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A Study on Influence of Yoga on Balance and Gait Deficits among Alcoholics

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Abstract:

Back ground: Alcoholism is the biggest burden to the health and socioeconomic development of the world. The social welfare system and the criminal justice system, often the first to come into contact with alcohol-related problems, can be sensitized in identifying and assisting individuals and families at risk for heavy drinking and acting as early referral systems. Extensive opportunities exist to lessen alcohol problems through community education and the prevention of drunk driving, domestic violence, public disorder, unintentional injuries and criminal damage. To manage withdrawal symptoms, gait and balance, drugs have been used abundantly. Yoga is an easily available and cost effective tool to manage these symptoms.

Materials and methods: A total of sixty alcoholic dependent individuals has been selected from two different de-addiction camps and were recruited for this study after satisfying the inclusion and exclusion criteria and by using an AUDIT questionnaire for the screening of the subjects. The first group comprised of a yoga intervention and the second remained to be the control. Subjects in both the groups were matched to their age group. Subjects in the yoga group practiced yoga for a period of 10 days. While the control group carried on its routine activities. Both the groups were assessed for balance, gait and withdrawal symptoms at baseline and following 10 days.

Results: The yoga group showed significant improvement in the balance ($p < 0.006$), gait ($p < 0.029$) and vomiting ($p < 0.001$). T test and non-parametric study (Wilkinson's test) was used to compare with the control group.

Interpretation and conclusion: Ten days of yoga practice has shown to bring a positive influence in alcoholic dependent individuals as signified by reduced vomiting symptom and improved gait and balance. Further studies are warranted to observe the withdrawal symptoms by long term yogic intervention.

Keywords: Alcohol dependent individuals, alcoholism, yoga, balance, withdrawal symptoms

1. Introduction

Alcohol addiction is a major health problem worldwide, resulting to extensive health related problems and admissions in much general hospital (Mukherjee, 2013). In India the prevalence of alcohol use is higher among the poor, which increases the risk of cardiovascular disease (Adami et al., 1992), cancer, liver disease and injuries among the poor relative to the better-off and alcohol use disorders decrease the life span by about 10 years. While low doses of alcohol have some healthful benefits (Høiseth et al., 2013). If the patient agrees to stop drinking, sudden decreases in alcohol intake can produce withdrawal symptoms, many of which are the opposite of those produced by intoxication. Features include tremor of the hands (shakes); agitation and anxiety; autonomic nervous system over activity including an increase in pulse, respiratory rate, and body temperature; and insomnia. These symptoms usually begin within 5–10h of decreasing ethanol intake, peak on day 2 or 3, and improve by day 4 or 5, although mild levels of these problems may persist for 4–6 months as a protracted abstinence syndrome (Longo, Fauci, Kasper, Hauser, Jameson, 2011).

An Alcohol can easily cross membrane barriers and reach different parts of the body very quickly. Attainment of its equilibrium concentration in different cellular compartments depends on the respective water content. Alcohol can affect several parts of the brain,

but in general contracts destroys brain cells, as well as depresses the central nervous system. Excessive drinking over a prolonged period of time can cause serious problems with cognition and memory. Alcohol interacts with the brain receptors, interfering with the communication between nerve cells and suppressing excitatory nerve pathway activity. Neuro-cognitive deficits, neuronal injury, and neuro-degeneration are well documented in alcoholics (Mukherjee, 2013). Historical and clinical aspects of pellagra and its relationship to alcoholism are reviewed from a biochemical perspective. Pellagra is caused by deficiency of niacin (nicotinic acid) and/or its tryptophan (Trp) precursor and is compounded by B vitamin deficiencies. Alcohol dependence can induce or aggravate pellagra by inducing malnutrition, gastrointestinal disturbances and B vitamin deficiencies, inhibiting the conversion of Trp to niacin and promoting the accumulation of 5-ALA and porphyrins. Alcoholic pellagra encephalopathy should be managed with niacin, other B vitamins and adequate protein nutrition. Future studies should explore the potential role of 5-ALA and also KA in the skin and neurological disturbances in pellagra (Badawy, n.d.). A review study conducted on Effects of alcohol on the endocrine system shown Chronic consumption of a large amount of alcohol disrupts the communication between nervous, endocrine and immune system and causes hormonal disturbances that lead to profound and serious consequences at physiologic and behavioral levels. These alcohol-induced hormonal dysregulations affect the entire body and can result in various disorders such as stress abnormalities, reproductive deficits, body growth defect, thyroid problems, immune dysfunction, cancers, bone disease, and psychological and behavioral disorders (Rachdaoui & Sarkar, 2013).

