Effectiveness of clobazam on perception, creativity, intelligence, selective and visual memory

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Abstract: Clobazam belongs to benzodiazepine class and is preferably used against anti-epileptic disorders. However, when used in reduced doses, its ability for improving cognitive functions becomes explicitly evident. This study objectively undertook the task of using the reduced doses of clobazam for proving potentials effects on cognitive functions. The drug, clobazam was administered in 'active group' which contained 15 young healthy volunteers. The 'placebo group' also entailed 15 subjects and each was administered with placebo drug. The controlled group' also included 15 subjects. All these 45 young healthy subjects were subjected to tests for perceptual learning, creativity, selective memory, visual memory and intelligence. Results clearly demonstrated significant impact of clobazam at the dose of 5mg/day on perceptual learning (P=0.0380), creativity (P=0.0787), memory function (P=0.4920), visual memory (P=0.4816) and intelligence of the subject (P=0.4920). The outcomes highlighted in the studies reviled the positive effects of clobazam when used at reduced doses.

Keywords: Clobazam, cognitive functions, statistical analysis, perceptual learning.

INTRODUCTION

Over the last few years people have become more and more concerned regarding benzodiazepine hypnotics and sedatives use, in particular for prolonged use in patients with other medication. This consideration is based upon the fact that benzodiazepines remain the unmatched remedy for most of the psychosomatic distresses. However this always comes with some side effects involving negative cognitive acts, decreased attention and anterograde amnesia (Mondloch, 1999, Heinemann, 2016). Long-term benzodiazepine class treatment reports that it damages a number of cognitive domains such as: Visual spatial ability, verbal learning and processing speed. These negative effects of benzodiazepines on variety of cognitive domains are yet to be explored in order to have clear view of these on behavioral and somatoform functions which are direct result of cognition. Study efforts in this regard have either remained inexplicit or failed to take cognizance of the scope of versatile effects that benzodiazepines are supposed to have on cognition and related mental functioning. This unearths an objective need to carry out more studies having well-designed, controlled variations and exploring multiple aspects of cognitive functions (Honer, 2006, Gruber, 2006). Also accompany with these should be well founded data incorporating inclusion multiple analysis. The evidence of the studies that support multiple analysis will allow more influence on slow variables that allow in-depth research and statistics. A general observation regarding benzodiazepines use is it may cause cognitive defects. Although BZ appears to be increasing objective and subjective sedate and attention deficit. During processing these other cognitive impairments, unable to describe other complications in memory affected by BZ (Buffett-Jerrott and Stewart, 2002).

Epidemiological data to evaluate the influence of utmost drugs used in psychiatry on perceptive task most likely to focus on the advances of perceptive shortfalls in old age and consumption of the drugs (Curran, 1991, Roiser, 2016). Anxiety disorders are most commonly treated by benzodiazepines class of drugs. The use of benzodiazepines is still widespread, but the impact of benzodiazepine class is little known. It is known that even in therapeutical quantities, BZ can also cause pharmacological and physiological dependency, causing withdrawal disorders afterward of cessation (Ashton, 1986, Patorno, 2017). Neuroimaging studies have also found transient changes in brain after treatment with benzodiazepines. These results indicate that when benzodiazepines are used as part of continuing treatment, patients would have negative cognitive effects. Various procedures and standard models are being used to evaluate the effects of drugs on the mental performance. Benzodiazepine classes are reported to have anterograde amnesia effects as well as retrograde amnesia or short-term impairment of memory only exception report (Stewart, 2005).

