ORIGINAL RESEARCH

Effects of Nutmeg Extract on Learning in Wistar Rats

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Abstract:

Background
The current study has designed to investigate the effect of nutmeg extract on acquisition of working memory by using radial arm maze in wistar albino rats.

Materials and methods
Twelve albino rats were examined for the study. Rats were divided into two groups as control and nutmeg treated group. Experimental rats were given 1-2mg/kg body weight of nutmeg extract orally dissolved in milk for ten days. The control rats were given equal quantity of milk for 10 days without nutmeg extract. learning behaviour was assessed by radial arm maze.

Results
Nutmeg treated significant beneficial effect on learning behaviour when it compared with the control group.

Conclusion
The current study reported the effect of nutmeg in learning in albino rats.

Keyword: Nutmeg, radial arm maze, learning.

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INTRODUCTION

Behaviour is considered as the result of coordinated connection between the inborn and environmental factors. Among the multiple environmental factors helps the development of the brain and behaviour, learning is considered as the most important. Learning is defined as "an enduring change in the mechanism of behaviour that results from experience with environmental events. Learning is broadly classified in to two, associative and non-associative. In associative learning the subject learns about the relationship between two stimuli (classical conditioning) or between stimulus and behavior (Operant conditioning). Non associative learning results, when the subject is exposed once or repeatedly to a particular type of stimulus. Multiple studies reported the involvement of hippocampus, an extension of temporal part of cerebral cortex in different aspects of learning and memory[1].

Nutmeg is the seed of the fruit which grows on the tree Myristica fragrance. It's an evergreen tree, grown up to 20-25 ft high with 4 chromosomes numbers such as 2n= 38[2], 2n=41[3], 2n= 42[4] and 2n= 44[3]. It has been proved as a potent antimicrobial, antiparasitic and anti-inflammatory agent[5]. It showed an active antioxidant and anticancer properties[6]. Other health benefits of nutmeg include hepatoprotection, renal protection and neuroprotection [7,8,9].

MATERIALS AND METHODS

Total 12 male wistar strain aged 6-7 weeks were selected for the study. The animals were housed in groups, in propylene cages in an acclimatized in room temperature and maintained on 12 hr light/dark cycle. Food and water were given ad libitum until they aged 60 days at the beginning of the experiment. The rats are randomly grouped into control and experimental with six rats in each group. The rats were given 1-2mg/kg body weight of nutmeg extract orally dissolved in milk for ten days. The control rats were given equal quantity of milk for 10 days without nutmeg extract. The study protocol was approved by IAEC (Institutional Animal Ethics Committee Approval).

Apparatus used to assess the acquisition was radial arm maze. It consists of eight equally spaced arms radiating from an octagonal central platform. Each arm was having a length of 56.2cm, width of 7.9cm and height of 10 cm. the entire maze is elevated 80 cm above the floor for easy locating of special cues by rats.

Radial arm maze task (RAM group)

Orientation phase was for three days- The starved rats were allowed to familiarize themselves with the radial arm maze. All the eight arms were baited with food pellets. The rat was placed in the centre of the maze and allowed to freely explore the maze for 15 minutes on the