2. Methodology

2.1. Subjects

A total of 60 male subjects with an age between 25 to 45 years were participated in the study. All the subjects were from de-addiction center. 60 subjects were selected from two different de-addiction camps.

2.2. Source of Subjects

Subjects for both experimental and control group were selected from the SDM

De-addiction Center Laila, Dakshina Kannada, Karnataka. Interested candidates were selected from the camp and screening was done by AUDIT questionnaire. A total of Seventy eight subjects were screened by the audit questionnaire and seventy-five subjects fulfilled the inclusion and exclusion criteria.

2.3. Demographics

	Yoga Group	Control Group
Age [mean \pm SD]	36.866 \pm 6.611	36.233 \pm 5.443
Total participants completed the study	30	30

Table 1: Demographic details of the subjects

2.4. Ethical Consideration

Ethical clearance was sought from the Institution Ethics Committee Prior to the start of study and approval for the same was granted

2.5. Written Informed Consent

Subjects who fulfilled inclusion criteria were apprised about the purpose of the study and their rights as a research subjects. Informed consent form was administered in English and explained to their local language i.e kannada for those who don't understand English. Adequate time was given to each subject to go through the information sheet and all their queries were answered. Their right to withdraw anytime from the study and need for willingness to participate voluntarily in the study was explained. All the subjects expressed their willingness to participate in the study by giving a signed informed consent.

2.6. Screening of Subjects

AUDIT questionnaire was used to screen subjects. The Alcohol Use Disorders Identification Test (AUDIT) is a simple ten-question test developed by the World Health Organization to determine if a person's alcohol consumption may be harmful. The test was designed to be used internationally, and was validated in a study using patients from six countries. Questions 1-3 deal with alcohol consumption, 4-6 relate to alcohol dependence and 7-10 consider alcohol related problems. A score of 8 or more in men (7 in women) indicates a strong likelihood of hazardous or harmful alcohol consumption. A score of 20 or more is suggestive of alcohol dependence (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993).

2.7. Inclusion Criteria

Patients satisfying the inclusion criteria of aged between 25 to 45years male subjects who had a willingness to participate in the study.

2.8. Exclusion Criteria

Subjects were excluded if they have a history of any neurological and psychiatric disturbances, subjects with physically handicapped and who were on anxiolytics.

2.9. Design

A matched Controlled design was executed in this study. Subjects were matched for their age and sex. The data collection was done before (day 1) and after (day 10) from the intervention and control group.