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Perceptual learning is a practice-induced improvement in the ability to demonstrate specified perceptual tasks. Perceptual learning has many ways to be measured, including attention weighting, differentiation, imprinting, and unitization. Tasking and their performance outcomes effectively present a statistical interpretation. Perceptual learning is thus an indirect measure of many neuronal processes as well as drugs' effects on such mental functioning. Compared with therapeutic doses of other benzodiazepine drugs, clobazam have negligible effects on memory. These outcomes are related with less tranquility produce by clobazam. These results are compared to the less observable sedation produced by clobazam. A good way to improve memory, is selective memory test remained advantageous over other approaches of measuring the memory functions for many years. Today, new efforts are being made to learn its versatile scope in academia and research, taking into account the concepts of design and dynamic testing (Koeppen, 1984, Bond and Lader, 2016). The visual short-term memory structure at a time can only project 3 to 4 objects. For about a century, the visual-memory range indicated about 1.5 to 5 object zones. As per many research studies visual memory processes explicitly translate physical neuronal skills in considerably effective way (Vogel and Machizawa, 2004).

MATERIALS AND METHODS

Study participants

The study enrolled 45 healthy subjects meeting the inclusion criteria. The survey is between 20 and 25 years old. Male and female study participants were students.

Inclusion & exclusion criteria

Students with Schizophrenia, Schizoaffective disorder and bipolar disorder currently have severe depressive episodes, alcohol abuse or 12-week treatment with MOA, antipsychotics or clozapine. Participants with a history or current connection of tumors, renal problems, gastrointestinal or hepatic diseases, pulmonary, endocrine or nervous systems disease (including epilepsy) were also excluded. Others reasons for exclusion include, Allergy to psychiatric compounds history includes the use of neuroleptic compounds that have been tested for neuroleptic malignant syndromes. Participant (N=45) screened for inclusion in the study, all participants met the inclusion and randomly divided to receive clobazam (N= 15) or placebo (N=15) and the control (N=15). Data from all 45 participants were included in the assessment of safety of clobazam.

Ethical approval

The research study was approved by the "The University of Lahore" (IREC) Institutional Research Ethics Committee. Participants meeting the conditions did not have clinically noteworthy laboratory and ECG abnormalities. The study was based on the ethical principles stemming from the Helsinki Declaration of 1989. Upon completion of the study description, all participants given the written informed consent.

STATISTICAL ANALYSIS

The outcome of the study was analyzed statistically by employing analysis of variances (ANOVA) with level of significance, 0.05 using Graph pad prism ver. 7.0.

RESULTS

This study enrolled 45 healthy volunteers; the age presentation was 22.5±5 years, which included 23 females and 22 males in total after taking informed consent for the evaluation of the effectiveness of clobazam on perceptual learning, creativity, selective memory, visual memory and intelligence test.

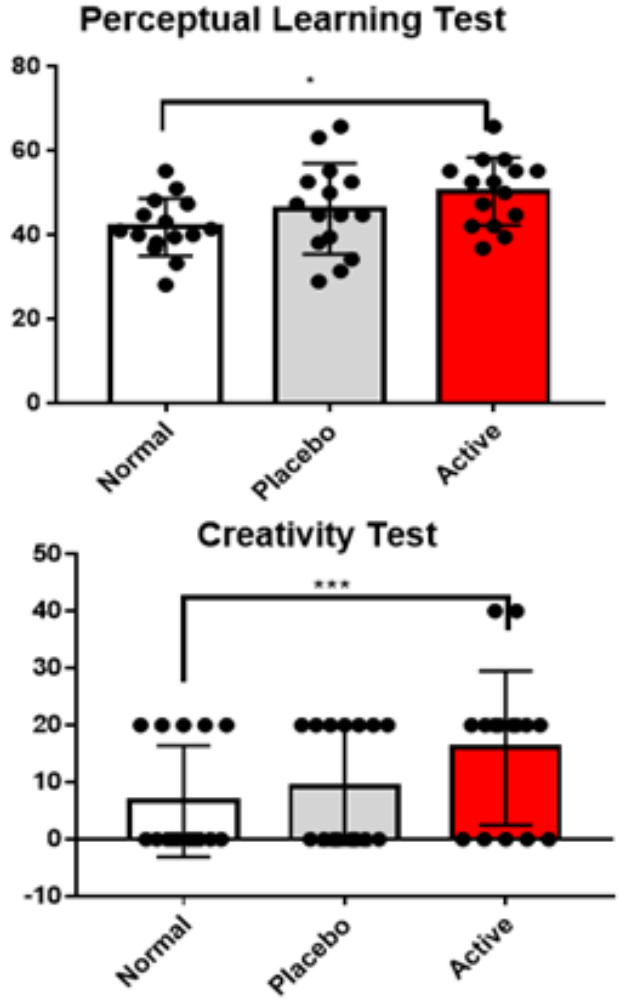

Fig. 1: Comparative analysis of Active vs Placebo vs Normal group during Perceptual & Creativity test (level of significance= 0.05)

