

# Non-invasive Interventions to Treat Depressed Elders: A Systematic Review Community-based Intervention to Prevent Depression in Elderly

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**Keywords:** Elder, Depression, Non-invasive, Non-pharmacology.

**Abstract:** Background: The most common psychiatric disorder in the elder population is depression. It may arise as a result of decrease in adaptation, low income, loss of life partner, disabilities and other factors. Handling elder depression requires special attention because it may cause ignorance and suicidal desires. The systematic review aimed to identify and synthesize the available evidence related to non-invasive interventions for depression. Methods: Multiple databases were used for this review determined from 2011 to 2017 with some limitations include the randomized controlled trial study were analyzed from Scopus, Pubmed, and Science Direct database which related to depression and non-invasive treatment. Results: Overall, 15 journals were conducted in older population with depression symptoms or diagnosed in the age range  $\geq 65$  years. This review reveals that cognitive behavior therapy, music therapy and activity therapy, potentially decrease the depression and anxiety levels in elderly compared with general therapy (psychopharmaceutical and routine consultation). Conclusions: These interventions which are used in this review have effective result and cost-effective without causing excessive physical and psychological stress. In order to maintain long-term effect, the health practitioner should be active to promote these non-invasive interventions in every level of health care services.

## 1 BACKGROUND

Depression is mental disorder arising from high and prolonged stress. This problem is quite possible for elderly to increase various changes in life. Many efforts have been taken included pharmacology and non-pharmacology interventions. Pharmacology intervention, antidepressant, an option when it abnormalities major depression (Ahmadpanah *et al.*, 2017). Although that pharmacology intervention has been proven clinically may reduce the depression, but these success followed by effects as impairment in the functions of awareness resulting in increased risk of fall. The most highly effective of antidepressants to block the reuptake of both adrenaline and serotonin at central nerves system (CNS) synapses is the tricyclic antidepressants. On the other hand, the side effects will come to overweight the function such as dry mouth, blurred vision, postural hypotension, constipation, urinary

hesitancy, sedation and weight gain (Neville and Byrne, 2009).

The population estimation of the 2010, 8 % population in the world, 524 million people aged 65 years or older. A predictor of World Health Organization has announced that 2050 the population of the elderly reached three times higher which is about one and a half billion. Projection surprising related elderly namely to increase the elderly population in the developed world only around 71% . In contrast, in the develop country an increase in happen until more than 250% (Suzman and Beard, 2011). This situation was trigger the worries about the emergence of the various problems which increase related complex physical impairment, psychology, social and spiritual.

Depression as a result of untreated emotional and mental disorders caused by intrinsic factors (frailty, chronic pain, and immobility) and extrinsic factors (low income and loss of life partner) may resulted in isolation, loneliness and long-term psychological distress. World Health Organization has been

released the information about unipolar depression among older population is 7% and in accounts for 5,7% of Years Life with Disability. The untreated condition in primary care setting also increases the perception of poor health, the utilization of health care services and require high cost of treatment (World Health Organization, 2017)

The conditions which are related to depression persistent are the decline of cerebral serotonin levels and elevated levels of cortisol. The changes of hormones associated with extra activity of hypothalamic-pituitary-adrenal (HPA) axis. Antidepressant treatment aimed to rise the serotonin synthesis and lowering cortisol, while some research shows that depression situation not always in line with cortisol level (Tsang *et al.*, 2013) Some of depression symptoms that can be observed include a decrease in energy and concentration, difficulty in leisure, self care deficit and self confidence reduction (Chan *et al.*, 2012). Depression in elderly requires special attention due to Suicidal Ideation. These problems are two closely linked and serious issue for elder. Environmental stress, physical stress, disability and low of adaptation skills and spiritual can be the emergence of the prolonged depression. Depression not only affect elderly who live at an institution care, but also community. When an aging process of elderly followed by the condition of the chronic disease, that may arise impairment in the functions of physical and psychological disorder due to affordability issues of themselves and lacking concern.

