similar in our study and of Deshpande study of GHQ. In both studies reduction in the four domains of GHQ were significant (P <0.001).

Javnbakht et al, 2009 in their study sought to evaluate the influence of Yoga in relieving symptoms of depression and anxiety in women who were referred to a Yoga clinic showed that women who participated in Yoga classes had a significant decrease in state anxiety (p=0.03) and trait anxiety (p<0.001) after two-month of Yoga classes. Hadi & Hadi studied the effects of hatha yoga on well-being in 107 healthy adults, with improved physical and mental health and well-being (Hadi et al, 2007).

The above studies showed improvement in general health by reduction of anxiety and improvement of physical and mental health similarly in our present study also we found
significant reduction of anxiety and other health variables (p <0.001) as shown in the result of GHQ test due to effect of integral yoga.

Wolf & Abell found that chanting the *Hare Krishna Mahamantra* had a significant effect, increasing *Sattva* and decreasing *Rajas* and *Tamas* (Wolf et al, 2002).

Deshpande et al in a randomized control trial on the effect of Integrated module of *Yoga* on *Guṇas* (Personality) and self-esteem in normal healthy volunteers found there were significant number of persons who showed improvement in *Sattva* and decrease in *Tamas* in *Yoga* group but not in physical exercise group. While in our present study also there was improvement in Sattva and decrease in rajas and tamas due to effect of yoga.

**8.1.2 MECHANISMS**

The upward trend in the central tendency of the scores on one of the guna test called the G-INVENTORY seems to be quite consistent with the *Gītā* concept. This concept proposes that the *Guṇas* initially vary in their dominance in determining the personality of an individual, but that gradually the individual’s personality mostly settles on one of the *Guṇas*. In the *Gita* Sri Krishna says ‘Everyone is helplessly driven to action by the *Guṇas* born of *prakṛti*’. Ultimately, though very slowly, through a conscious moral evolution, moves from *Tamas* and *Rajas* to *sattva* and finally goes beyond the *Guṇas* and attains liberation/highest state.

According to modern understanding and research in integral yoga one can improve one’s health and develop one’s personality and potential by practicing yoga regularly whether it is yogasanas or pranayamas or meditation or cleansing kriyas, or devotional practices, or moving consciously from tamas to rajas to sattva (selfless services) or acquiring discrimination and wisdom through self-enquiry. One can adopt one or more practices according to one’s nature or tendencies and can progress on the path of Yoga as proclaimed by Swami Vivekananda also.
Sustained attention is the capacity to attend to a task for a required period of time. It is closely associated with the task difficulty or task complexity. While it is easier for simple tasks, it is more difficult for complex tasks. The ability to sustain attention may be considered an aspect of steadiness of mind, which in turn is a sign of mental stability. Thus we may in general consider sustained attention to depend on emotionality.

8.1.3 YOGIC PERSPECTIVES

In the Bhagavad-Gita, the Yoga śāstra (scripture of the science of Yoga) presents this whole process of elevating oneself to the highest state through this model of practice of yoga in a wonderful narration:

Traiguṇyaviśayā vedaṁ nistraigunyo bhavārjunaṁ
Nirdvandvo nityasattvastho niryogakṣema ātmavān
Yogasthāḥ kuru karmāṇi sandgaṁ tyakatvā dhanaṁjayaṁ
Siddhyasiddhyoḥ samo bhūtvā samatvaṁ yoga ucyate  || (Gitā 2/45, 48)

The Vedas deals with the three Gunas of Nature; be thou above these three gunas (nistraigunyo) and free yourself from the pairs of opposites, and ever remain in the quality of Sattva (goodness) freed from the thought of acquisition and preservation (niryogakṣema) and to be established in the Self (ātmavan).

Lord Krishna further says to Arjuna that now perform action by establishing yourself in the Self/Silence (In YOGA) yogasthah, perform actions abandoning all attachments sangam tyaktva and being balanced in success and failure. This type of evenness of mind is called Yoga (Union with Divine) samatvam yoga ucyate that means it will take you to the highest state of perfection.

