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EFFECTIVENESS OF LAUGHTER THERAPY ON THE LEVELS OF ANXIETY AND DEPRESSION AMONG INMATES RESIDING AT AN OLD AGE INSTITUTION: AN INTERVENTIONAL RESEARCH.

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ABSTRACT

Background: Inmates of old age institutions suffer from anxiety and depression along with other morbid conditions. We aimed to find if conventional modality like laughter therapy can help in alleviating such stress.

Methods: 76 inmates of an old age institution were randomly assigned into two groups, an experimental group of 37 inmates and control group of 39 inmates. All participants remained on their prescribed medication regimen for the treatment of anxiety and depression. Only the test group was given access to laughter therapy for 35 minutes a day for 101 days.

Findings: The laughter therapy given to the elderly residing in the old age home has significantly reduced their levels of anxiety and depression ($P<0.001$).

Interpretation: Laughter therapy can lead to reduction in the levels of anxiety and depression. It can serve as an adjunct and an add-on cost-effective and patient complaint therapy in rapidly alleviating anxiety and depression.

KEYWORDS

eeffectiveness, laughter therapy, anxiety, depression, old age home

INTRODUCTION

The process of ageing is natural, universal, and irreversible. According to Seneca; "Old age is an incurable disease", but more recently, Sir James Sterling Ross commented: "You do not heal old age. You protect it; you promote it; you extend it."[1]. A number of elderly people are increasing in almost every country. Globally older people constitute 11.7% in 2013. Presently about 2/3rd of the world's older population live in developing countries [2]. In India, 3.8% of the population comprises of people above 65 years of age. It is expected that by 2030 elderly population will form 21.8% of population[3].

Public health in the elderly people includes four dimensions: physical health, physical functioning, anxiety, and depression [4]. The general characteristics of old age are changes in the physiological, emotional, social, and spiritual essence of an individual [5]. The elderly face a number of problems. Separation from or loss of assistance from their children makes them physically and emotionally neglected that lead to problems like anxiety, depression, loneliness, feeling of insecurity, and social isolation [6]. Also changes like retirement, death of loved ones, increased isolation, medical problems can all lead to depression and anxiety in elderly. Its effects go far beyond mood. It also impacts energy, sleep, appetite, and physical health [7] .

For health promotion in older adults, various strategies have been recommended by experts, among which laughter therapy is an important one [8]. Currently there are several laughter therapy clubs in various parts of the world where a group of people gather to practice laughter as a form of exercise. Laughter stabilizes blood pressure, decreases muscle tone, massages inner organs, stimulates circulation, facilitates digestion, and promotes an overall sense of well-being [9].

As psychiatrist Robert Holden states, laughing produces happy chemicals in the body called endorphins which work in the brain to give an overall feeling of well-being. Laughing, however, does not have to be genuine. Fake laughter will also cause the body to respond as if the laughter is real [10]. In addition, tears produced by laughter differ from those produced from sadness and depression in that they contain toxins the body tries to release throughout the laughter response [11-12].

During the literature review, we found that laughter therapy provides good massage to all internal organs, reduces the stress hormones levels, increases the circulation, and relaxes the muscles [9]. Hence, we carried out the present research study to assess the effectiveness of laughter therapy on the levels of anxiety and depression among residents of old age institution currently on anti-anxiety and anti-depression medications, and to find out if laughter therapy can be used as an adjunct add-on therapy to tackle anxiety and depression along-with anti-anxiety and anti-depression medications.

MATERIALS AND METHODS:

Study Design and Participants:

The present study was an interventional study for which approval from the Institutional Ethics Committee (IEC) was obtained before starting the research.

Source of data: Data was collected from residents of an old age institution in Kolhapur city, India.

Research design: Pre-test and post-test exposure design.

Duration of research: The research was conducted for a period of 102 days from May 19, 2016 to August 29, 2016.

Inclusion Criteria:

1. Elderly above the age of 55 years with either sex.
2. Elderly who are willing to participate and ready to sign on the consent form.
3. Elderly who are presently on anti-anxiety and anti-depression medications.
4. Elderly with past history of anxiety and depression.

Exclusion Criteria:

1. Elderly who are under treatment of other psychiatric illnesses.
2. Elderly who are deaf, dumb and blind.
3. Elderly above the age of 80 years with either sex.

