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Effectiveness of aerobic exercises on depression: An experimental study on old age at Mangalore

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Cover Page Footnote

We convey our heartfelt thanks to the administrative authorities of selected old age home in Mangalore and to all the subjects without whose generous help and cooperation, the objectives of the study would not have been accomplished

Original article

Effectiveness of aerobic exercises on depression: An experimental study on old age at Mangalore

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Abstract

Introduction: Old age homes have taken up the traditional role of family for the security of elderly people. Studies have proved that prevalence rate of depression were high among institutionalized elderly. **Objective:** The aim of this study is to determine the depression status among the inmates, evaluate the effectiveness of aerobic exercises on depression among elderly and to find association between depression score among elderly with selected demographic variables. **Methodology:** Quantitative evaluative approach with quasi-experimental one group pre-test post-test design was used. Convenience-sampling technique was used to select 50 people above the age of 60 years, residing at a selected old age home in Mangalore. The information of 50 elderly collected, was by using a customized geriatric depression scale followed by administration of aerobic exercise. The post-test was conducted on the eighth day, with the same modified geriatric depression scale. **Results**: Assessment of the level of depression of elderly shows that, majority of the respondents 28 (56%) had moderate level of depression, 14 (28%) respondents had severe depression followed by 8 (16%) respondents who had mild levels of depression. The total mean percentage of the elderly on depression was 48.29%, with mean and standard deviation of 29.94 and 13.79, respectively. The overall mean post-test depression score (16.68±13.86)) was significantly lower than the overall mean pre-test score ((29.94±13.79). It was also found that the obtained t' value was 8.71, which was higher than the table value. The study findings also revealed that there was a significant relationship between age (χ^2=9.43), gender (χ^2=12.97), family history of depression (χ^2=17.80) with the depression score, as the computed chi square value was greater than the table value at the of .05 level of significance. The findings of the study revealed that the depression level among the institutionalized elderly was high. **Conclusion**: The study concluded that some effective adjuvant intervention for depression among elderly residing at old age homes was necessary.

Key words: Effectiveness, depression, geriatric, old age home

Introduction

Increase in life expectancy all over the world had raised the number of elderly persons drastically. Naturally, ageing is an inevitable change which happens even with the best of health care and good nutrition. It is a normal change related to time that occurs throughout life. Ageing is characterized by a decreased capability to compensate and a decline in functional efficiency. (Lessay, 2008).

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Each grey hair reflects the vast and extensive knowledge that a person had acquired over his/her lifetime. The eyes of elderly can visualize the pros and cons of activities. Older citizens act as guides for the young. It is the responsibility of the younger relatives to craft their evenings to make them enjoyable and unforgettable. It is the duty of the public to support the elderly in a calm manner to give them care and happiness, especially to those who are lonely and are not under the care of their children. (Karim, 2007).

The natural social security for the elderly traditionally is provided by Indian families. Unfortunately, in recent times, old age homes have taken up the role of traditional families in providing care to the elderly. Most

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of the aged parents are forced to stay at old age homes. Old age homes, which was a rarity to the Indian society three decades back, has freshly multiplied across all the cities of the country. This fact indicates the growing gap between the generations and an increased pressure on all the aspects of care of the older persons, especially in the financial, health and shelter sectors. Life events such as admitting them to old age homes may depressingly affect their mental health, thereby increasing social separation, loneliness, depression and suicidal thoughts (Prakash, 2004).

Depression in the old-aged worsens many of the existing medical conditions, which contributes in higher mortality rates. Environmental factors such as lack of care, isolation, and bereavement contributes to additional susceptibility to depression among the already helpless elderly. Appropriate handling of depression in aged people relieves suicidal ideas, prevents worsening of the symptoms, improves functional and cognitive status, which reduces mortality risk and improves the quality of life (Fadem, 2000).

Today, one out of every ten elderly citizens of the world lives in India. The aged population of India which was 56.7 million in 1991 was 75 million in 2001 and 89 million in 2011. According to the population projection made by the Registrar General India, it indicates that this number would be 100 million by 2021. So, the proportion of people aged 65 and above is likely to increase from 4% in 1990 to 9% by 2030 (ICMR, 2012).