Based on the problem, then required clarification and the fact to strengthen the function of non-invasive treatment and enhance the nurses and patient relationships. This study is expected to deliver the benefits especially for nurse to give intervention of depression for elderly without make physical and psychological injuries.

## 2 METHODS

### 2.1 Aims

The purpose of this systematic review in relation to review the non-invasive treatments systematically in elderly with depression. Specifically, this review will answer some questions below:

1. What kinds of non-invasive threatment that are beneficial to resolve depression in elderly?
2. Is the non-invasive threatment overweight pharmacology therapy?

3. What are the impacts of a non-invasive threatment to reduce the level of depression?

### 2.2 Inclusion and Exclusion Criteria

These studies that serve as the basis for the analysis in this review are randomised controlled trial study given to the group of elderly with non-invasive interventions. Focus of the studies is to explain the effectiveness of various intervention the elderly who show symptoms depression or have been diagnosed the participants who received psychiatric antidepressant therapy and living in a prolonged period are not included in this review.

### 2.3 Search Strategy

Search literature related handling of non-invasive on elderly depression begins by searching through the database of Scopus, PubMed and Science Direct determined from 2010 until 2017. The searching process was started by entering keywords related to depression, elderly, non-invasive and non-pharmacology.

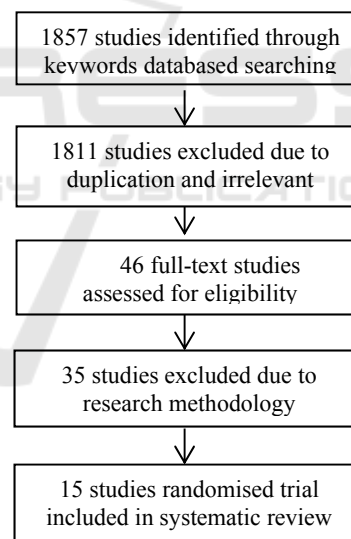


Figure 1: Flowchart for the search and study selection process.

### 2.4 Study Selection

The studies analyzed in this review are the full text through an assessment using Critical Appraisal Skills Programme (CASP) for Randomized Controlled Study analyzing study (CASP, 1994). This study involves four reviewers to analyze 15 related literatures.

## 2.5 Data Collection

Details of related participants, interventions and effects evoked in each study was done by two reviewers. The results of the review then discussed and verified by other reviewers in this study.

## 2.6 Data Synthesis

Heterogeneity in the studies conducted a review to provide systematic review of  $p \leq 0.05$  criteria that indicate the effectiveness of an intervention. Analysis of the research findings will be presented on the results of the review.

# 3 RESULTS

## 3.1 Study Selection

Based on database search, the related studies of this review are 15 journals that meet the inclusion and exclusion criteria. A total of 1857 studies were obtained by keyword searching. After removal of duplicates and irrelevant studies, 46 studies of full text articles were identified then 31 studies were excluded due to not meet inclusion criteria. The remain 15 randomised studies were considered in this review.

## 3.2 Study Characteristics

Criteria of participants are included in this review were a group of elderly in community as well as the elderly who showed symptoms of depression or have suffered diagnose depression based on various instruments for the study of depression.

Given the overall intervention is a non-invasive intervention with minimal intervention period of a month. Some of these studies reveal related cognitive therapy, music therapy, diet therapy, counselling or physical exercise to reduce depression level in the elderly.

The main assessment in such is a decrease in depression level in the elderly after received the therapy. Other aspects that participated in the assessment are physical, cognitive function, quality of life and anxiety.

## 3.3 Quality Appraisal

Total respondents of this review is 1462 elders with symptom or have been diagnosed with depression. The area of several studies that included in this review are hospital and community setting.