Geriatric Anxiety Inventory and Geriatric Depression Scale-Short Form were used to screen the patients and assess the levels of anxiety and depression respectively. The Geriatric Anxiety Inventory (GAI) consists of 20 "Agree/Disagree" items designed to assess typical common anxiety symptoms in older adults [27]. The Geriatric Depression Scale-Short Form is a 15-questionnaire screening tool for depression in older adults [28].

Laughter therapy to the experimental group was given in the form of voluntary laughter sessions, humorous movies, laughter yoga and stand-up comedy shows which are aired on television. Clearance from Institutional Ethics Committee (IEC) was obtained. Written Informed Consent was obtained from concerned subjects and authority of institutions. Privacy, confidentiality and anonymity were granted. Scientific objectivity was maintained with honesty and impartiality.

The elderly meeting the above inclusion criteria were found to be 76. They were randomly sampled into two groups. The experimental group consisted of 37 subjects and the control group of 39 subjects by the method of simple randomized sampling. The experimental group was subjected to intervention in the form of laughter therapy along with their anti-anxiety and anti-depression medications and the control

group was subjected to only their respective medications. Laughter therapy was given in the form of voluntary laughter sessions, humorous movies, laughter yoga, and stand-up comedy shows which are aired on television.

Geriatric Anxiety Inventory and Geriatric Depression Scale-Short Form were used to screen the patients and assess the levels of anxiety and depression respectively. Pre- and post- test scores were evaluated with the help of GAI and GDS in both the groups and the results were compared and intervened. Demographic data was also obtained on the first day of study and analyzed.

Participants were assessed before the intervention. Laughter therapy was given to experimental group for 6 days a week for the duration of 35-40 minutes for 2 weeks after which the participants were again screened for anxiety and depression. The control group who did not receive the intervention was also screened. Then again the therapy was given for 2 weeks and assessment done. This was continued for 101 days and on 102nd day the final assessment was done for both the groups and results of scores of the first and last day were compared.

Demographic data was analyzed in terms of frequency and percentage. The anxiety and depression scores before and after the laughter therapy were analyzed in terms of mean and SD. Effectiveness of laughter therapy on anxiety and depression was analyzed by paired t-test. Double blind method was followed for data analysis to prevent bias. Association between depression and anxiety with demographic variable was done by Fischer's exact test. Correlation between depression and anxiety was done by correlation test.

RESULTS:

Table *1* below shows the frequency distribution of demographic variables in the experimental and control groups. Apart from the demographic variables in Table *1*, it was observed that overall out of 76 participants about 47·36% of the subjects were visited by their family members or friends once in a month and 39·47% were not visited by any of the family members. 76·31% used to live in nuclear family, 21·05% used to live in three-generation family and 2·64% used to live in a joint-family before joining the old age home. 9·2% of all 76 participants had source of economic support from retirement or widow pension whereas 38·15% did not have any economic support, 27·6% had economic support from children or grandchildren and 25% from other unspecified sources. All the 76 subjects were suffering from either one more physical problem with each having depression and anxiety (inclusion criteria).

Table 1: Frequency Distribution of Demographic Variables in the experimental and control groups.

VARIABLE	CLASSIFICATION	EXPERIMENTAL GROUP (%) (Total-37)	CONTROL GROUP (%) (Total-39)
Age	56-60	08 (21·62)	10 (25·64)
	61-65	08 (21·62)	11 (28·20)
	66-70	06 (16·21)	05 (12·82)
	71-75	06(16·21)	06 (15·38)
	Higher than 75	09 (24·32)	07 (17·94)
Educational Status	Illiterate	07 (18·91)	12 (30·76)
	Primary Education	18 (48·64)	14 (35·89)
	Secondary Education	07 (18·91)	08 (20·51)
	Higher Education	05 (13·51)	05 (12·82)
Sex	Male	21 (56·75)	18 (46·16)
	Female	16 (43·25)	21 (53·84)
Marital Status	Single (never married)	01 (2·71)	03 (7·69)
	Married (spouse alive)	05 (13·51)	07 (17·94)
	Divorced	11 (29·72)	14 (35·89)
	Widow/Widower	20 (54·05)	15 (38·46)
Occupation Status	Unemployed	14 (37·83)	06 (15·38)
	Self – employed	04 (10·81)	03 (7·69)
	Retired	05 (13·51)	10 (25·64)
	Housewife	14 (37·83)	20 (51·28)
Religion	Hindu	36 (97·29)	37 (94·87)
	Muslim	01 (2·71)	02 (5·13)
Duration of Stay	<1 year	10 (27·02)	08 (20·51)
	1-3 years	22 (59·45)	19 (48·71)
	>3 years	05 (13·51)	12 (30·76)