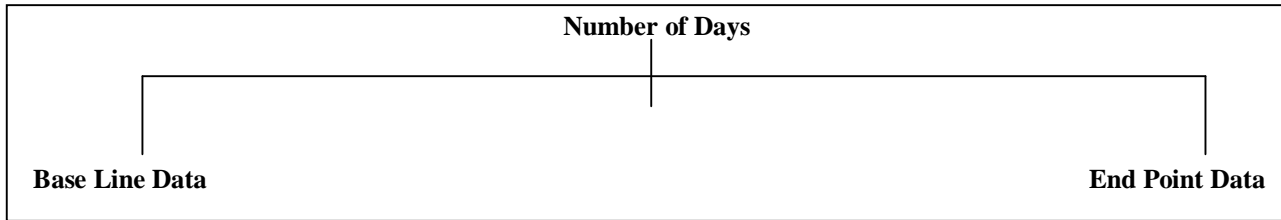


Figure 1: Trial Profile

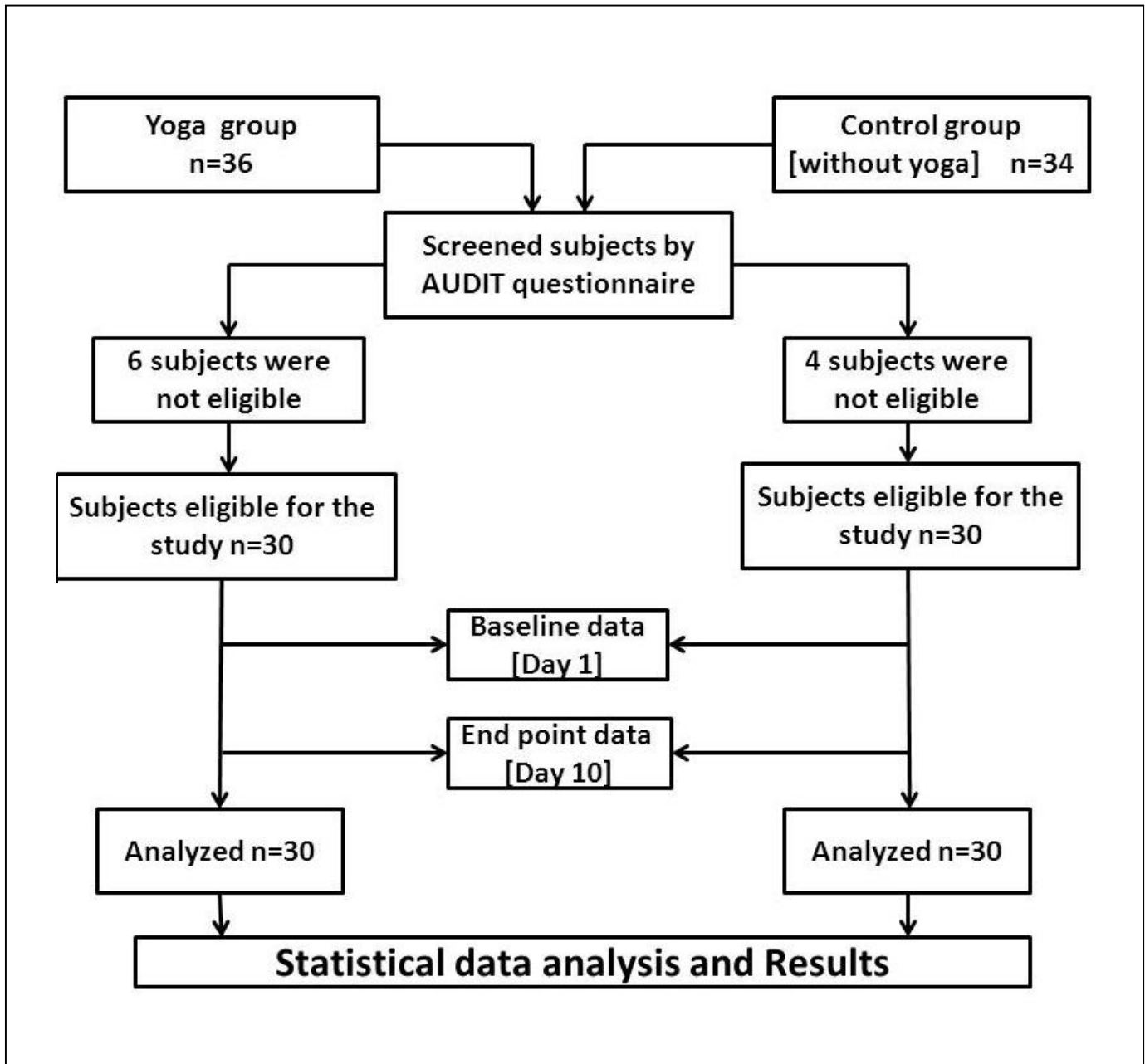


Figure 2: Design of the Study

2.10. Assessment

Baseline and post assessment were done from both groups.