During this test, participants were given the task of writing how they thought about their characters before

being displayed. Representing *p value* difference of perceptual learning between the normal, placebo and active groups; normal versus placebo (p value=0.3691 ns); normal versus active (p value=0.0290 significant); placebo versus active (p value 0.046 ns). This test is the measure of the ability to create Imagination through visuals. Creativity tests and the use of placebo drug provides good results compared to normal participants in the group (fig. 1). Fig. 1 was validating the creativity test between normal, placebo and active group showing that normal versus placebo p value =0.7963 ns; normal versus active p value=0.0733 ns; placebo versus active 0.2518 ns.

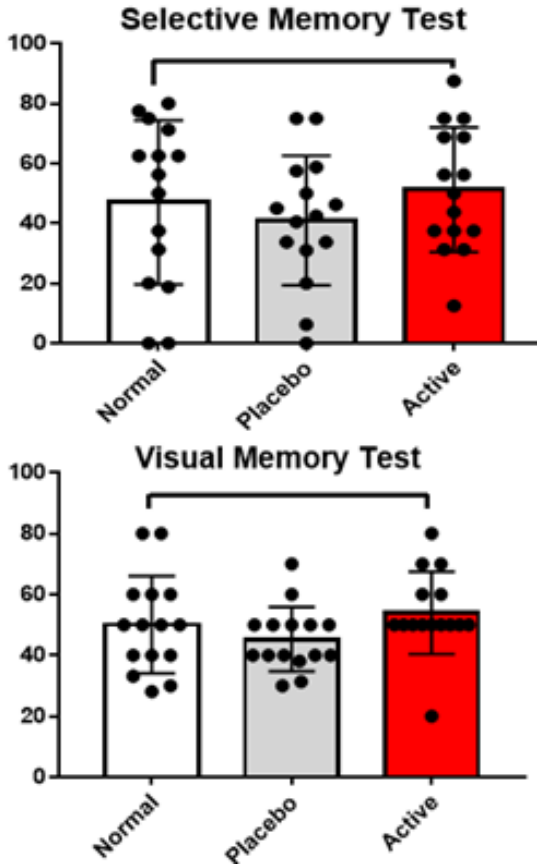

Fig. 2: Comparative analysis of Active vs Placebo vs Normal group during Selective Memory & Visual Memory test (level of significance= 0.05)

Authenticating the p values of selective memory test normal versus placebo p value 0.7654 ns; normal versus active 0.8734 ns and placebo versus active 0.4625ns. In case of active group, it is obvious that this group is statistically insignificant than the normal group (P = 0.4644), while it was found that both the normal group and the Active group units showed a better selective memory test results than Placebo group. However, overall results were also insignificant (P=0.4920). fig. 2: Showing that normal versus placebo p value=0.599 ns; normal versus active p value =0.7100 ns; placebo versus active 0.1948 ns.