Figure 1 below shows the common morbidity profile of the 76 subjects at the old age home. It shows that apart from anxiety and depression, majority elderly suffered from unilateral cataract (53·94%), 18·42% had history of (H/O) diabetes, 32·48% had H/O hypertension, 23·68% had H/O arthritis, 26·31% had H/O respiratory problems, 11·84% had H/O problems related to Urinary Tract, 5·26% suffered from cardiovascular disorders and 6·57% had always recurrent gastric problems.

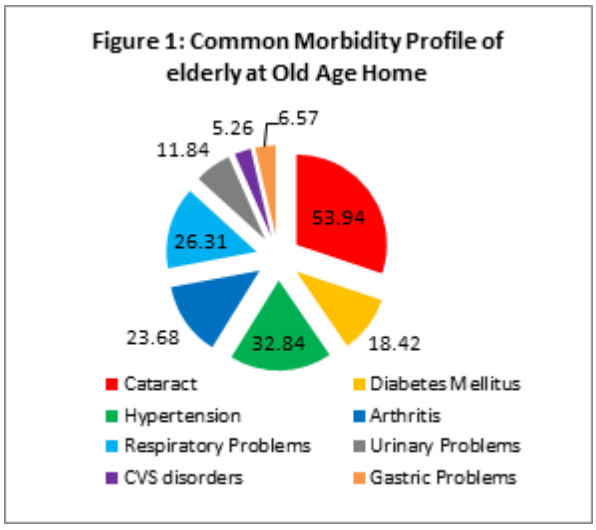

Table 2 below depicts the before and after intervention mean scores for depression and anxiety for the EXPERIMENTAL group calculated by paired t-test. The experimental group was given the intervention and was also on their respective anti-anxiety and anti-depression medications. For depression: the mean score before and after administration of laughter therapy was 9·7837 (95% CI: 9·1707 to 10·3966) and 5·3243 (95% CI: 4·8811 to 5·7674) with SD as 1·9022 and 1·3754 respectively. The difference between the pre-test and post-test mean scores is 4·4594 where the t-value is 23·6926 which is highly significant at P<0·001. For anxiety: the mean score before and after administration of laughter therapy was 14·4054 (95% CI: 13·6000 to 15·2107) and 9·2702 (95% CI: 8·5471 to 9·9932) with SD as 2·4995 and 2·2441 respectively. The difference between the pre-test and post-test mean scores is 5·1325 where the t-value is 24·9721 which is highly significant at P<0·001.

Table 2: Comparison in the mean scores of GDS and GAI before (on first day) and after (on 102nd day) the intervention (laughter therapy) in the EXPERIMENTAL group.

VARIABLE	Before Intervention		95% C.I.	After Intervention		95% C.I.	t-value	P-value
	Mean	SD		mean	SD			
Depression	9·7837	1·9022	9·1707 to 10·3966	5·3243	1·3754	4·8811 to 5·7674	23·6926	0·0000
Anxiety	14·4054	2·4995	13·6000 to 15·2107	9·2702	2·2441	8·5471 to 9·9932	24·9721	0·0000

Table 3 below depicts the before and after intervention mean scores for depression and anxiety for the CONTROL group calculated by paired t-test. The control group was not given the intervention but was on their respective anti-anxiety and anti-depression medications. For depression: the mean score before and after the research study was 10·2051 (95% CI: 9·8197 to 10·5904) and 9·3846 (95% CI: 8·9624 to 9·8067) with SD as 1·1960 and 1·3101 respectively. The difference between the pre-test and post-test mean scores is 0·8205 where the t-value is 5·4376 and it is significant at P<0·005. For anxiety: the mean score before and after the research study was 14·9743 (95% CI: 14·2008 to 15·7477) and 13·2564 (95% CI: 11·2091 to 15·3036) with SD as 2·4005 and 6·3535 respectively. The difference between the pre-test and post-test mean scores is 1·7179 where the t-value is 9·1803 which is significant at P<0·005.