A study was conducted among 1000 participants aged above 65 years in the rural communities of South India with the aim to rule out the prevalence and factors associated with elderly depression. The study revealed that within a month, about 12.7% were affected by depression. Major depression was correlated with reduced hunger, history of head injury, temporary ischemic attack, an additional disability, or reduced nourishment. The study also revealed that in rural South India, elderly depression rate is much higher. Poverty and illness are the major factors contributing to depression among aged people while high-quality community support is protecting them from the depression (Antonelli, Rubin, & Fassone, 2000).

Exercise has a positive adjunct for the treatment of depression and also helps to increase the muscle tone, decrease the incidence of heart diseases, obesity and is also very effective in alleviating depression (Randers, 2008). Aerobic exercise can be used as an alternative or complementary treatment for depression. This exercise regimen consists of rhythmic movements of all muscle groups. It involves one of the feet to be in contact with floor, which helps the elderly to move muscles without strain on tissues (Denise & Bernadette, 2005).

The investigator has personally witnessed many elderly people suffering from various psychological disturbances. With personal experience, review of related literature and discussion with experts, the researcher has identified the importance of this topic in present time and thereby has undertaken the topic for research work.

The objectives of the study were to determine the depression status among the inmates of a selected old age home using modified Geriatric Depression Scale; evaluate effectiveness of aerobic exercises on depression among elderly; find association between mean pre-test depression score among elderly with selected demographic variables.

Materials and Methods

Quantitative evaluative approach was used for the study to accomplish the objectives. Quasi-experimental study with one group pre-test – post-test design was adopted for this study. The research study was conducted in a selected old age home in Mangalore. In this study, the target population consisted of elderly, aged above 60 years. Taking into consideration the proximity and availability of subjects, convenience sampling technique was used for selection of samples. This study comprised of 50 elderly of selected old age home in Mangalore.

Study design

One group Pre-test Post-test design

Subjects	Pre-test	Treatment	Post-test
Elderly residing at selected old age home in Mangalore	O_1	X	O_2

Key

O_1: Administration of modified geriatric depression scale to assess the level of depression among elderly.

X: Administration of aerobic exercise for eight days, one hour daily in the morning.

O_2: Administration of modified geriatric depression scale to assess the level of depression among elderly after eight days of the administration of aerobic exercise.

Description of tool

The final tool comprises of two parts.

Part I: Demographic variables

It consists of nine items seeking information about demographic variables such as age (in years), gender, religion, marital status, nature of admission to the old age home, duration of stay in the institution, performance of daily chores, nature of illness (if any), and family history of depression.

Part II: Modified geriatric depression scale

The tool was developed by Dr S A Greenberg, Professor, NYU College of Nursing, NY. Permission was obtained from him to modify the tool for non-economic profitable works (Greenberg, 2012). After modification, the final tool consisted of 31 items. The respondents were instructed to select the most appropriate answer for each question. Positively scored items got maximum of two points when the answer was "always" meanwhile negatively scored items got maximum of two points when the answer was "never." The questions were in English and translated to Kannada by a language expert.

Reliability of the tool was recognized by testing the tool on five elderlies in the selected old age home in Mangalore. Reliability of the tool was done by using the Karl Pearson's Correlation formulae. Spearman Brown's formula was used to find out the reliability of the full test. The tool was found to be reliable *(r*=.81).

Data collection process

Administrative permission was obtained from the concerned authorities of the selected old age home prior to the data collection procedure. The intention of the study was explained to the inmates and consent was obtained in written forms. Confidentiality was assured to all the subjects of data collection.

Data was collected from the inmates of the selected old age home, in Mangalore. The data was collected from 50 elderlies using a modified geriatric depression scale, followed by administration of aerobic exercise to the same subjects. The post-test was conducted on the eighth day, with the same modified geriatric depression scale. The investigator thanked and appreciated the cooperation shown by all the subjects.

