

Effect of yoga techniques on academic achievement of high school chemistry students in Mysore –India

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Abstract: Yoga is the process of using physical exercises and mental imagery that originated in the Indian cultures more than three thousand years ago. It is the name given to a practice that helps create a union between the mind, body, and spirit. Yoga's benefits extend to persons of all faiths, ages and abilities. Yoga has so many techniques that this investigation has been used two techniques (Asana techniques and Meditation techniques) of four essential yoga categories (1. Breathing techniques 2. Asana techniques 3. Relaxation techniques 4. Meditation techniques). It is definitely true that yoga has an affect on body, mind and emotion but the main purpose of this research is recognized impact of yoga on academic achievement. This research is semi-empirical and subjects were 90 high school students in Mysore city- India. In this study, the effectiveness and efficacy of two common techniques (Yoga Asana and Meditation) have been shown on change the academic achievement of high school chemistry students. Research instruments used included academic achievement pretest and post test that was prepared by investigator and teachers. Based on the statistical analysis of ANCOVA it showed that the difference between means of experimental groups (asana and meditation) and control group on the gain scores academic achievement in chemistry is found to be significant at the 0.05 level of confidence which indicates that students of the experimental groups and the control group differ on the gain scores of chemistry.

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1. Introduction

Despite the recent studies on the effects of yoga on mental health, but there is no hardly research undertaken on the effects of yoga on academic achievement. In this article investigated the effects of yoga on the chemistry in high school in Mysore city. The Sanskrit word yoga has the literal meaning of "yoke", from a root yuj. As a term for a system of abstract meditation or mental abstraction it was introduced by Patanjali in the 2nd century BC. Yoga is a physical, mental and spiritual discipline, origination in modern India, whose goal is the attainment of a state of perfect spiritual insight and tranquility. Yoga is the process of using physical exercises and mental imagery that originated in the Indian cultures more than three thousand years ago. It is the name given to a practice that helps create a union between the mind, body, and spirit (Kalish, 2001). Yoga as a life style or systematic techniques for improving the physical body and mind has so many benefits that the first and essential of them is personal discipline. When the personal discipline is stabilizing in life it affect on most of human function. So it seem if yoga techniques considered

in physical education program it can be affect on all the students functions special in academic achievement . Yoga has so many techniques that this investigation has been used two techniques of four essential yoga categories (1. Breathing Techniques 2. Asana Techniques 3. Relaxation techniques 4. Meditation Techniques). It is definitely true that yoga has an affect on body, mind and emotion but the research question is recognized impact of yoga on chemistry academic achievement.

2. Review of related literature

In recent years yoga exercises have been recommended by some researcher and there are so many researches about application and benefits of yoga but a few of research studies have shown its effectiveness on student's academic performance. Takhar & Sharma (2012) investigated the effect of Yoga on academic achievement. The results indicated: (1) The significant effect of yoga on academic achievement of students was found, means training of yoga can help to increase the academic achievement. (2) The academic achievement of students living in urban area was

increased as a result of training of yoga. (3) The effect of yoga training on academic achievement of students studying in Std. IX. (4) Development level of students was increased after the training of yoga. Kauts & Sharma (2009) studied the effect of yoga on academic achievement. The findings of this study reveal that the students who experienced yoga module performed better in overall academics as well as in their separate subjects than those students who did not experience yoga module. According to studies of Wheeler & Wilkin (2007), yoga in adults improves focus, concentration and learning readiness as well as enhances health and fitness. According to Gates & Wolverson (2007), yoga can produce a calming effect, which helps children get into a frame of mind conducive to learning. For example, a recent study showed that children who participated in Yoga Ed were more relaxed, less active, and better able to concentrate. Compared with a group of students who only exercised, students who participated in yoga exhibited improved educational performance. Krishna (2006) investigated a study with aim the effect of simplified Kanadalini Yoga on personality development and academic achievement of students. This study was conducted on 450 students in Chennai in two groups of experimental and control. Results of ANOVA showed that sex and subject studied was not significant but results of training showed significant effect on the personality and the academic achievement of the students. Siar (2005) conducted a study to measure the effects of the Super brain Yoga with fifty-six (56) middle school students in Norristown, Pennsylvania, who were experiencing academic and behavioral problems. The results of the study showed that there is a positive relationship and significant improvement in the academic and behavioral performance of a middle school adolescent by using the Super brain Yoga.