Table 3: Comparison in the mean scores of GDS and GAI before (on first day) and after (on 102nd day) of the research study in the CONTROL group.

Variable	Before Study		95% C.I.	After Study		95% C.I.	t-value	P-value
	Mean	SD		mean	SD			
Depression	10·2051	1·1960	9·8197 to 10·5904	9·3846	1·3101	8·9624 to 9·8067	5·4376	0·0000
Anxiety	14·9743	2·4005	14·2008 to 15·7477	13·2564	6·3535	11·2091 to 15·3036	9·1803	0·0000

Table 4 below depicts the comparison between the EXPERIMENTAL and CONTROL groups on the last day of the research study. For depression: the mean score after administration of laughter therapy between the Experimental group and the Control group was 5·3243 (95% CI: 4·8811 to 5·7674) and 9·3846 (95% CI: 8·9624 to 9·8067) with SD as 1·3754 and 1·3101 respectively. The difference between the experimental and control group mean scores is -4·0603 where the t-value is 13·2133 and it is significant at P<0·001. For anxiety: the mean score after administration of laughter therapy between the Experimental group and the Control group was 9·2702 (95% CI: 8·5471 to 9·9932) and 13·2564 (95% CI: 11·2091 to 15·3036) with SD as 2·2441 and 6·3535 respectively. The difference between the experimental and control group mean scores is -3·9862 where the t-value is 7·2395 and it is significant at P<0·001.

Table 4: Comparison in the mean scores of GDS and GAI on 102nd day between the EXPERIMENTAL & CONTROL group.

VARIABLE	Experimental Group		95% C.I.	Control Group		95% C.I.	t-value	P value
	mean	SD		Mean	SD			
Depression	5·3243	1·3754	4·8811 to 5·7674	9·3846	1·3101	8·9624 to 9·8067	13·2133	0·0000
Anxiety	9·2702	2·2441	8·5471 to 9·9932	13·2564	6·3535	11·2091 to 15·3036	7·2395	0·0000

Fischer exact test was used to find the association between depression and anxiety with demographic variables. There was no statistical association found between any of the demographic variable like sex, marital status, previous occupation, education status, duration of stay in old age home with depression and anxiety; but there was statistical association found between depression and anxiety with increasing age: For depression - P: 0·033 with 95% confidence interval for correlation between depression and age at 0·0299 to 0·6057 and for anxiety - P: 0·045 with 95% confidence interval for correlation between anxiety and age at 0·0071 to 0·5911.

Depression and anxiety were also statistically related to each other with correlation: 0·6727 (P: 0·01, 95% C.I for correlation between depression and anxiety: 0·4459 to 0·8183).

DISCUSSION:

We examined the effects of a laughter therapy program on the levels of anxiety and depression of the residents dwelling in an old age home in Kolhapur, a city in Maharashtra in Western India.

The demographic data of marital status in the present study revealed that out of total 76 participants 46·05% were widows/widowers and 32·89% were divorced whereas 5·26% were never married. This revelation was contrary to a survey conducted in old age homes in Kerala where 8% were widowed and divorced and 44% were never married at all [29]. This difference may be because of limited sample size in the present study and socio-cultural differences in the two states of Maharashtra and Kerala.

In the present study, 47·36% subjects were visited by their family members once in a month whereas 39·47% were not visited by any of their family members. Most of the residents (76·31%) lived in nuclear families before joining the old age home. Also majority of the 76 subjects were living in the old age institution since 1-3 years (53·94%). The residents also reported feelings of loneliness, deprivation, neglect and isolation. In a comparative study by Aruna Dubey et al the old age elderly have reported a feeling of loneliness [25]. Thus old age elderly suffer from such feelings of neglect, isolation and loneliness.

There was also a finding in the present study that subjects were suffering from medical illnesses like eye-problems (cataract), respiratory problems like asthma and bronchitis, arthritis, hypertension, diabetes mellitus, etc. These findings were similar to studies done by Dr. Deotale et al [26]. These findings should lead to realization that health care services for geriatrics should be planned and implemented effectively [22, 26].

There was also an association observed of depression and anxiety with increasing age in the present study. This can be supported from a study conducted by Swarnalatha [6] in a district of Andhra Pradesh. However, there was no association observed with depression and anxiety with other demographic variables like sex, marital status, previous occupation, education status, duration of stay in the old age home. These findings are similar to a study conducted by Shine George Joseph [18].

