

Combination of Physical Exercises Program with Music Activities and its Effect on Musculoskeletal Pain, Anxiety and Depression among Institutionalized Elderly

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Abstract

Elderly populations constitute a large segment of Egyptian community. Physical and psychological changes occurs during elderly stage makes them complain frequently from muscle pain, anxiety and depression. **The aim of this study** was to evaluate the implementation of physical exercises program combined with music activities on musculoskeletal pain, anxiety and depression among institutionalized elderly. **Materials and method:** Quasi experimental design was used. The study was conducted in Elsaada Geriatric Home in Tanta City; Egypt. 20 elderly subjects of the residents firstly conduct physical exercises for one hour/day for two weeks. Two weeks after, implement physical exercise combined with music activities for another two weeks. The effect of interventions on pain, anxiety and depression was evaluated using Visual Analogue Scale and Behavioral rating scale of pain, Beck Anxiety Inventory and Geriatric Depression Scale. **Results,** there was a statistically significant differences found between the effect of physical exercises intervention and physical exercises with music intervention in relation to levels of depression; anxiety and pain with a difference mean score 2.85 ± 4.38 , 7.65 ± 5.32 and 1.35 ± 1.50 respectively. **Conclusion and Recommendation:** This study provides evidence that the combination between exercise and music interventions is more effective tools for relief of pain, anxiety, and depression among elders. The study recommended that the Geriatric home should involve music activities and exercise program on their daily schedule. Also, nurses can use exercise and music interventions beside each other as safe, inexpensive and effective interventions, for elders with musculoskeletal pain, anxiety

Key words: Elders, Pain, Anxiety, Depression, Exercise, and Music.

Introduction

The elderly population has grown proportionally faster in Egypt. The percentage of population aged 65+ reached to 5.0% in 2010 and it is projected to reach 14.2% in 2050. Life expectancy in Egypt reached also 72.3 years in 2010 and it is projected to reach 79.1 years in 2050 ⁽¹⁾. As the population ages, they have limited regenerative abilities and are more prone to disease, syndromes, and sickness than younger adults. The changes associated with old age comprise both physical changes and mental changes, often interactive ⁽²⁾. Health care systems in Egypt have largely ignored the needs of the elderly. There are only sporadic programs to care for the elderly, mainly initiated by the community or within the private sector the country has only 34 old people's homes to over a million elderly people, and some homes have waiting lists of over 1000 persons ⁽³⁾.

A growing list of psychological states including stress, anxiety, depression and mood disturbance becomes common among elders and have been linked to many chronic disorders such as coronary heart disease, cancer, diabetes and mental disorders as well as to accidents ⁽⁴⁾. Many of elders are also very much affected by joint and muscle pain which affect their quality of life. Although

today there is a wide range of medicinal assistance readily available, the best relieving solution is to first try a natural relief method. Thus, there is an urgent need for inexpensive and effective strategies to promote psychological well-being and improve general health status, especially for elders ⁽⁵⁾.

Music is one of life's earliest experiences and in late adulthood musical memories remain as some of the most deep-rooted. For the geriatric client, music therapy can be an effective and enjoyable medium for the maintenance and improvement of cognitive, physical and socio-emotional functioning. Providing music that is related to an individual's cultural and/or religious backgrounds, or providing opportunities to rediscover musical skills can promote relaxation and alleviating anxiety and depression. It can also stimulate cognitive functioning through providing opportunities to learn new skills as well as through utilizing previously acquired knowledge. Both long and short term recall can be stimulated through such experiences as musical associations, singing familiar songs, and sequenced activities utilizing rhythm instruments, songs and/or movement. Music can stimulate and activate signal pathways,

which can, in turn, modulate chemical mediators; thus, facilitating recovery from depression or diminishing its symptoms⁽⁶⁻⁸⁾

Music is often used to provide motivation for physical activation in the elderly. Playing instruments can increase range of motion, develop muscle strength and tolerance, and enhance both fine and gross motor functioning. Singing can improve oral-motor skills and enhance respiratory functioning. Music can also facilitate states of relaxation thereby promoting sleep and decreasing pain and anxiety. Music therapy offers an alternative and positive approach for reinforcing quality of life for the elderly. Scientists believe that music's ability to make the person feel good may be one way it helps to alleviate pain. When the body encounters something painful electrochemical signals travel from the site of the pain to the spinal cord and on to the brain. Studies suggest that music can interfere with pain signals even before they reach the brain as pleasant music triggers the release of the brain chemical dopamine.⁽⁹⁻¹¹⁾

