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Effectiveness of brain training exercise among elderly with cognitive impairment in selected oldage homes at Puducherry

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Abstract
Old age is an unavoidable reality and is a community need. Aging occurs at different dimensions, such as social, behavioural, psychological, morphological and molecular.

Old age is viewed both as a stage in the life span of an individual and also a segment of a population in society. The public consider 50 years and above as old age whereas substantial proportion of persons who are in their 60's do not look upon themselves as old. Psychologist consider the age of 60 as a demarcating line between middle and old age, whereas social researchers often set the boundary of the old age as 65 years.

Objective: Identify the cognitive impairment among the elderly and to Determine the effectiveness of brain training on cognitive impairment among the elderly.

Materials and Methods: A quasi experimental for Study Group and Control Group was choose the for this study to assess the cognitive impairments among elderly in old age home.

Results: The results showed mean value of 5.15 and a standard deviation of 0.671 in the mean value was 4.65 and standard deviation was 0.587.

Keywords: elderly, cognitive impairment, brain training, exercise

Introduction

The elderly is outnumbering the young people all over the world. Globally, the rate of growth of the aging population is exceeding the general population. By the mid 1998 world population stood at 5.9 billion and was expected to reach the six billion mark by mid-1999, according to the United Nation's report.

By the year 2050, the median age is projected to reach 37.8 years. It will mean an increase from 580 million elderlies in 1998 to almost two billion in 2050. The increase will be more dramatic in the less developed regions, where the population aged 60 years or over will grow from 354 million in 1998 to almost 1.6 billion in 2050.

The world health organization (WHO) has projected that the elderly population in the developed nation would decrease from 19% to 12% by 2026 and the developing countries would account for three fourth of the world's elderly population.

The cognitive functions of every individual are to be treasured and are to be maintained to its optimal functioning. Cognitive functions can be retained if one involves himself in learning, reading, doing activities that involves concentration, doing physical exercise also refreshes our mind and makes it more active. As for now the society of the elderly population is suffering with cognitive impairments varying at its level ranging from mild, moderate to severe. Moderate and severe forms need medical assistance for its cure, whereas mild cognitive impairment may be rectified to a certain level by involving the individual in activities that stimulate the brain.

Objectives Identify the cognitive impairment among the elderly and to assess the effectiveness brain training excesses among elderly.

Material and Methods
A Quasi experimental pre and posttest design was chosen for the study.

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	Group	Pretest	Intervention	Posttest
NR	Study	O1	X*	O2
	Control	O1	*	O2

Setting: The study was conducted in selected Oldage homes in Puducherry.

Target population: The elderly with mild cognitive impairment residing at old age home located in Puducherry.

Sample: Sample was elderly people who fulfilled the inclusion criteria residing at selected old age homes in Puducherry.

Sample Size: The sample size was 40 with 20 in each group.

Sampling technique: The sampling technique used was convenience sampling technique.

Description of the tool: The tool used in this study consists of two sections:

Section-I Contains demographic variables.

Section-II Contains Montreal Cognitive Assessment scale The Montreal Cognitive Assessment (MoCA) was designed as a rapid screening instrument for mild cognitive dysfunction. It is a standardized tool which assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation. Time to administer the MoCA is approximately 10 minutes.

Results and Discussion

Table 1: Frequency and percentage distribution of demographic variables of the elderly

Demographic Variables		Study Group n= 20		Control Group n= 20	
		No.	%	No.	%
1. Age in years					
a.	60-64 yrs	9	45	7	35
b.	65-69 yrs	8	40	11	55
c.	70-74 yrs	2	10	1	5
	d. >75 yrs	1	5	1	5
2. Gender					
a.	Male	10	50	9	45
b.	Female	10	50	11	55
3. Marital Status		5	25	2	10
a.	Married	15	75	18	90
b.	Widow/ Widower				
4. Education					
a.	Basic informal education	4	20	4	20
b.	Elementary level	8	40	7	35
c.	High School level	5	25	6	30
d.	Hr. Secondary level	3	15	3	15
5. Occupation					
a.	Skilled	1	5	1	5
b.	Unskilled	9	45	8	40
c.	House wife	10	50	11	55
6. Religion					
a.	Hindu	14	70	16	80
b.	Christian	6	30	4	20

Major findings of the study: With regards the distribution of demographic variables of 40 elderlies, the majority of 9 (45%) of the elderly were in the age group of 60-64 years, 8 (40%) belonged to 65-69 years, two (10%) belonged to 70-74 years and one (5%) belonged to above 75 years.