2.11. Tinetti Balance Assessment Tool

The Tinetti Assessment Tool is a simple, easily administered test that measures a patient's gait and balance. The test is scored on the patient's ability to perform specific tasks. It takes 10 to 15 minutes to complete the task. Scoring of the Tinetti Assessment Tool is done on a three point ordinal scale with a range of 0 to 2. A score of 0 represents the most impairment, while a 2 would represent independence of the patient. The individual scores are then combined to form three measures; an overall gait assessment score, an overall balance assessment score, a gait and balance score. The maximum score for the gait component is 12 points. The maximum score for the balance component is 16 points. The maximum total score is 28 points. In general, patients who score below 19 are at a high risk for falls. Patients who score in the range of 19-24 indicate that the patient has a risk for falls (Tinetti, Williams, & Mayewski, 1986).

2.12. Clinical Institute Withdrawal Assessment for Alcohol Revised (CIWA-Ar)

Alcohol Withdrawal Assessment Scoring Guidelines were assessed by Clinical Institute Withdrawal Assessment for Alcohol Scale, Revised (CIWA-Ar) is a common measure used in North American hospitals to assess and treat Alcohol withdrawal syndrome and for Alcohol detoxification. This clinical tool assesses 10 common withdrawal signs. This assessment for monitoring withdrawal symptoms requires approximately 5 minutes to administer. The maximum score is 67. Patients scoring less than 10 do not usually need additional medication for withdrawal (Sullivan, Sykora, Schneiderman, Naranjo, & Sellers, 1989).

2.13. Intervention

2.13.1. Group 1 (Intervention Group):

Subjects in this group were given regular yoga sessions in the form of loosening exercises (sukshnavyayama) 10 min, sun salutations (suryanamaskaras) for 15 min, postures (asanas) like Tree pose (vrukshasana) 2 min, standing twist pose (katichakrasana) 2 min, cow face pose (Gomukasana) 2 min, cobra pose (Bhujungasana) 2 min, Extended hands and feet pose (Uttithapadasana) 2 min, wind relieving pose (pavanamukthasana) 2 min, Deep relaxation technique 10 min, breathing techniques (pranayamas) Alternate nostril breathing (Nadishodana pranayama) 2 min, Bellows breath (Bhastrika) 2 min, Humming bee breath (Bhramari) 2 min, Kriya skull shining breath (Kapalabathi) 2 min, and guided relaxation techniques (OM chanting) 5 min. This intervention was given 60 minutes each day for a period of 10 days (Swami Muktibodhananda, 1998).

2.13.2. Group 2 (Control Group)

Subjects were not given any kind of yogic intervention. Only pre (baseline data) and post (end point data) data for assessments in the form of questionnaires were taken from the subjects.

2.14. Data Extraction & Analysis

The data was collected as self-reported measures using assessment tools viz., TINETTI & CIWA-Ar. The assessments were done as baseline and following a 10 days intervention (yoga intervention for the experimental group and no specific intervention for the control group). The data later were further scored using their respective scoring keys and then arranged in Microsoft Excel sheets for statistical analysis.

Data were analyzed by using IBM SPSS 18.0. The data were checked for normality and a T test was employed to compare means between the two groups for CIWA Ar and non-parametric test (Wilkinson's test) was used to analyze Tinetti balance assessment tool. For all the analysis, we present 95% confidence intervals and considered $p < 0.05$ as significant.

3. Results

The yoga group showed significant improvement in the balance ($p < 0.006$), gait ($p < 0.029$) and vomiting ($p < 0.001$). T test and non-parametric study (Wilkinson's test) was used to compare with the control group. Results were assessed in between the groups. Data was extracted at both baseline and post-intervention. The results showed a significant difference in the scores of Tinetti balance assessment tool ($p < 0.001$). In CIWA Ar there was a significant difference showed in the vomiting symptom ($p < 0.001$), But other symptoms did not show much significance.