We have seen from previous studies and the present study that integral yoga plays very important role in increasing of Sattva guṇa and in reduction of Rajas and Tamas guṇas and brings improvement in sustained attention, emotional intelligence and in all dimensions of general health as assessed and hypothesized in the present study.
8.2 KAPĀLABHĀTI VS BREATH AWARENESS

The present study found significant reduction in anxiety and significant improvement in sustained attention and verbal and spatial memory after the practice of kapālabhāti by healthy volunteers. While after the practice of breath awareness by self controlled group found there was insignificant reduction in anxiety and significant increase in sustained attention but not similar to the kapālabhāti. In case of verbal and spatial memory there was significant reduction which is contrary to the effect of kapālabhāti.

8.2.1 COMPARISON WITH EARLIER STUDIES

A study done by king J (1988) on 33 nursing students found that state anxiety levels were reduced at .001 levels of confidence due to the relaxation with guided imagery. While in present study also we found that there was significant reduction of state anxiety (p <0.001) after the practice of kapālabhāti which is similar to result of king study

Previous studies done by patil et al (2007) found significant improvement in sustained attention in two relaxation techniques i.e. after practice of cyclic meditation and supine rest. He found change in sustained attention 24.9% and 13.6% respectively which is similar to our present study.

Similarly a study done by Telles et al (2008) found increase in sustained attention (SLC) by 32.5%, 16.5% after kapālabhāti in middle aged adults and older persons respectively and no change in young medical students. The mechanism underlying the changes in three different groups is not known. But result of middle aged adults and older persons is similar to our study.

For the SLC and DLS tasks, present results suggest that kapālabhāti augments attention, both enhancing performance, and reducing distraction. The study found increases in sustained attention scores after practice of both kapalbhati (23.69% & 14.89% for SLC & DLS tasks respectively) (both p<0.001), and breath awareness (14.83% & 6.73% for SLC & DLS respectively) (both p<0.001), but, again, significantly more after kapālabhāti than breath awareness (both SLC & DLS p<0.001). These results support the idea that kapālabhāti is more effective in increasing subjects' sustained attention span than breath awareness.
Manjunath N (2004) assessed the effect of yoga on group of 30 healthy subjects and found significant increase in of 43% in spatial memory scores which is similar to the result of our present study.

While study done by Naveen et al 1997 showed significant increase in spatial memory but not in verbal memory after the practice of four breathing practices (pranayama practice). Blakeslee (1980) stated that the left hemisphere is more involved with verbal memory while the right hemisphere is more involved with the recall of non-verbal spatial information. In this study of Naveen et al it appears that there was no specific lateralized effect of breathing through a particular nostril. The performance also did not appear to be related to the nostril.

8.2.2 MECHANISMS

While in our study kapālabhāti was with the both nostrils which showed significant increase in both verbal and spatial memory which is inconsistent with the result of Naveen et al where increase was only in spatial memory and not in verbal memory after practices of single and alternate nostril breathing practices. This is matter of further research that how forceful both nostril kapālabhāti over other breathing practices i.e. left, right and alternate nostril breathing without any effort (Chandra Anuloma viloma, Surya Anuloma viloma and Nadi shudhi pranayama) is useful in improvement of verbal memory.

In this light, the present study's findings that verbal and spatial memory scores both increased significantly after kapālabhāti practice (33.44% & 34.20%, respectively, both p < 0.001), but decreased significantly after breath awareness practice (-36.51% & -16.84% respectively, p < 0.001), is very important. We found that kapālabhāti does not produce a lateralized effect.

Sustained attention is the capacity to attend to a task for a required period of time. It is closely associated with the task difficulty or task complexity. While it is easier for simple tasks, it is more difficult for complex tasks. The ability to sustain attention may be considered an aspect of steadiness of mind, which in turn is a sign of mental stability.
Thus we may in general consider sustained attention to depend on anxiety free, calm and stable mind.

### 8.2.3 YOGIC PERSPECTIVES

According to *Māṇḍukya Upaniṣad* which contains this wonderful verse:

\[
\text{laye sambodhayet citam vikṣiptaṁ śamayet punaḥ}
\]

\[
sakaśāyaṁ vijānīyāt samapṛāptaṁ na cālayet|| (Man. Karika-111-44)
\]

When the mind becomes lethargic, stimulate and awaken it: when it speeds up and distractions set in, calm it. Thereafter as you progress recognize the dirt within us in the form of past impressions and desires *sakashayam* (*samskaras* and *vasanas*) by observing the mind while practicing yoga and once it reaches to balance, do not disturb it.