- With regard to the marital status five (25%) were married, 15 (75% were widows and widowers, in two (10%) were married, and 18 (90%) were widows and widowers.
- With regard to education, in four (20%) had basic informal education eight (40%) were educated up to elementary level, five (25%) were educated up to high school level, and three (15%) were educated up to higher secondary level. In four (20%) had basic informal education, seven (35%) were educated up to elementary level, 6 (30%) were educated up to high school level, and 3 (15%) were educated up to higher secondary level.

- With regard to the occupation, in, 1 (5%) was a skilled worker, 9 (45%) were unskilled workers, and 10 (50%) were house wives. In the 1 (5%) was skilled worker, 8 (40%) were unskilled, and 11 (55%) were house wives.
- With regard to religion, in the study group 14 (70%) were Hindus, and six (30%) were Christians and in the control group 16 (80%) were Hindus, and four (20%) were Christians.

Table 2: Frequency and percentage distribution of cognitive impairment in pretest and posttest among elderly (N=40)

Cognitive Impairment Score	Study group n = 20				Control group n = 20			
	Pretest		Posttest		Pretest		Posttest	
	No	Percentage %	No	Percentage %	No	Percentage %	No	Percentage %
0-15	0	-	0	-	0	-	0	-
16-20	13	65	4	20	14	70	11	55
21-25	7	35	15	75	6	30	9	45
26 and above	0	-	1	5	0	-	0	-

Study group and control group

- Among the study group the pretest showed that no elderly had scored between 0-15, 13 (65%) elderly had cognitive impairment scores between 16-20 and seven (35%) had scored between 21-25, in the posttest no elderly had scored between 0-15, 4 (20%) had scored between 16-20, 15 (75%) elderly scored between 21-25, and one (5%) had scored 26 and above.

- Among the control group the pre-test showed that no elderly had scored between 0-15, 14 (70%) elderly had cognitive impairment scores between 16-20 and 6 (30%) had scored between 21-25, in posttest no elderly had scored between 0-15, 11 (55%) had scored between 16-20, nine (45%) elderly scored between 21-25, and no elderly had scored 26 and above.

Table 3: Mean comparison of cognitive impairment among elderly between the study and the control group (N=40)

Aspects of cognitive impairment	Study Group n = 20		Control Group n = 20		t - value	P value
	Mean	SD	Mean	SD		
Overall	22.25	1.803	20.30	1.342	3.881	0.001 ***
Part I – Visuospatial Exercise	3.35	0.875	3.40	0.681	0.202	0.841 NS
Part II- Naming Exercise	2.15	0.587	2.00	0.649	0.767	0.448 NS
Part IV- Attention Exercise	4.30	0.923	3.80	0.616	2.015	0.051 NS
Part V- Language Exercise	2.25	0.550	2.25	0.444	0.000	1.000 NS
Part VI- Abstraction Exercise	1.45	0.510	1.25	0.444	1.322	0.194 NS
Part VII- Delayed Recall	3.60	0.681	3.00	0.725	2.698	0.01 *
Part VIII-Orientation Exercise	5.15	0.671	4.65	0.587	2.508	0.17 NS

The overall score of cognitive impairment showed a mean value of 22.25 and a standard deviation of 1.803 in the study group. In the control group the mean was 20.30 and standard deviation was 1.342 and the independent t test value was 3.881 and Pearson's value showed 0.001 which was statistically significant at $P < .001$ level.

- The part one visuospatial exercise shows a mean value of 3.35 and standard deviation of 0.875 in the study group. The control group's mean value was 3.40 and the standard deviation was 0.681 and the independent 't' test showed a value of 0.202 and the p value was 0.841 which is statistically not significant.