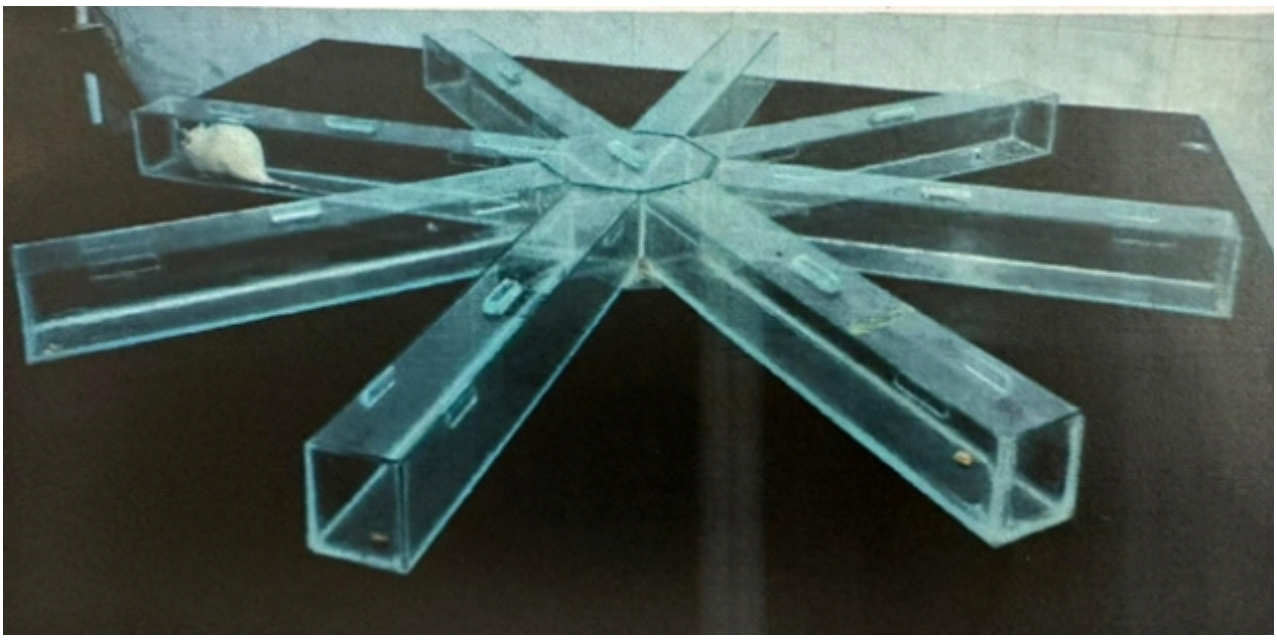

Fig 1: Radial arm maze

first day. The rats were required to take the food pellets from each arm without making a re-entry into arm already visited. The trial was terminated when the animal takes the food reward from all the eight arms or after ten minutes if all the eight arms were not visited. A correct score was given when the rat visits an arm and collets the food reward, and a maximum score of 8° can be attained per trail. When a rat re-enters an already visited arm or does not enter an arm, it was taken as a working memory error. The acquisition test was continued until the rats attained learning criteria of obtaining a correct score >=7, and an error <=1, for three consecutive trials. Four trials/ day was given with an inter trial interval of one hour.

Statistical analysis

The values were entered into SPSS v24. Comparison between the groups were done by independent sample t test. p value less than 0.05 was considered as statistically significant.

RESULTS

The mean value of trials is 23.88± 2.32 and 20.65± 1.91 in control and experimental groups respectively. (Graph 1)

DISCUSSION

Effect of nutmeg extract in learning was assessed in the study. Behavioural and learning assessment have done in radial arm maze. The study reported the significant beneficial effect of nutmeg in learning in experimental animals. Learning refers to the permanent modification of behaviour which occurs as a result of observation and practice. It has been well known fact that hippocampus play a vital role in the memory and learning [10].

Like other herbs and spices, the assumed health benefits of nutmeg have been many and varied, but greatly unproven. Previous studies reported the significant effect of nutmeg in downregulating the activity of acetyl choline esterase activity[11]. This enzyme has a crucial role in learning and memory process. Our current study agrees with this previous finding and observed a significant effect on learning behaviour.

CONCLUSION

In conclusion the current study proved that oral administration of nutmeg extract is having learning boosting capacity in experimental animals. This effect is probably due to the structural neurochemical and neurophysiological changes in the rat brain. We recommend additional detailed research in this area.

Conflict of interest: None

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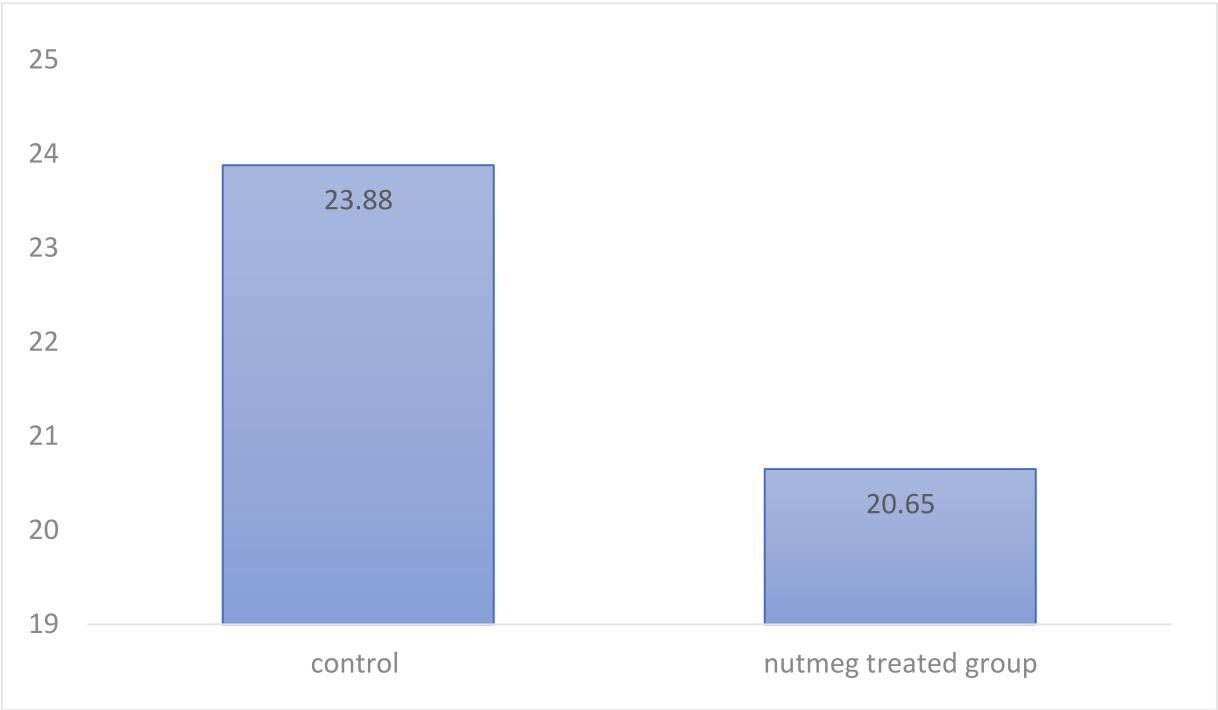

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