We compared the mean scores of depression and anxiety in the experimental group before and after the administration of laughter therapy. There was statistically highly significant difference in the mean scores before and after the intervention of laughter therapy (P<0·001). The findings were supported by the study of Ko Hae-Jin et al [19], Hirsch RD et al [23], Houston DM et al [24] which showed that laughter therapy had statistical significant difference on the levels of depression and anxiety. Zahra Sharif Ahmadi et al [21] also supported the findings for anxiety but the findings for depression were contrary to the findings of Zahra et al [21] in which the scores of depression were not statistically significant after the intervention of laughter therapy. This might be because the duration of intervention of Zahra et al [21] was very short (6 weeks) as compared to the present study (14 weeks) which might have thus resulted from the shorter duration of the study. Thus resulting of changes in a depressive mood of a person depends on time for which the intervention is carried out. It has also to be noted that the experimental group subject were still on their anti-anxiety medications. Thus laughter therapy coupled with routine medications can result in rapid improvement of depressive mood.

We also compared the mean scores of depression and anxiety in the control group before and after the research study which was not provided the intervention but was on respective medications for anxiety and depression. There was statistical significant difference in the findings of anxiety and depression in the mean scores before and after administration of laughter therapy (P<0·005). These findings were contrary to the findings of Hanna Karen Moreira et al [15], Dalbir Kaur [20], Houston DM et al [24], Hirsch RD et al [23], and Zahra et al [21] where no significant changes were observed in the scores of depression and anxiety and the social well-being of the control subjects. This statistical significance might have aroused from the fact that the control subjects were still on their anti-anxiety and anti-depression medications in spite of not getting the intervention of laughter therapy. However if compared with the mean scores of the experimental group it can be said that anti-anxiety and anti-depressive medications coupled with laughter therapy will have a rapid and profound effect on the mental health of a person.

Another interesting finding of the study was that humorous movies were used as a means of laughter therapy intervention in the experimental group resulting in statistical difference in the mean scores of depression and anxiety. This was similar to the finding of Omega [14] in which funny films were given as a part of laughter therapy. Thus humorous video movies can be used as an easy and cost-beneficial means of providing laughter therapy to improve the mental health of a person.

The mean difference in the scores of depression and anxiety in the experimental and control group comparison after the intervention of laughter therapy was statistically significant similar, reflecting the effect of such intervention in reducing anxiety and depression in elderly. The result was similar to those of Ko Hae-Jin [19] and Houston et al [24]. The studies by Dr. Kataria, Hanna Karen Moreira, Ko Hae-Jin and Houston DM et al similarly implies like the present study that laughter therapy can have positive effects like creating positive

emotional stress, discharging dense excitement and alleviating the symptoms of diseases [13] [15] [19] [24].

A study done by Hirsch RD et al [23] also had similar findings in the mean scores of depression after intervention. The study showed that laughter therapy has effect on depression, general health, cheerfulness, and life satisfaction of the elderly.

Another comparative study of laughter therapy in a laughter therapy group, exercise program group, and control group of randomly selected elder women revealed a similar significant difference in the depression scores of laughter therapy and group exercise groups as compared to the control group. This showed that laughter yoga is as effective as exercise program in controlling depression [16]. Similarly a study by Ronald Kessler in US has shown that these alternate therapies are used more than conventional therapies by people with severe anxiety and depression [17].

CONCLUSIONS:

It can be concluded that elderly staying in old age institutions suffer from anxiety and depression. The technique of laughter therapy is free from any complications and does not cause any deviations or complications arising from the general health of the elderly. The harmless intervention can prevent the chronic use of anti-anxiety and anti-depression drugs, thus improving the general health and well-being in such elderly population. The intervention can serve as an adjunct and an add-on cost-effective and patient compliant therapy in rapidly alleviating anxiety and depression in patients on anti-anxiety and anti-depression drugs.

However further studies should be encouraged to assess the effectiveness of laughter therapy on other health problems of the elderly. Research into the effects of laughter on the other body systems like endocrine system, immune system should be encouraged. Health care services should be promoted to address the elderly health care like implementation of plans to conduct regular health check-up camps in the old age institutions.

However, the study had following limitations:

1. Laughter therapy was given for only 35 minutes for 101 days. However, the present study was restricted for old age population only.
2. The sample size was limited to 76 hence generalization for findings is restricted.

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