With the above method of practicing yoga in any form which involve stimulations and relaxation one can reach to the heights of human potential. For further and deeper understanding of the above principle one can refer to the book written by Dr. H.R. Nagendra, “New Perspectives in Stress Management”, lesson-1 Stimulation and Relaxation Combine –The Core. The book reference (Nagendra H.R. 1998).

In our present study we have given intervention of one minute *kapālabhāti* one minute relaxation like that ten cycles form the effect of stimulation and relaxation combined. Whatever few assessments done in state anxiety, sustained attention, and verbal and spatial memory showed significant improvement in all these variables which prove that yoga works even on healthy people with this principle of stimulation relaxation combine which is core method of all *sadhānas* to progress on the path of yoga. It also proved the hypothesis made in the present study.

### 8.3 DEEP RELAXATION TECHNIQUE VS SUPINE REST

The present study found significant reduction in state anxiety and significant improvement in sustained attention (*P* <0.001), in healthy subjects after the practice of deep relaxation technique in comparison of supine rest. While supine rest showed
insignificant reduction in state anxiety and significant improvement in sustained attention but in comparison to deep technique it is not that much significant as shown in table 4.

8.3.1 COMPARISON WITH EARLIER STUDIES

Barber L R (1995) in his study on the effect of a relaxation with guided imagery on anxiety showed significant decline of anxiety (P < .05) in 60 subjects over the 4 weeks period. Similarly a study done by King J (1988) on 33 nursing students found that state anxiety levels were reduced at .001 levels of confidence due to the relaxation with guided imagery. While in present study also we found that there was significant reduction of state anxiety (p < 0.001) after the practice of deep relaxation technique which is similar to result of King study.

Schenfere P M (2000) in his study on effects of progressive relaxation on measurement of attention, relaxation and stress response on 67 normal male volunteers showed reduction in physiological arousal following the stress management technique. In another study by Rutschman J R (2004) on effects of meditation and relaxation on attention in two groups found meditation was not found to enhance overall attention capacity more than relaxation. (p < 0.001). However it did lead to increased attention flexibility and sustainment.

A another study done by Patil et al (2007) on effect of two relaxation technique on sustained attention found significant improvement in sustained attention after practice of cyclic meditation and supine rest. He found change in sustained attention 24.9% and 13.6% respectively (p < .001). Our result of deep relaxation technique on sustained attention in comparison to Patil study found equally beneficial i.e. change in sustained attention was 24.78% and in Supine rest it was 10.62 (p < 0.001). Therefore we can conclude that DRT is equally good as of cyclic meditation.

According to modern trends there are various techniques of relaxation are there like Autogenic training (visualization relaxation), Biofeedback method of relaxation, Self hypnosis, Deep breathing, Relaxation Meditation, Progressive Muscle relaxation etc. which can give relaxation to mind sufficiently.
8.3.2 MECHANISMS

In contrast, the measures of sustained attention, the Six Letter Cancellation and Digit Letter Substitution tests were improved by both DRT and SR, though the latter seemed to produce a distinctly smaller effect. The question now arises as to the possible relationship between the findings on anxiety and those on sustained attention. The conclusion of following study will help us to find out the possible reasons in changes of anxiety and sustained attention.

A self-controlled study by Telles et al (2007) on immediate effects of three yoga breathing techniques on performance of a letter cancellation task (LCT) improved significantly in Nadi suddhi pranayama and in Surya Anuloma pranayama but no significant change was observed following left nostril breathing and simple breath awareness. The authors concluded that anxiety reducing effects of pranayama might have contributed to better LCT performance, since this requires selective attention. Similarly in our study also we can say that anxiety reducing effects of deep relaxation might have contributed to better SLC and DLS performance.

8.3.3 YOGIC PERSPECTIVES

In Yogavāsiṣṭha one of the best texts on Yoga the essence of Yoga is beautifully portrayed as under:

Manah Prashamanopayah Yoga Ityabhidhiyate (Y. V.3.9.32)

Yoga is skilful methodological trick to calm down the mind. It is an upaya a skilful subtle process and not brutal, mechanical, gross effort to stop the thoughts in the mind or relax the mind.

As we have seen in Yogavāsiṣṭha the definition of mind, that yoga is trick to calm down the mind, our present study prove the same as our yogic deep relaxation technique (DRT) reduced the anxiety and improved the sustained attention significantly as in other studies. So it proved our hypothesis of the study.