## 3.4 Synthesis of Result

*Group music therapy*, a related study of non-invasive intervention of group music therapy in group has been conducted by Chu *et al.*, 2014. The therapy were grouped into 12 session with 6 kategori. Session 1-2 with activity music playing, session 3-4 with singing activities, session 5-6 with listening music, session 7-8 aimed to enhance attention towards music and color, session 9-10 therapist played instrumental which related to traditional festival, session 11-12 aimed to enhanced the creativity of elders by create music through instrumental that they have been selected. The auditory stimulation against music is highly potential to distract the elders from stressor and enhance mind concentration. *The Chinese Version of The Cornell Scale for Depression in Dementia (C-CSD)* is used to evaluate depression level that cover five dimensions such as mood and related signs, behaviour disturbance, cyclic function, ideational disturbance and physical signs. When the feeling of fun starting to arise and the the level of depression decreased, that resulting the lowering cortisol level. This study reveals there is no difference of saliva cortisol level between treatment group and control group which received therapy as usual. Another positive impact of music therapy is cognitive enhancement until 1 month post therapy. The evaluation of cognitive function based on 6 domain of MMSE reveals the enhancement of cognitive function in treatment group compared with control group.

*Live music therapy*, Cooke *et al.*, 2010 conduct the research related to music therapy and compared with reading therapy. The specific result of this study reported that the first group which received reading therapy as the first treatment showed the rising of belonging sensation compared with music decline in the level of depression.

Table 1: The randomized controlled trial study which included in systematic review.

Authors, Year	Type of study	Population	Intervention	Outcome
Chu <i>et al.</i> , 2014	RCT	104 older persons with dementia	- Group music therapy - Therapy as Usual	- Depression - Cognition
S.-H. Kwon, 2015	RCT	89 elder in community	- Whell of Wellness Counseling	- Wellness evaluation of lifestyle - Depression with PHQ-9K - Health-related Quality of Life
Gustavson <i>et al.</i> , 2016	RCT	221 partisipants aged $\geq 65$ yo	- Problem Solving Therapy Supportive Therapy	The suicide item of The Hamilton Depression Rating Scale
Hummel <i>et al.</i> , 2017	RCT	155 early discharged patients aged $82 \pm 6$ years old	- Cognitive Behavioural Group Psychotherapy	- Hospital Anxiety and Depression Scale
Kiosses <i>et al.</i> , 2010	RCT	30 elders	- Home-Delivered Problem Adaptation Therapy (PATH) Supportive Therapy	- Depression - Disability
Mace <i>et al.</i> , 2017	RCT	220 older patients	- Therapeutic relationship	- Depression reduction
Sharifan, Hosseini and Sharifan, 2017	RCT	180 elders	- Frequent fish consumption of fish marinated in essential oil	- Depression symptoms
Cooke <i>et al.</i> , 2010	RCT	47 elders	Live music therapy - Reading book	- Self-esteem improvement - Feelings of belonging - Depression level
Apóstolo <i>et al.</i> , 2014	RCT	56 elders	- Cognitive stimulation on nursing - Therapy as Usual	- Cognitive function - Depression Level - Activity Daily Living
Ekkers <i>et al.</i> , 2011	RCT	93 elders	- Competitive memory training (COMET) - Therapy as Usual	- Depression level - Rumination
Tsang <i>et al.</i> , 2013	RCT	38 depressed elders	- Qigong exercise Newspaper reading program	- Psycho-physical effect - Neurophysiological effect
Yap <i>et al.</i> , 2017	RCT	54 elders aged $74,65 \pm 6,40$ yo in community	- Rhythm-centred music making	- Quality of Life - Deression mood - Sleep Quality - Lubben Social Network Scale (LSNS)
Gok Ugur <i>et al.</i> , 2017	RCT	64 elders in nursinghome	- Music therapy	- Depression levels - Systolic blood pressure
Sabir <i>et al.</i> , 2016	RCT	61 elders	- Integrative reminiscence	- Depression - Stress level - ER visitation
Chan <i>et al.</i> , 2012	RCT	50 older adults in community-dwelling	- Listening music	- Depression score

