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Examining the effects of group activity-based intervention (GABI) on cognitive function selective attention in the residents of the rehabilitation centre for drug and alcohol abuse- randomized pilot trial

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Abstract

The consumption of drugs by adolescents may have a negative impact on cognitive performance as determined by functional neuroimaging tasks and neuropsychological assessments. It's clear that the younger generation abuses substances; the most prevalent ones are drugs, alcohol, and nicotine. Addiction to substances has detrimental consequences and can result in a range of behavioral, psychological, and cognitive problems. This experimental study aimed to investigate the effects of group activity-based intervention (GABI) on residents of drug and alcohol abuse rehabilitation centres' selective attentional cognitive function. Selective attention was measured using the Six Letter Cancellation Task Scale (SLCT). Thirty patients from a rehabilitation facility were included in the current investigation. Thereafter, two further groups were created: the 20-30 year old Active Group I and the Experimental Group I. For a duration of six weeks, participants in the experimental groups I attended three 45-minute sessions each week. The other group, which was the control/active group, continued with their usual rehabilitation routine. The Statistical Package for the Social Sciences, or SPSS, Version 26.0, was used for data analysis. The results suggest that there was no discernible improvement in Selective Attention with Group Activity-Based Intervention (GABI). No discernible changes were seen during the training, indicating that the experimental group I (aged 20 to 30) from this programme. Possible explanations for this include the brief duration of the intervention programme and the possibility that the participants' lifestyles impacted the study's findings. Furthermore, the study's findings may encourage more in-depth research with diverse populations and programme modifications in the future, enabling them to better assist participants' mental health in the context of drug and alcohol abuse.

Keywords: Selective attention, rehabilitation, group activity-based intervention (GABI), drug, six letter cancellation task

Introduction

Substance addiction has a significant impact on individuals, families, and communities because its consequences are cumulative, resulting in costly social, physical, and mental health issues. Adolescents are frequently the first to experiment with substances, and more than 80% of drug users began doing so during their adolescent years. Substance use disorders are a major health issue among young people, and they are more common in the male population in Egypt. Tramadol dependency is the most common substance misused in Egypt, followed by polysubstances. The most common varieties are smoking, cannabis, and opiates. Smoking, cannabis, and opioids are increasingly popular, and polysubstance use is widespread (El-Awady, 2017; Jessica, 2019) [5, 13].

Adolescent substance use may have an unfavourable effect on cognitive performance, as indicated by neuropsychological testing and functional neuroimaging tasks. Adolescent alcohol and marijuana users perform worse on working memory, verbal learning and memory, visuospatial functioning, and psychometric motor speed measures, with poorer performance associated with higher dosages and an earlier age of onset (Nguyen-Louie, 2015; Ganzer, 2016) [16, 7].

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Recent studies have identified impairments in a variety of skills, including learning, memory, executive functioning, problem-solving, visuospatial, verbal ability, and information processing speed, that are linked to excessive alcohol and other substance use problems (Gonzalez, 2007; Gruber, 2007) [8, 9]. Furthermore, polysubstance use disorder has been associated to extensive abnormalities, including significant deficiencies on neuropsychological tests of working memory, cognition, inhibition, flexibility, self-regulation, and decision-making (Moreno-López, 2012; Formiga, 2021; Abdulaal, 2023) [15, 25, 26].

Group activity, or GA, is widely acknowledged to be critical for both the prevention and treatment of mental health disorders such as depression and anxiety, as well as promoting mental health outcomes such as wellbeing (Peluso, 2005) [28], improved brain function and memory (Sharma, 2006), better sleep, and improved mental and cognitive function (Marques, 2016) [27]. Physical activity benefits have been found as one of several aspects that influence a person's mental health. Participating in group activities is frequently suggested as a technique to handle these issues and maintain mental health.

Recent studies demonstrate that group-based activity (GBA) or physical activity (PA) intervention is a promising supplemental therapy for treating and avoiding addictive behaviours. It has been hypothesised that encouraging physical activity in early life can aid develop motor skills (Timmons, 2007) [24]. This hypothesis is supported by research indicating a reciprocal, albeit cross-sectional, relationship between physical exercise and motor development (A. Fischer, 2005; Williams, 2008; Iivonen, 2013) [6, 11, 14]. In fact, motor abilities are thought to be associated with a variety of health outcomes, including obesity (Okely, 2004) [17], self-esteem (Ulrich, 1987) [2], cardiorespiratory fitness (Okely, 2001) [18], and cognition (Riethmuller, 2009) [21]. Although a number of observational studies have demonstrated a correlation between physical exercise and mental health, they are insufficient to elucidate the specific direction of that correlation (Strong *et al.*, 2005) [29]. There are two possible explanations for this: either

persons who are mentally well are more likely to be physically active, or the opposite may be true. It is most likely a two-way relationship.