Physical activity has been shown to be associated with decreased symptoms of depression and anxiety as common psychiatric conditions seen in elderly persons. Exercises is considered one of the most positive and healthy coping strategy to

manage anxiety and depression. Exercise probably helps ease depression in a number of ways, which may include: releasing feel-good brain chemicals that may ease depression (neurotransmitters and endorphins), reducing immune system chemicals that can worsen depression, increasing body temperature, which may have calming effects. Exercise has many psychological and emotional benefits too. Meeting exercise goals or challenges, even small ones, can boost the persons' self-confidence. Moreover, exercise is a distraction that can get the elderly away from the cycle of negative thoughts that feed anxiety and depression and give them the chance to meet or socialize with others. Just exchanging a friendly smile or greeting as the person walk around his/her neighborhood can help improving mood status⁽¹²⁻¹³⁾.

Scientists have found that regular participation in aerobic exercise has shown to decrease overall levels of tension, elevate and stabilize mood, improve sleep, and improve self-esteem. About five minutes of aerobic exercise can begin to stimulate anti-anxiety effects. According to some studies, regular exercise works as well as medication for some people to reduce symptoms of anxiety and depression, and the effects can be long lasting. One vigorous exercise session can help alleviate symptoms for hours, and a

regular schedule may significantly reduce them over time^(11,12)

When the pain and stiffness sets in, however, moving the affected joint is the last thing on many peoples' minds and lack of exercise actually can make the joints even more painful and stiff. The best conventional management for joint pain generally involves exercises to keep the joints flexible, encourage nourishment of the cartilage, and strengthen the muscles surrounding joints. It is the movement of a joint that forces oxygen and nutrients into the cartilage and removes waste products, thus helping to keep the cartilage healthy. Exercise gives energy to get through the day and improve the general sense of well-being⁽⁷⁾.

Gerantological and psychiatric nurses should understand and meet the often complex physical and mental health needs of older people. They try to help their patients protect their health and cope with changes in their mental and physical abilities, so older people can stay independent and active as long as possible. Health promotion related to physical activity and exercise is an integral part of the nurse practitioner (NP) role⁽⁸⁾. Nurses can share in providing natural, inexpensive and effective strategies, such as exercise and music activities, to improve physical and mental status of elders. There is a suggestion that using more than one strategy at the same

time may give better effect. The aim of this study is to evaluate the effect of a combination between exercise program and music activities on improving level of pain, anxiety and depression among elders and compare it with the effect of exercise program only.⁽⁴⁾ The aim of this study was to evaluate the implementation of physical exercises program combined with music activities on musculoskeletal pain, anxiety and depression among institutionalized elderly.

Research hypotheses:

Implementation of physical exercises program combined with music activities will decrease intensity of musculoskeletal pain and decrease levels of anxiety and depression among institutionalized elderly more than implementation of physical exercises program only.

Materials and method:

Materials: Study design:

Quasi experimental design was used in this study

Setting:-This study was conducted in Elsaada Geriatric Home which follow to Ministry of Social in Tanta City; with a total capacity of 32 beds, 25 were occupied during carrying out this study (7 male and 18 female)

Subjects: - 20 elder clines (4male and 16 female) who fulfilled the study criteria; (agree to participate in the study, have no contraindication for movement and free from

any psychotic illness) constituted the study subject.

Tools of the study:

Four tools were used in this study

Tool I: - A Socio demographic and clinical data structured questionnaire

schedule, which consists of 2 parts to elicit:

Part 1: - Socio demographic data such as age, sex, education, marital status, number of children and music like and dislike.

Part 2: - Clinical data such as medical history for most chronic diseases,

Tool II: - Pain assessment structured interview, it consists of 3 parts.

Part 1: - Clinical assessment of pain, including:

This part was developed by the researchers after review of literature to assess pain location, type of pain (primary or secondary pain), duration, character, and nature of the pain, using analgesics and its effect on reducing pain level ,factors that increase or decrease pain level . Each measurement was answered on categories (Yes or No) with NO scored "0" and Yes scored "1". Higher score indicate severer pain.