*Whell of Wellness Counseling*, researcher involved 4 research assistants, 2 doctorals and 2 masters of nursing. When the research was begins, researcher communicate each other via online chat room as needed. Elders in community received Whell of Wellness Counseling from well trained nurses. The weekly education about nutrition, exercise and another related procedure during 4 weeks. This studi revealed that Whell of Wellness Counseling is beneficial to enhance health status of community-dwelling elders. The evaluation of elder life styles in experiment group are spirituality, self-esteem, work and leisure, relationship and love, except realistic belief. Participants in experiment group experienced significant enhancement of depression condition compared with control group between before and after treatment. The evaluation of physical component scales, mental and quality of life between 2 group is no significant differences between both groups (Kwon, 2015).

*Problem Solving Therapy*. Elders with mayor depression disorder were diagnosed by Structural Clinical Interview for DSM-III-R with score  $\leq 33$ . This intervention well organized for 12 weeks aimed to compare the effectiveness of Problem Solving Therapy and Supportive Therapy. Amount 61 % of participants reported Suicidal Ideation (SI). 27 % partisipants have history of medical illness as antidepressant users. Supportive therapy group reported amount 44,6 % have lower rate of Suicidal Ideation than Problem Solving Therapy Group (60,4%). Problem Solving Therapy Group has significant result to reduce Suicidal Ideation regarding to logistic regression analysis for 12 weeks of therapy (Kristen A. Gustavson *et al.*, 2016).

*Cognitive Behavioural Group Psychotherapy*. Hummel *et al.*, 2017 was researcher who involved 155 elders of discharged patients with Hospital Anxiety and Depression Scale (HADS score)  $> 7$ . Comorbid depression in elders has close relation with functional disorders, recurrent hospitalization or admissions and mortality rate. CBT treat elders in community appropriately. The research finding is significant reduction of Hospital Anxiety and Depression Scale (HADS score) in CBT group, 18,8% to 11,4%, after 4 months intervention. In addition, other advantages of CBT in elders are support the healing process, physical function enhancement and other functional parameters. CBT at the first and last meeting its conduct as individual treatment aimed to obtain individual evaluation.

*Home- Delivered Problem Adaptation Therapy (PATH)*. The focus of this research is ecosystem

which are patient, care giver, and environment. This therapy involved the participations of patient and care giver in order to facilitate problem resolution and adaptive functional. In general, the participants graduated from *high-school atau higher-education*. Amount 19 caregivers involved in this study. The advantages comes from this research, namely a decrease of depression level was higher in PATH group than Supportive Therapy (ST) group. Furthermore, PATH was able to reduce disability 3,7 times than ST intervention (Kiosses *et al.*, 2010).

*Therapeutic relationship*. Executive disfunction in elder as manifestation of neuropsychological deterioration due to frontal system damage, resulted on low response against antidepressants. Participants in this research are elderly with major depression based DSM-IV and MMSE (Mini Mental Study Exam) score that shows the cognitive disorder globally. Before starting the research, the therapists were trained to reduce bias. The focus of this research is Client Perception of Therapist Scale (CPTS) to understand the dimensions of understanding and acceptance that demonstrates the strength of relationship to patient development in depression reduction. The principle of this research finding is CTPS and therapist ability may greatly affects the variation of elder depression level. This findings rise the expectations that the therapists should have active contribution to conduct monitoring as well as attention from the clinic to give positive reinforcement on reporting result of TR (R.A. Mace *et al.*, 2017).