The objective of this research was to conduct a comprehensive review of the literature in order to assess the impact of group activity-based intervention (GABI) on sustained attention and cognitive function in residents of the Rehabilitation Centre for Drug and Alcohol Abuse. Additionally, this review aims to educate academics and medical professionals on the advantages of participating in group activities and the creation of evidence-based physical activity guidelines for this age range. Our goal was to investigate how a group activity-based intervention affected the participants' ability to demonstrate selective attention. In order to determine how a group activity-based intervention affected residents of a Sikkim rehabilitation center's cognitive performance, a randomised pilot trial was conducted for this purpose.

Methodology

This experimental study sought to assess the effects of group activity-based intervention (GABI) on the cognitive function (selective attention) of residents of a rehabilitation centre in the Indian state of Sikkim. Thirty rehabilitation centre participants volunteered to participate in the study with prior consent from the facility, and their responses were considered. Then, two further groups were created: the 20-30-year-old Experimental Group I (N = 15) and the 20-30-year-old Active Group I (N = 15). Over the course of six weeks, participants in the experimental groups I attended three 45-minute sessions each week. The other group, which was the control/active group, continued with their usual rehabilitation routine. The repeated measure ANOVA experiment study design included a pre-, mid-, and post-test. Table 1 shows that the training consisted of group exercises like guided yoga sessions, cooperative games, and the meaningful sharing of viewpoints and experiences. Six weeks of first and second-week group activity-based intervention (GABI) (as demonstrated).

Table 1: Group Activity-Based Intervention (GABI) Protocol of the Study (1st and 2nd week)

S. No.	Game/Activity	Exp. Group I (Days)	Warm-up	Main activity	Cool down
1	Green light- Red light	Monday	10 min	25 min	10 min
2	Aerobics	Wednesday	10 min	25 min	10 min
3	Guided Meditation	Friday	10 min	25 min	10 min

*Control groups followed their daily routine in rehabilitation centre of Sikkim.

Six Letter Cancellation Task (Natu & Agarwal, 1997) [31]:

The cancellation worksheet consists of the six target capital letters printed at the top of the working section shall be used. Subjects are to search and mark as fast and as accurately as possible, target letters arranged randomly in 22 rows and 14 columns. After 90 seconds from the start, task will be interrupted. Subjects shall be instructed regarding two possible strategies to cancel target letters: focus on all target letters at once or select a single target letter at a time. Further, it is suggested that they can adopt different searching strategies (Randomized or organized searching: horizontal scanning, for example, from left to right, or vertical scanning) according to their own choice. The total cancellation attempted, and incorrect cancelled targets are recorded. The

net score is calculated by deducting the incorrect cancellations from the total cancellations attempted. The six-letter cancellation reported an adequate amount of stability over time 0.78 (Pradhan & Nagendra, 2008) [32].

Results

The researcher used IBM Statistical Package for the Social Sciences (SPSS) software (version 26.0) to analyse the data using the Repeated Measure ANOVA Test in order to meet the study's objectives. Group Design for Pre-, Mid-, and Post-Tests. Two groups-the experimental and the control/active-were used in the analyses, and the statistical significance level was set at $p = 0.05$.

Table 2: Descriptive Statistics (Mean \pm Standard Deviation) of Selective Attention for Groups (20-30 years).

Groups		N	Mean	Std. Deviation	Std. Error
Experimental Group	Pre	15	39.0333	12.32754	2.32433
	During	15	43.3223	14.28687	2.64131
	Post	15	44.7333	8.88974	1.46035
	Total	45	42.3628	11.83471	1.54244
Control Group	Pre	15	40.6667	15.17461	2.65792
	During	15	41.3432	14.27524	2.85857
	Post	15	42.2752	14.35755	2.87874
Total	Total	45	41.5107	14.60246	2.79841

Table 2 indicates the mean and standard deviation of Selective Attention of Experimental Group of pre, during and post-test of age group 20 to 30 years and mean and standard deviation of Selective Attention of Control Group of pre, during and post-test of age group 20 to 30 years respectively.