Part 2: Visual Analogue Scale: - A scale developed by Wewers M.E. & Lowe N.K. (1990) ⁽¹³⁾ to assess pain intensity. It is a simple assessment tool consisting of a 10 cm line with (0) on one end, representing no pain, and (10) on the other end, representing the

worst pain ever experienced. The patients are instructed to point to the position on the line between the two ends to indicate how much pain they are currently feeling. The level of pain was classified as follow:-

0	—————>	No pain
1-3	—————>	Mild pain
4-6	—————>	Moderate pain
7-9	—————>	Severe pain
10	—————>	The worst pain ever experienced

Part 3: Behavioral rating scale: - A scale developed by Kohler & Strain, 1992⁽¹⁴⁾.

To be used with patients who are unable to provide self-report of pain. It consists of five observable measurements (face score, restlessness score, muscle tone score, Vocalization score, and CONSOL ability score). Each of the five measurements is rated on 3 point Likert type scale (0, 1 or 2). The total pain score of the five measurements ranges between zero and 10, with higher scores indicating severer pain.

Tool III: Beck Anxiety Inventory (BAI)

This tool was developed by Beck JG (1988) ⁽¹⁵⁻¹⁶⁾. It consists of 21 items to assess anxiety level. Each statement was rated on a 4 point Likert type scale where 0 =not at all, and 3=severe and constantly, ranging between 0 and 3 with a total score "63", classified as follows:

A grand sum between 0 – 21 indicates low anxiety.

A grand sum between 22– 35 indicates moderate anxiety

A grand sum that exceeds 35 indicate Persistent and high anxiety

Tool IV: - Geriatric Depression Scale (GDS)

The scale was developed by Yesavage JA et.al. (1983) ⁽¹⁷⁾. It consists of 30 items to assess the level of depression in elderly.

Each statement has Yes or No response where No scored as "0" and Yes scored as "1" with a total score ranging between zero and 30, classified as follows:

No depression (0-9), Mild depression (10-19), severe depression (20-30)

Method: The tools of the study were translated by the researchers to Arabic language.

- Both the translated tools and those developed by the researchers were validated by a jury to ensure their content validity. The jury consisted of five experts from the geriatric and psychiatric nursing fields. The jury response proved the validity of the tools.
- Before starting the study, an official letter was addressed from the dean of the faculty of nursing to the directors of geriatric home to request their permission and cooperation to collect data from the selected setting.

- Ethical considerations: - Informed consent to participate in the study was obtained from the study subject after explanation the purpose of the study. They were also assured about the confidentiality of the obtained data .As well, the elders' privacy was always respected. The study subjects were also informed that they have the right to withdraw from the study at any time if they wanted to.
- Reliability of the study tools (tool II part 1,2and 3, tool III and tool IV) were tested though measuring internal consistency. Using test-retest methods & Chronbach Alfa were =0.780, 0.94, 0.80, 0.86 and 0.81 respectively.
- A pilot study was carried out on 5 elders to ascertain the clarity and applicability of the study tools. In addition it serves to estimate the approximate time required for interviewing the study subjects.

Developing and implementing the program

The program was developed after review of literature and implemented by the researchers.a-The general objective of the Program was to reduce the level of pain, anxiety, and depression among elders through implemented physical exercise and music activities.b-The contents of the Program were organized in twenty (20) successive sessions provided for the studied subjects (five

sessions each week); divided into two interventions separated by two weeks;

1. Implement physical exercises alone for the studied subjects for two weeks.
2. Two weeks after, implement physical exercise combined with music activities for another two weeks.

a- In the day before implementing the program sessions, the researchers conduct a session of five hours to establish relationship with the studied subjects and oriented them about the Program as well as complete the assessment tools (tools II, III, and IV) to assess pain, anxiety, and depression among elders

b- Each of the physical exercise sessions consists of one hour divided in to two half hour separated by 15 minutes as a rest period. The physical exercises program includes stretching and strengthening exercises and exercises to improve hand mobility and reduce hand pain. Stretching exercises such as neck Stretch, shoulder raises and rotations, shoulder push outs, arm/trunk stretch, hip stretch, ankle rotations, hamstring stretch, and arm circling, calf stretch, thigh stretch, and side bends. Strengthening exercises such as calf raises, wall arm push outs,

and squats. The researcher first demonstrated the exercise in front of them, then the studied subjects carried out them after that.