- The part two naming exercise shows a mean value of 2.15 and the standard deviation of 0.587 in the study group. The control group's mean value was 2.00 and the standard deviation was 0.649 and the independent t test showed a value of 0.767 and p value was 0.448 which was statistically not significant.

- The part four attention exercise shows a mean value of 4.30 and standard deviation of 0.923 in the study group. The control group's mean value was 3.80 and the standard deviation was 0.616 and the independent t test showed a value of 2.015 and p value was 0.051 which was statistically not significant.

- The part five language exercise shows a mean value of 2.25 and standard deviation of 0.550 in the study group. The control group's mean value was 2.25 and the standard deviation was 0.444 and the independent t test showed a value of. 000 and P value was 1.000 which was statistically not significant.

- The part six abstraction exercise shows a mean value of 1.45 and standard deviation of 0.510 in the study group. The control group's mean value was 1.25 and the standard deviation was 0.444 and the independent t test

showed a value of 1.322 and P value was 0.194 which was statistically not significant.

- The part seven delayed recall exercise showed a mean value of 3.60 and a standard deviation of 0.681 in the study group. The control group's the mean value was 3.00 and a standard deviation was 0.725 and the independent t test showed a value of 2.698 and P value was 0.01 which was statistically significant at $p < .05$ level.

- The part eight orientation exercise showed a mean value of 5.15 and a standard deviation of 0.671 in the study group. The control group's mean value was 4.65 and standard deviation was 0.587 and the independent's' test showed a value of 2.508 and P value was 0.17 which was statistically not significant.

- Among the study group the pretest showed that no elderly had scored between 0-15, 13 (65%) elderly had cognitive impairment scores between 16-20 and 7 (35%) had scored between 21-25. In the posttest no elderly had scored between 0-15, 4 (20%) had scored between 16-20, 15 (75%) elderly scored between 21-25, and 1 (5%) had scored 26 and above.

- Among the control group the pretest showed that no elderly had scored between 0-15, 14 (70%) elderly had cognitive impairment scores between 16-20 and 6 (30%) had scored between 21-25, in posttest no elderly had scored between 0-15, 11 (55%) had scored between 16-20, 9 (45%) elderly scored between 21-25, and no elderly had scored 26 and above.

- Brain training was administered for the elderly in the study group, after which the cognition was assessed using Montreal cognitive assessment scale. Effectiveness of brain training on cognitive impairment among the elderly between the study and the control

group. The calculated independent t- test value was 3.881 and was statistically significant at p< 0.001 level.

Nursing Implication
Nursing Practice Most of the elderly suffer from depression, worthlessness, rejection by the care takers, and some may even end up losing hope to live their later years of life, because they have to depend on others for carrying out their routine activities due to their cognitive impairment, this may not be revealed during hospitalization as most of the elderly patients do not express these problems. Thus it is the nurse's responsibility to assess all the elderly patients for cognitive impairments.

Brain training needs to be implemented as a part of other therapies and to be practiced by the nurse in the day-to-day activities while caring for elderly patients. The nurse needs to motivate the patients to practice brain training in their daily life.

Community
The nurse can focus on brain training as a part of psychiatric rehabilitation in the community. Encourage the elderly to do these exercises at home as a part of their day to day activities.

Nursing Education: Brain training needs to be included as a psychosocial therapy. The nurses need to be educated regarding brain training exercises. Continuing nursing education on brain training can also be conducted.

Nursing Administration: The nursing administrators should organize programs on brain training and provide proper resources for the nursing staffs to implement brain training exercises on the elderly patients.

Nursing Research: Research enables nurses to build on the existing knowledge. More researches can be conducted on cognitive impairment among elderly.

Recommendations for Future Research
1. This study can be replicated on a larger scale.
2. The study can be done by maximizing the time period of brain training exercises.
3. This study can be carried out to assess the effectiveness of brain training on patients with other neurological disorders that alters the cognitive functions.

Conclusion
The study concluded that the elderly with cognitive impairment leads to various mental health problems. As a Psychiatric nurse, responsible to give awareness in preventing and promoting to restore their mental health.

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