Table 3: ANOVA Table between groups of Selective Attention (20-30 years)

Groups		Sum of Squares	df	Mean Square	F	Sig.
Experimental Group	Between Groups	324.432	2	139.436	1.230	.234
	Within Groups	12432.300	42	130.837		
	Total	12756.732	44			
Control Group	Between Groups	68.549	2	35.344	.438	.956
	Within Groups	15687.765	42	188.825		
	Total	15756.314	44			

Table 3 indicates since the level of significance is .234 which is >0.05 it is seen that there is no significant difference in scores between various groups of Selective Attention among age group of 20 to 30 years of the experimental group. This table also indicates since the level of significance is .956 which is >0.05 it is seen that there is no significant difference in scores between various groups of selective attention among age group of 20 to 30 years of the control group.

Discussion

The primary goal of the current study was to examine the effect of a 6-weeks group activity-based intervention (GABI) on cognitive function sustained attention in residents of the Rehabilitation Centre for Drug and Alcohol Abuse. After 6 weeks of group activities training, it was evident that experimental group I was not benefited from it. However, Further, this is consistent with a study of home-based exercise intervention showed the improvement in global cognitive measures for subjects at risk for cognitive decline (Suzuki, 2013) [30]. The intended results in the current study may not have been obtained due to the study's pilot run. So, for future researchers, more intense and long-term interventions should be considered to determine the possible influence of activity-based intervention (GABI) on the likelihood of persons developing substance use disorders (SUDs). Several recent studies have found that physical activity improves mental health and emotional well-being in both adults and children (Peluso and Guerra de Andrade, 2005; Strong *et al.*, 2005; Hallal *et al.*, 2006; Ahn and Fedewa, 2011; Biddle and Asare, 2011) [28, 29, 33, 34, 41], Singh 2021, 2023 [39, 40].

Investigations revealed that inhalant usage has a significant impact on all domains of executive function. Das (2016) [35] and Marín-Navarrete (2018) [36] discovered impairments in executive functioning among inhalant users, including information processing speed, self-monitoring, visual and motor speed, working memory, psychomotor function, and spatial problem-solving abilities. Prior to Several studies have

examined the relationship between exercise and mental health. Bhalla *et al.* (2018) [38] investigated the state of substance use disorders in Sikkim at the time. Assessing the prevalence of alcohol and other drug use in Sikkim, comparing it to the national situation, and summarising government efforts related to control and prevention as well as the current health care system were the goals of this study, which aimed to develop a range of strategies for the establishment of services for substance use disorders in the State within the current the Health Care System framework. It was concluded that while the State Government is taking many innovative steps to control, regulate, and prevent drug and alcohol abuse in society, legislators also need to include steps that ensure early detection and better management of drug and alcohol-related harm by enabling the community through adequate human resource development and capacity-building training.

Bhalla *et al.* (2018) [38] looked into the effectiveness, philosophy, and evidence of exercise-based treatments for drug use disorders. Epidemiological research indicates that those who report taking harmful substances are generally less likely to achieve required levels of physical activity, with a few significant exceptions, such as athletes and teenagers. An increasing amount of evidence suggests that individuals with substance use disorders (SUDs) may enjoy exercising, and that engaging in regular exercise may aid in their recovery from SUDs as well as enhance their general health and fitness. Wang (2014) [37] looked at the connection between exercise and drug use disorders through a meta-analysis. The purpose of this meta-analysis was to look into the potential benefits of long-term physical activity as a treatment for substance use disorders (SUD). Exercise can be more beneficial to individuals who abuse illegal drugs and alcohol than to those who abuse nicotine since it can lessen depressive symptoms in the first group and increase the rate of abstinence in the latter. Exercise kinds, activity levels, and follow-up times all demonstrated comparable treatment outcomes for substance use disorders.

Aside from the intervention, the potential limitations of the current study could be the individuals' lack of desire and their daily routine at the rehab centre. The intended results in the current study may not have been obtained due to the study's pilot run. So, for future researchers, more intense and long-term interventions should be considered to determine the possible influence of activity-based intervention (GABI) on the likelihood of persons developing substance use disorders (SUDs). Researchers are advised to carry out more control interventions in close quarters in the future. Additionally, a study should be conducted to ascertain whether combining or integrating yoga with physical exercise would provide greater benefits than either practice alone. Improved cognitive abilities linked to executive function domains will be a mediating factor in enhancing wellbeing, making the clinical applicability of findings notable. To investigate the long-term

impact and its implications on the mental health and cognitive function of the population affected by substance use disorders (SUDs), as well as to investigate the underlying mechanisms, more thorough trials are required.

Conclusion

Activities that range from low to moderate intensity and mind-body workouts are examples of exercise-based treatments for SUDs. To investigate the long-term impact and its implications on the mental health and cognitive function of the population with substance use disorders (SUDs), particularly concerning drugs and alcohol, as well as to investigate the underlying mechanisms, more thorough trials are required.

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