N.B. Before implementing the exercise program, the researchers attended a training program in physiotherapy to master this exercises

c- The physical exercises combined with music activities session consists of:

- Combined and executive type of music activities are used in conjunction with other therapeutic procedures (physical exercises). The subject is asked to select a music he likes as it would soothe him better, and his music was used as an adjuvant to various therapies (physical exercises).
- Executive music activities consist of individual or group singing. Subjects with long stays are the best candidates for this form of music intervention.
- Each session consists of two hours; during the first hour, the participants were allowed to sing songs, playing an instrument as they prefer or listening to music and songs.
- During the other hour, the participants were asked to conduct

a group of exercises as the researcher do in front of them with musical background. The exercises in the intervention include stretching and strengthening exercises as in the first intervention program.

d-Teaching methods & aids used during the sessions

- Group discussions, Role play, demonstration and re demonstration were used as teaching methods.
- Musical instrument, flip charts, Pictures, lap top, head phones, sound system and musical CDs were used as teaching aids.

e- Evaluation of the intervention

Three assessments were done to the study subjects in order to evaluate their level of pain, anxiety and depression.

- ❖ First time (pre assessment) was done before implementation of the Program using the four study Tools.
- ❖ Second time: post assessment I, was done immediately after the implementation of physical exercises Program, Using Tool I part 2, Tool II, Tool III, and Tool IV.
- ❖ Third time: post assessment 2, was done immediately after the

implementation of physical exercises combined with music activities, Using Tool I part 2, Tool II, Tool III, and Tool IV.

Statistical analysis:

Data was collected, tabulated and analyzed using SPSS V18. Statistical presentation and analysis of the present study was conducted, using the mean, standard error, student t- test, Paired t-test, Chi-square, Linear Correlation Coefficient.

Results

Table (1) presents the distribution of the studied elderly by their-socio-demographic characteristics. It shows that, the age of the studied sample ranged from 60-84 years, with a mean age 70 ± 5.129 years. Most of elderly participants (80%) were females. As regards to the elderly education, about two thirds (65%) of the subjects were illiterate while 30% of them had university education. In relation to marital status, more than three quarters (80%) of the subjects were widow/widowers and 15% of them were single, while 75% were having children, with 46.6% having from 2 to 3 children followed by 33.33% having from 4-5 children and 20% having from 6-7children.

Table (2) presents the distribution of the studied elderly by their medical history. It shows that 55% of the elderly had osteoarthritis and 35% of them had hypertension, followed by 30% who had

Table (1) Distribution of the studied elderly by their socio-demographic characteristics

Socio-demographic characteristics	Studied elderly(n= 20)	
	No	%
Age		
60< 74 year	16	80.00
74 < 84year	4	20.00
Mean± S.D	70± 5.129	
Sex		
Female	16	80.00
Male	4	20.00
Education		
Illiterate	13	65.00
University (high) education	6	30.00
Primary education	1	5.00
Marital status		
Widow	16	80.00
Single	3	15.00
Divorced	1	5.00
Having children		
Yes	15	75.00
No	5	25.00
Number of children (n=15)		
2-3	7	46.67
4-5	5	33.33
6-7	3	20.00

Table (3) Distribution of the studied elderly according to their clinical assessment of the pain intensity

Clinical assessment of the pain intensity	Studied elders (n=20)	
	No	%
Site of the pain*		
Knee	15	75.00
Hands & Elbow	10	50.00
All joints	5	25.00
Back	5	25.00
Neck & Shoulder	3	15.00
Type of the pain		
Primary	15	75.00
Secondary	5	25.00
how long does the pain last		
Since some years	15	75.00
Since some months	5	25.00
The onset of the pain		
Insidious	11	55.00
Associated with trauma	9	45.00
The nature of the pain*		
Throbbing	14	70.00
Burning	11	55.00
Sharp	5	25.00
Allodynia	3	15.00
The continuity of the pain		
Intermittent	17	85.00
Continuous	3	15.00

Figure 2:- Relation between elders' mean score of the level of anxiety, depression, and pain intensity in relation to the pre and two post interventions (total mean differences scores).