Lee (1999) pointed to the yoga sutras' "directions for understanding life more fully and techniques, including the use of the body and the breath and meditation, for attaining deeper wisdom," such wisdom can surely be seen to incorporate academic achievement.

Aron & et al., (1980) conducted a four-year longitudinal study of undergraduate students in the transcendental Meditation (TM) program. The purpose was to measure whether the TM program enhanced student intelligence and personality. Results showed an increase on general intelligence for all students. In addition, an increase was seen in the four personality areas – social self-confidence, sociability, general psychological health and social maturity. Brook (2007) studied the effects of yoga

on the anxiety levels of fifteen fourth and fifth graders in an upper middle-class school. Teachers reported that after the class, students were seen to be more engaged in their learning. Similarly, Kember (1985) study showed postgraduate students who took transcendental Meditation improved in their academics. Janowiak & Hackman (1994) also investigated how meditation influenced college students' stress and personality levels. Data was collected from 62 college students enrolled in health education courses. Randomly assigned, twenty-one students were assigned to two 8-week conditions of meditation and twenty students to a condition of relaxation, and the remaining twenty were the control group. Mantra meditation was taught to the meditation group and a form of yoga relaxation (Shavasana) was taught to the relaxation group. T-test results showed post-test scores were higher than pre-test scores for the three groups however, test scores were only significant for the relaxation group. In addition, a significant correlation was found for both groups, the meditation and relaxation group, between changes in stress ratings and compliance total scores, specifically those with greater compliance to meditation/relaxation showed a decrease in their stress level. Linden (1973) found that 3rd grade students who practiced meditation showed reduced anxiety when taking tests. Another study, Brewer & et al., (2010) showed that Yoga-based interventions may be effectively used as an adjunct to traditional counseling services at university and college counseling centers as well as in schools, specifically as an alternative intervention for stress reduction and emotional regulation. Also a few research studies have shown the effectiveness of relaxation (Benson, et al., 2000), meditation (Linden, 1973) and yoga (Angus, 1989; Hopkins, 1979) on students' concentration and stress levels, as well as their academic performance. A three-year study conducted by Benson, et al (2000) showed middle school students who were exposed to a relaxation response curriculum scored higher on work habits, cooperation, attendance and had significantly higher GPA's than their counterparts. This research seeks to investigate whether the using asana and meditation techniques in yoga can be effective in the improvement of students' chemistry academic achievement? In order to respond to the question above, the following hypotheses were outlined and examined:

1. There is a significant difference between the asana group and the traditional group in chemistry academic achievement.

- There is a significant difference between the meditation group and the traditional group in chemistry academic achievement.

3. Materials and method:

The main purpose of this research was specifying effectiveness of yoga in improving of the academic achievement. This research is semi-empirical and subjects were 90 high school students in Mysore city –India. In this study, the effectiveness and efficacy of two common techniques of Yoga therapy (Asana yoga and Meditation) have been shown on change the academic achievement of high school students. The sample included for this research was 90 students from high school students who were studying in 3 schools in Maysor/India (2011-2012). At the first stage from among 50 schools (5320 students), 3 schools were selected randomly. At the second stage from each school 1 class was selected and assigned to experimental and control group randomly. Tools have been used for data collection were academic achievement pre test and post test in chemistry. The first step Multi stage cluster random sampling in selection of schools and students of

Mysore city was used. After choosing the samples, in the next step the student were divided to 3 groups. (Experimental group in first level of yoga - experimental group in second level of yoga and control group). Before using the yoga techniques (Asana and Meditation) a test was taken on chemistry as a pre-test on three groups (asana, meditation and control). A yoga module included two essential yoga techniques (Asana and Meditation) was shared daily for an hour in the morning with the experimental group for 12 weeks in two different levels. At the end of the semester, post-test in chemistry was done on three groups in the same condition. The post-test was contained the second half of the book. In the present study, descriptive statistics were used to show mean and standard deviation of academic achievement in three groups. Two factors covariate analysis (ANCOVA) were used to investigate the impact of yoga asana and meditation techniques on chemistry achievement with regarding to effect of pretest.

4. Result

Table 1. Mean and standard deviation of chemistry academic achievement post test before controlling pretest are presented in the following table.