Results

Description of demographic variables

Table 1:
Frequency and Percentage Distribution of Sample based on Demographic Variables

N=50

Demographic variable	Frequency (f)	Percentage (%)
Age (in years)		
60-69	11	22
70-79	25	50
≥80	14	28
Gender		
Male	22	44
Female	28	56
Religion		
Hindu	13	26
Muslim	13	26
Christian	24	48
Marital status		
Single	24	48
Married	12	24
Divorced	5	10
Widow	5	10
Separated	4	8
Nature of admission to old age home	27	54
Voluntary		
Forced by children	15	30
Others	8	16
Duration of stay in old age home (in years)	10	20
Less than one		
1-4	18	36
More than 4	22	44
Performance of daily activities	33	66
Independent		
Partially dependent	12	24

Demographic variable	Frequency (f)	Percentage (%)
Use of assistive devices	5	10
Others	0	0
Are you suffering from any illness? Yes	29	58
No	21	42
Family history of depression Yes	27	54
No	23	46

The data presented in Table 1 shows that majority 25 (50%) of the subjects belong to the age group of 70-79 years. Among the respondents, 28 (56%) were females. Most of the respondents 24 (48%) belonged to Christianity. Majority of the respondents 24 (48%) were single. Majority of respondents 27 (54%) were admitted voluntarily to the old age home. Among the respondents, 22 (44%) were staying for more than 4 years. Majority of respondents 33 (66%) were independent in their daily activities. Most of the respondents 29 (58%) were suffering from other kinds of illness. Majority of respondents 27 (54%) had a family history of depression.

Table 2:
Assessment of Pre-Test and Post- Test Scores on Depression among Elderly People

N=50

Level of depression	Range of score	Pre-test Frequency (f)	Pre-test Percentage (%)	Post- test Frequency (f)	Post- test Percentage (%)
No depression	0	0	0	8	16
Mild	1-20	14	28	27	54
Moderate	21-40	28	56	11	22
Severe	41-62	8	16	4	8

The data in Table 2 shows that in pre-test, majority of the respondents 28 (56%) had moderate levels of depression, 14 (28%) had mild depression and 8 (16%) of respondents were severely depressed. In post-test, majority of the respondents 27 (54%) had mild level of depression, 8 (16%) respondents had no depression, 11 (22%) respondents were categorised in the moderate level of depression and very few were 4 (8%) were severely depressed group.

Evaluation of the effectiveness of aerobic exercises on depression among elderly

The data presented in Table 3 reveals that the mean post-test depression score (16.68) was lower than the mean pre-test score (29.94). The '*t*' value obtained was 8.71, which was higher than the table value, indicating significant difference in the depression level before and after aerobic exercise. Hence, the research hypothesis was accepted and null hypothesis was rejected.

Association of pre-test depression scores of elderlies with selected demographic variables

Data presented in table 4 shows that obtained chi square values of the variables religion, marital status, and nature of admission to the old age home, duration of stay in old age home, performance of daily activities had no significant relationship with depression scores. Hence, the researcher rejected the research hypothesis (H_1) with regard to the above variables.

However, the computed chi square value of the variable age, gender, family history of depression indicated significant relationship between the above demographic variables and depression scores. Hence, the research hypothesis (H_2) was accepted.

Table 3:
Difference between Pre-Test and Post-Test Scores on Depression among Elderly

N=50

Area	Mean score Pre-test	Mean score Post-test	Mean difference	SD of difference	't' value	Level of significance
Modified structured geriatric depression scale	29.94	16.68	13.26	4.6195	8.71	p<.05 HS

t_{49}=3.235 *HS= Highly significant*

Table 4:
Chi Square Value Showing Association of Depression Scores Among Elderly and Selected Demographic Variables

N=50

Demographic variables	Depression score			χ^2 *value*	*df*	*p* value	Level of significance
	Mild	Moderate	Severe				
Age in years							
60-69	4	4	3	9.4300	4	.0512	S
70-79	6	16	3				
≥80	4	8	2				
Gender							
Male	5	15	2	12.9700	2	.0015	S
Female	9	13	6				
Religion							
Hindu	4	5	4	0.0021	4	1.0	NS
Muslim	6	5	2				
Christian	4	18	2				
Marital status							
Single	8	12	4	0.5110	4	.9724	NS
Married	3	7	2				
Others	3	9	2				
Nature of admission to the old age home	8	17		0.0790	4	.992	NS
Voluntary			2				
Forced by children	4	7	4				
Others	2	4	2				
Duration of stay in the old age home in years	4	4	2	0.5120	4	.9723	NS
Less than one							
1-4	8	7	3				
More than 4	2	17	3				
Performance of daily activities	8	20	5	0.0091	2	.995	NS
Independent							
Dependent	6	8	33				
Family history of depression							
Yes	10	13	4	17.8000	2	.0001	S
No	4	15	4				