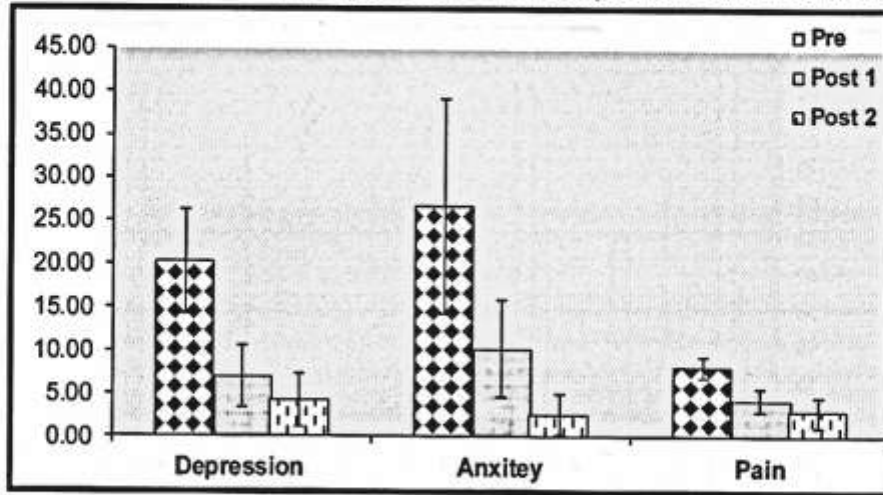
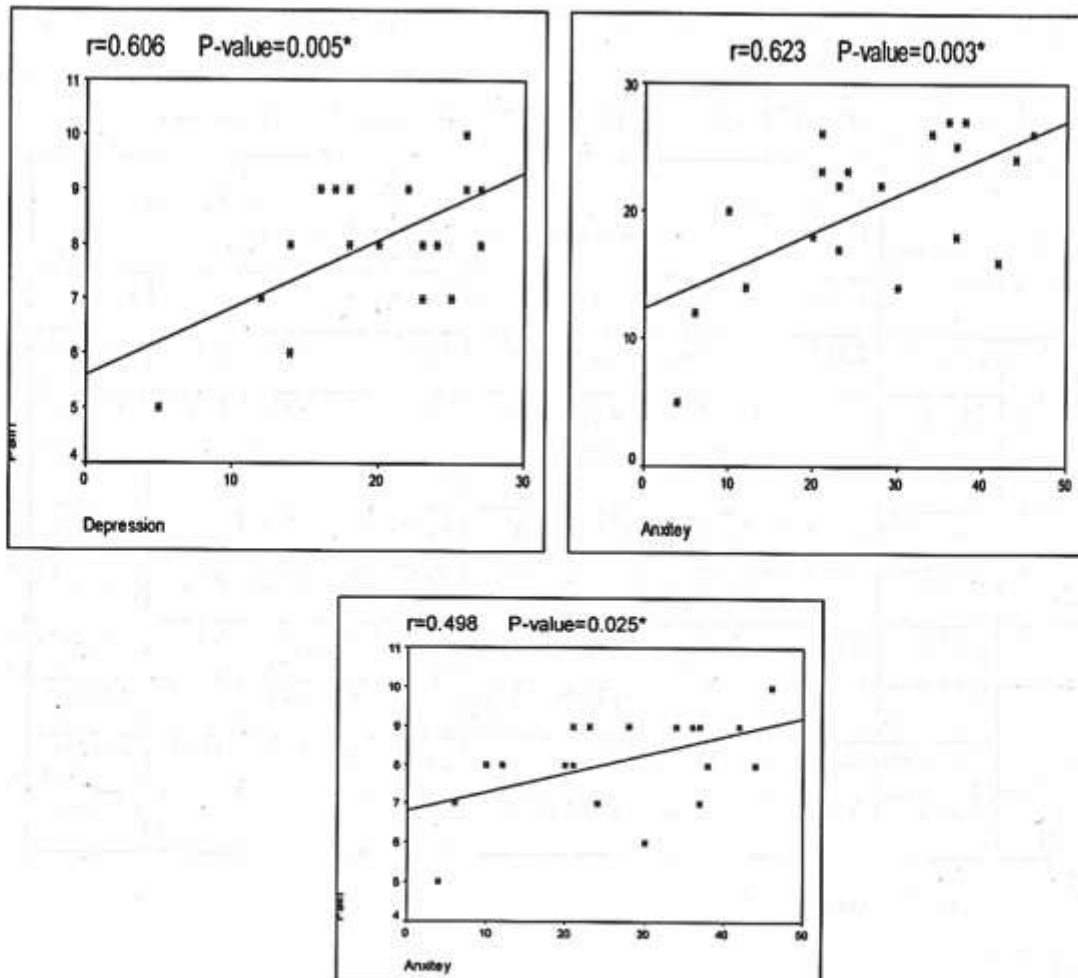


Figure 3: Correlation between intensity of pain, levels of anxiety and depression in studied subjects' pre interventions.