VARIABLE	Yoga Group (Group 1)		Control Group (Group 2)		p Value
	PRE (mean ± SD)	POST (mean ±SD)	PRE (mean ± SD)	POST (mean ± SD)	
Nausea/Vomiting	3.47 ± 1.65	0.2 ± 0.41	2.47 ± 2.270	0.83 ± 1.34	0.001
Anxiety	4.6 ± 1.65	1.133 ± 1.72	3.6 ± 1.71	1.033 ± 1.27	0.215
Paroxysmal Sweats	2.3 ± 1.98	1.5 ± 1.31	1.27 ± 1.31	0.97 ± 1.13	0.119
Tactile disturbances	2.63 ± 1.07	1.2 ± 0.714	1.9 ± 0.88	0.97 ± 0.61	0.184
Visual disturbances	2.83 ± 0.75	1.17 ± 0.75	1.57 ± 0.82	0.93 ± 0.74	0.957
Tremors	1.9 ± 1.84	1.4 ± 1.52	1.53 ± 1.57	1.03 ± 1.42	0.365
Agitation	3.07 ± 1.66	1.27 ± 1.46	1.67 ± 1.47	1.23 ± 1.33	0.486
Orientation and clouding of sensorium	2.366 ± 0.10	0.4 ± 0.56	1.83 ± 0.59	0.6 ± 0.56	0.808
Auditory Disturbances	2.37 ± 1.45	1.133 ± 0.78	2.07 ± 1.11	1.06 ± 0.78	0.868
Headache	4.53 ± 1.65	0.57 ± 0.817	3.67 ± 1.32	1 ± 0.87	0.566

Table 2: Mean scores of both the groups on the CIWA Ar. Values are Mean ± Standard Deviation and p value (n=30 each)

Variable	Yoga Group (Group 1)		Control Group (Group 2)		P Value
	PRE	POST	PRE	POST	
Balance	5.866 ± 1.547	10.8 ± 1.126	6.6 ± 1.544	9.9 ± 1.398	0.006
Gait	5.3 ± 1.178	11.166 ± 1.599	6.433 ± 1.104	10.533 ± 1.041	0.029
Total	11.17 ± 1.84	22.03 ± 1.83	13.03 ± 1.79	20.5 ± 1.7	0.001

Table 3: Mean scores of both the groups on the Tinneti balance assessment tool.

Values are: Mean ± Standard Deviation and p value (n=30 each)

4. Discussion

Practicing Yoga regularly has been shown to influence autonomic status positively. In this study following the yogic intervention, the balance and gait were significantly ($p < 0.001$) improved when compared to the control group. Among the withdrawal symptoms only vomiting showed significant changes ($p < 0.001$) as compared to the control group. In the present study improvement in gait was seen between the groups and was significant ($p = 0.029$) and it was similar to the previous study, showed by giving yogic intervention in the form of tissue stretch for 10 minutes twice a day for 12 days can improve the altered gait in low back pain subjects (Corey, Vizzard, Bouffard, Badger, & Langevin, 2012). Also the balance is improved significantly in alcoholics ($p = 0.006$) compared to previous study, the dynamic balance of individuals measured using a Balance Master. Adult healthy subjects practicing Islamic prayer regimes exhibited statistically significantly better dynamic balance than the non-practicing healthy subjects (Alabdulwahab, Kachanathu, & Oluseye, 2013). Since there are no studies conducted in yoga and withdrawal symptoms on alcoholic dependent individuals. But there was a study conducted on anxiety symptom in non-alcoholics and there was a significant improvement seen in the symptoms by giving 12-week yoga intervention (Grover, Varma, Pershad, & Verma, 1994). Reduction in Vomiting symptom has been showed significantly ($p < 0.001$) in the present study compared to previous study has showed Nausea and vomiting can be managed by integrated approach of yoga as a complementary conventional treatment in breast cancer patients (Raghavendra et al., 2007).

The tremor amplitude in untreated patients with essential tremors was improved by long term use of propranolol drug. Compared to this literature in our study we may have to administer prolonged yogic intervention to show the significant improvement in a tremor (Murray, 1981)

The results overall have shown to be significant making yoga a very safe and beneficial tool in helping alcoholic individuals to improve gait, balance and vomiting symptom after withdrawing alcohol.

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