NS=Not significant, S=Significant

Discussion

The present study was conducted to find the status of depression among elderly. In order to achieve the objectives of the study, descriptive survey approach was adopted. Convenience sampling technique was adopted to select the subject for the study. The data was collected from 50 elderly people.

The assessment of the level of depression of elderly shows that majority of the respondents 28 (56%) belonged to moderate level of depression, 14 (28%) respondents had severe depression followed by 8 (16%) respondents who had mild levels of depression. The total mean percentage of the elderly experiencing depression was 48.29%, with mean and standard deviation of 29.94 and 13.79 respectively.

The result of the present study was supported with the findings of the study conducted under Calicut University. Among the 50 inmates of old age home, it was found that four of them had mild depression, 28 had moderate depression and 18 had severe depression. From the 50 non-institutionalized elderly, 34 had mild depression, 14 were reported with moderate depression and only two were reported with severe depression. On the analysis of gender wise depression, it was found to be more prevalent among females as compared to males. Occupation wise and age wise analysis was found to be irrelevant (Shabeer, Kavitha, & Shyal, 2014).

Another study was conducted among older people about their rate of depression. The purpose of this study was to estimate frequency rate of depression among the older people. The study included 146 old age people living in the community. The data was collected based on DSM IV classification. The result revealed that prevalence rate of depression increases with age and the prevalence rate was 6.4% among men and 14.3% among women. The study proved that poor health condition and societal barriers were important factors for depression (Chong, Tsang, & Chen, 2010).

The assessment of the level of depression after the administration of aerobic exercise shows that majority of the respondents, 27 (54%) reached mild levels of depression, 8 (16%) respondents reached the zero level, 11 (27%) respondents became moderately depressed, followed by 4 (8%) of the respondents who had severe depression.

The overall mean post-test depression score (16.68±13.86) was significantly lower than the overall mean pre-test score (29.94±13.79). It was also found that the obtained 't' value was 8.71, which was higher than the table value.

This finding is congruent with the studies conducted by other researchers.

A study was conducted in Brazil to assess the effectiveness of short term aerobic exercise among patients with moderate to severe depression. The participants were 25 men and 27 women with mean age of 69 years. Duration of study was 10 days for 30 minutes every day. There was a clinically relevant and statistically significant reduction in depression scores recorded by using Hamilton Depression Rating Scale for depression at the end of the program. (Mendes, Ramos, Lima, & Toress, 2008).

The study findings revealed that there was significant relationship between age (χ^2=9.43), gender (χ^2=12.97), family history of depression (χ^2=17.80) with the depression score, as the computed chi square value was greater than the table value at the of 0.05 level of significance.

However, no association was found between the depression score and variables like religion, marital status, nature of admission to the old age home, duration of stay in the old age home, performance of daily activities, and nature of illness, as the obtained chi square values were less than the table value.

The present study result was supported by a multivariate study which was conducted in Britain among 60,869 subjects to find the significance of age on depression. The result revealed that there was a linear increase in prevalence of depression with increase in age which has significance in the present study (Westshield, 2001).

Another study which supported the findings of present study was conducted in Sweden in the year 2009, on gender differences, inheritability of depressive symptoms in the elderly. A sample of 959 twin pairs was selected. They were assessed by the centre for epidemiological studies and depression scale. The result revealed that depressive symptoms were more (29%) in women than men and also there was significant hereditary influence on depression (Hui, 2009)

Recommendations

Based on the findings of current study, the following suggestions were put forward

- Similar type of studies can be undertaken on larger samples.
- An experimental study can be conducted with control group to identify the usefulness of the various other interventions.

Conclusion

The present study had ruled out the association between age, gender and family history of depression. The overall findings of the study revealed that the inmates at the old age home were having severe depression.

The study concluded that aerobics is an ideal method to prevent depression among elderly.

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