Discussion

Depression and anxiety in elderly people may be contributed to multiple losses of aging. Chronic pain in older people presents also a significant obstacle in maintaining function and independence the present study examined the impact effect of physical exercises program combined with music activities on the intensity of musculoskeletal pain and levels of anxiety and depression compared with the effect of physical exercises program alone among institutionalized elderly. The overall results of the study show that both intervention (physical exercises alone and physical exercises accompanied with music activity) significantly improve levels of pain, anxiety and depression. However physical exercises accompanied with music activity made higher significant improvement levels in these. It is known that music can improve motivation, elevate mood, and increase feelings of control in older people. Also, Physical exercises have major role in activating the physiological and Psychological functions. Physical activity encompasses an intentional, structured activity undertaken to improve one's health^(18, 19).

The present study shows that two weeks of physical exercises made a significant improvement in levels of pain, anxiety and

depression among elders. This can be explained by the fact that the studied institutionalized elders were not accustomed to practice exercises for long time, they didn't have a chance to make a wide range of movement because of their presence in geriatric home that lacks holding the strategy of having an exercises program or activities. In addition, the majorities of studied elders were females and haven't a chance to make any house hold that they used to do before. to add more, these old females are probably cultured to practice. This was evident as they needed an intensive effort to explain the importance of the program to motivate them. After sharing in this program their response to physical exercises was very impressive and energetic. Exercises appear to have mental health benefits on them promoted their psychological well-being too.

This result is congruent with other recent epidemiological reports, experimental trials and literature reviews supporting the fact that physical activity and exercise are associated with better physical and psychological health⁽²⁰⁻²³⁾. Biddle et al reviewed evidence on exercise and physical activity in relation to different aspects of mental health. They found that exercise is associated with the strongest anxiety-reduction effects and emphasized the causal link between physical activities and

reduction in clinically-defined depression ⁽²⁴⁾. Also, Singh who found that Beck Depression inventory, Hamilton Rating Scale of Depression and Quality of life subscales of bodily pain were all significantly improved by exercise among elders aged 60-84 ⁽²⁵⁾.

Regarding the combination of music activity and singing with an exercises activity, a statistically significant improvement occurred in the levels of pain, anxiety and depression as measured by Visual analog scale (VAS), Geriatric Depression Scale (GDS) and Beck Anxiety Inventory (BAI). In the present study, the studied elders chose a soothing music that established a soothing power. It probably had a unique link to their emotions, refreshed their memories about the happy times in their life, gave them hope in life and also diverted elders' attention from their pain, anxiety and depression. On the other hand, when elders chose exciting music, it motivated them and gave them energy, refreshment, optimism. So music can make elders calmer and relaxed and less anxious during and after conducting exercises which help them getting red off depressed mood and anxiety. Also, music may have a positive influence on wellbeing by providing joy, social interaction, reviving memory and social inclusion.

The present study result is congruent with the findings of some studies that examined the effect of music with exercise on older people. For example, Jeon EY 2009 found that music therapy and rhythmic exercise had positive effects on quality of life, mental health and upper extremity muscle strength in institution-dwelling elderly women. ⁽²⁶⁾ On the same line, Sahranavard et al (2012) who found that aerobic exercises with music are significantly reducing depression in women over 25 years ⁽²⁷⁾. Similarly, a lot of studies support that using music and singing in health care can improve quality of life for older people by easing pain, anxiety and depression. Ruth MC et al who indicated that listening to relaxing music had steadily decreased pain scores in elderly with osteoarthritis pain ⁽²⁸⁾. Castillo S 2010 revealed also that music therapy group revealed a better improvement not only in the frequency of depression symptoms, but also stimulates beneficial feelings and decrease levels of depression ⁽²⁹⁾. Moreover, Guétin S et al (2009) who reported that a significant improvement in anxiety and depression were observed in the music therapy group and the effect of music therapy was sustained for up to 8 weeks after the discontinuation of sessions ⁽³⁰⁾.

Finally, one can tell that if activities done while listening to music can positively alter the physiological and psychological functions and may even be music specific. This idea agrees with **Raja R and Arumugam, N 2006** who found that there is a significant difference of muscle recruitment between simulative music, sedative music and music silence.⁽³¹⁾

Conclusion and Recommendation:-

This study provides evidence that the combination between exercise and music interventions is more effective tool for relief of pain, anxiety, and depression among elders.

The study recommended that

- The nurses can use exercise and music interventions beside each other as safe, inexpensive and effective interventions for elders with musculoskeletal pain, anxiety and depression.
- Geriatric homes may add music activities and physical exercise program on their daily schedule

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