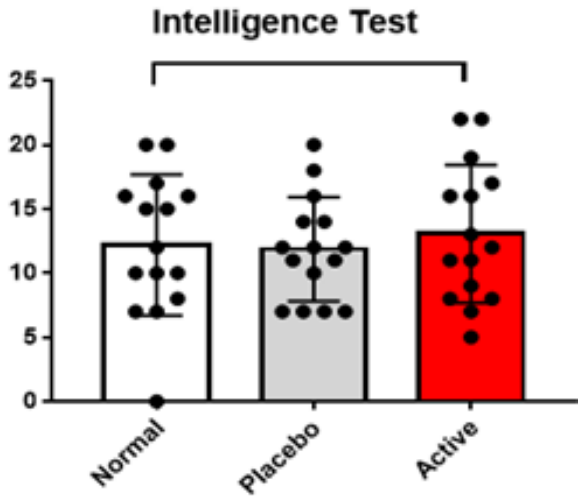

Fig. 3: Comparative analysis of Active vs Placebo vs Normal group during Intelligence Test (level of significance= 0.05)

Demonstrating that normal versus placebo p value=0.2568 ns; normal versus active 0.8847 ns and placebo versus active p value=0.7912 ns. In intelligence the use of placebo drug provides good results compared to normal participants in the group. fig. 3 was confirming the level of intelligence between normal, placebo and active group showing that normal versus placebo p value =0.7963 ns; normal versus active p value=0.0733 ns; placebo versus active 0.2518 ns.

DISCUSSION

The principle objective of this clinical study was to display the impacts of clobazam in the improvement of memory, Intelligence and creativity of testing and behavior of the participants, in the middle and after treatment with Clobazam. The practice of a simple visual task leads to vivid improvements in the effectiveness of their training, which is precise to the incentives used for preparation. Perceptual learning was studied, to evaluate an important factor for the determining the clobazam dose on perceptual learning. Perceptual tests carried out to assess the perception of pupils (Creese, 1976). Perceptual learning test is an important parameter for the effectiveness of measuring the effect low dose of clobazam and its effectiveness on perception. Learning skills were conducted to assess students' ability to recognize and learning. Over the decade, research on creativity and imagery have developed all together, but amazingly they are rarely interrupted. (Holmes, 2008). This paper presents a novel model of creative visual-imagination, which link creativity and imaginings research, also provides a novel psycho-metric tool, titled as 'Test of Creative Abilities' (TCA), established to find the creative imaginings abilities with this model. Creativity test measures the creative capabilities and

capacities of the participants. Creativity test make available decent details, effect on the participants taking placebo and clobazam in comparison with the normal group.

The selective-memory test was used to found out the effects of clobazam and placebo to the memory capacity and capabilities of the participants. The selective-memory test ensures good data regarding placebo-controlled participants with normal compatibility compared to active group values. In case of group activity, it was observed that the group was statistically superior to the control group (P = 0.4464) and observed that the placebo group had a better selective memory than the normal group and the active group of subjects (P = 0.4920). The selective-memory test was used to measure the outcomes of placebo and the clobazam on the memory function of study participants. Selective-memory test is used to evaluate the effect of clobazam and placebo on memory functions of the participants. The visual memory test in active group provides good results of memory test as compared to Placebo and Normal group. Selective memory test provided a good study comparison, effects of clobazam in association with normal and placebo controls. Fatigue, memory impairment, lack of concentration and working ability are always a definite disorder that is difficult to evaluate. The risky visual-memory problems showed the effects of the medication (active and placebo drugs) on memory function. The selective-memory test make available good values for participant taking clobazam and placebo with normal compatibility. In group activity, it was seen that the group is statistically superior to the control group.

Extensively used in nonverbal intelligence-test analysis, the cognitive process intelligence-test is between "high scores" and "low scores" participants and what is the process that subjects and all the essentials, in the test is a common intelligence test to measure the placebo and actively differentiate medication effects on the memory of participants. The intelligence test demonstrated that normal versus placebo p value=0.2568 ns; normal versus active 0.8847 ns and placebo versus active p value=0.7912 ns. Intelligence test make provided decent details, effect on the participants taking placebo and clobazam in comparison with the normal group and placebo.

CONCLUSION

The dose of 5mg Clonazepam in 45 volunteers showed a significant effect on psychomotor activities as compared to placebo. This study inferred that clobazam elucidate considerable positive effects on cognitive performance. This claim is supported by the different battery of tests performed in the present study. However, this study should be carried out on large scale in order to evaluate cognitive functions.

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