Group	Mean	S.D
Experimental 1(Asana)	16.25	1.25
Experimental 2(Meditation)	15.32	1.61
Control(Traditional)	12.51	2.02

As seen from the table above the mean of post test of chemistry academic achievement scores in asana group is about 4 scores higher than the mean of scores in traditional group, as from the table 1 it is evident that mean of chemistry academic achievement scores for in meditation

group is about 3 scores higher than mean in traditional assessment group. A close look at the table further revealed that means in both groups of experimental were higher than the control group mean.

Table 2. T-Test for Comparative Mean before and after yoga asana technique in academic achievement in chemistry

Mean		SD		Sig(1-tailed)	df	t
Pretest	Posttest	Pretest	Posttest			
16.4	17.1	2.08	1.37	0.001	28	3.89*

*Significant at 0.05 levels

From the above table it is evident that asana techniques has significant influence over the chemistry academic achievement mean, as the obtained ‘t’ value of 3.89 was found to be statistically significant (p<05). The mean paired

differences clearly revealed that the differences between chemistry academic achievement scores before the asana techniques and after that were statistically significant.

Table 3. T-Test for Comparing Means before and after yoga meditation techniques in the academic achievement of chemistry

Mean		SD		Sig (1-tailed)	df	t
Pretest	Posttest	Pretest	Posttest			
16.3	18.7	1.61	1.4	00.01	28	3.12*

*Significant at 0.05 levels

From the above table it is evident that meditation techniques has significant influence over the chemistry academic achievement mean, as the obtained 't' value of 3.12 was found to be statistically significant ($p < 0.05$). The mean paired differences clearly revealed that the differences between chemistry academic achievement scores

before the meditation techniques and after that were statistically significant.

Two factors covariate analysis test to comparison of mean of the students' post test of chemistry academic achievement scores in experimental group (asana and meditation) and traditional assessment group are presented in the following table.

Table 4. Covariate analysis to comparison of mean in post test of chemistry academic achievement

*Significant at 0.05 levels

Source	SS	df	Ms	F
Covariant(Pretest)	1.25	1	1.25	.254
Covariant(IQ)	1.26	1	1.26	.3
Group 1(Asana)	28.32	1	28.32	3.95*
Group 2 (Meditation)	221.77	1	21.77	4.27*
Asana* Meditation	30.02	1	30.02	5.85*

As seen from the table above according to two factors covariate analysis, it is found that the yoga asana techniques has significant influence over mean scores on post test of chemistry academic achievement, as the obtained F value was found to be statistically significant ($F=3.92$; $p < .05$) and indicating that a significant difference is between the asana group and the traditional group in post test of chemistry academic achievement. Also the above table shows yoga meditation techniques has significant influence over mean scores on post test of chemistry academic achievement, as the obtained F value was found to be statistically significant ($F=4.27$; $p < .05$) and indicating that a significant difference is between the meditation group and the traditional group in post test of chemistry academic achievement. So the interaction between asana group and meditation group was found to be significant ($F=5.85$; $p < .05$).

Discussion:

This study investigated the effects of yoga techniques on chemistry achievement of high school students and analysis of result showed that there is a significant influence of yoga asana on academic achievement, in traditional assessment groups scored significantly lower than students who were in asana group. In other words, asana techniques had positive impact on chemistry achievement of students. So, result showed that

there is a significant influence of yoga meditation on academic achievement, in traditional assessment groups scored significantly lower than students who were in meditation group. In order to confirm or reject the hypotheses formulated, we have tried to compare our results with further studies done in the same area.

These results are coordinate with the earlier studies such as, (Takhar & Sharma, 2012; Kauts & Sharma, 2009; Gates & Wolverton, 2007; Wheeler & Wilkin, 2007; Brewer & et al., 2010; Krishna, 2006; Siar, 2005; Kalish, 2001; Benson, et al., 2000; Lee, 1999; Linden, 1973; Janowiak & Hackman 1994; Angus, 1989; Hopkins, 1979), which found that meditation, practiced over long periods, produces definite changes in perception, attention, and cognition. Other study showed that yoga techniques are helpful in management of anxiety and improvement in concentration. Doubtless when anxiety be reduced and concentration go up it is meaning the performance academic will be improve. This study investigated the effects of yoga techniques on academic achievement of high school students and analysis of result showed that there is a significant influence of yoga techniques on academic achievement in chemistry, between experimental group and control group. It means that one of the best strategies for improving the academic performance is expanding

the use of yoga techniques in physical education program in schools. Yoga has impact on some important features same as the self confidence, self concept and so in mental health, therefore it can effect on academic performance.

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