*Frequent fish consumption of fish marinated in essential oil*. There is a study which reported that a high quality diet has an important role in controlling depression. It has widely publicized that high level of N-3 Long Chain Polyunsaturated Fatty Acids (PUFAs) and monounsaturated fatty acid concentration have positive impact to reduce depression. Diet fish consumption-based intervention for mild to moderate depression preceded by fish analysis related content of mercury and should be ensured safe for consumption. The main content of perilla oil is used as a condiment are octacosanol,  $\gamma$ - tocopherol, dan  $\beta$ -sitosterol. Perilla frutescens mostly found in northwestern Iran with high ALA and contains saturated fatty acid and unsaturated fatty acid that proven to prevent depression and delayed the worsening development. Yi *et al.*, 2013 has proven that *Essential Oil of Perilla Frutescens* (EOPF) may reduce abnormal behavior induced stress after finish an animal-based investigation by using mice. In this study, the diet that given to elder aimed to know about the

influence of unsaturated fatty acids from either fish or perilla on elderly depression management. Two of three groups instructed to consume fish or fish marinated with EOPF (434 g/week) and one group as control that consume fish under 6 g/day (Sharifan, Hosseini and Sharifan, 2017). Statistically, the larger portion of fish consumption and frequent reveal positive improvement score of depression in the elderly. Fish consumption and EOPF is associated with greater improvement compared to other groups which only consume small fish portion.

*Cognitive stimulation on nursing.* Apóstolo *et al.*, 2016 revealed in his study that cognitive stimulation may increase cognitive function, stimulate to thinking, concentration and memory and sosial circumstances. The increase experienced in basic level does not affect the independence of ADL fulfillment. The program has been set for 14 session, twice/week for 7 weeks.

*Competitive memory training (COMET).* Ekkers *et al.*, 2011 has proven his intervention by involving 93 elderly with depression and rumination. Result in treatment group shows that group which received *Competitive memory training (COMET)* showed a higher rate development to treat depression and rumination compared to the group which received usual treatment.

*Qigong exercise.* Physical exercise as intervention performed by Tsang *et al.*, 2013 involved 38 elderly who have a history of chronic disease. Evaluation of symptoms of depression, psychosocial function, muscle strength, saliva cortisol and serotonin serum demonstrated significant reduction of depression level in qigong group. Qigong is also proven to increase self-efficacy, self-concept of physical well being and handrails strength. a decrease in cortisol trends found in qigong group but did not occurred a significant difference compared to control group.

*Rhythm-centred music making (RMM).* Intervention in the form of listening to music was performed by Yap *et al.*, 2017 with the elderly as a sample of 54 people in nursing homes. Previously carried out assessment of the elderly which include EQ5D (European Quality of Life-5 Dimension), GDS (Geriatric Depression Scale), LSNS (Lubben Social Network Scale), PSQI (Pittsburgh Sleep Quality Index). The granting of the music intervention on the elderly was performed for 1 hour each session 1 a total of 10 sessions with a group A as the intervention group and the control group B as group later in the second session as the control group A and Group B as the intervention group. The results of this study show no significant results on a

scale of measurement of EQ5D, GDS, and PSQI LSNS.

*Music therapy.* Related study which used listening music as intervention was performed by Gök Ugur *et al.*, 2017 with 64 elders as sample in nursing home. Previously, collecting data was done by using Elderly Information Form and Geriatric Depression Scale. Participants have been given intervention to listen music 3 days in a week for 8 weeks. Depression level was assessed since first week to 8<sup>th</sup> week. The research finding reveals that music therapy be able to reduce depression level and systolic blood pressure in elderly. In line with the study, Sejalan dengan penelitian tersebut, Chan *et al.*, 2012 also proved the effectiveness of music therapy through interventions during 8 weeks therapy with 30 minutes of listening the chosen music in every weeks.

*Integrative reminiscence.* The related study of reminiscence showed significant result in decreasing depression and stress level and rarely ER admission. Depression level was measured by CES-D scale and reveals that reminiscence is suitable for mild to moderate depression.

## 4 DISCUSSIONS

Based on the results of the review of 15 randomized controlled trial journals related to depression treatment in elderly, proved that non-invasive therapy provide a positive impact against depression level in the elderly. The number of participants involved in each study at least 30 people who showed symptoms of depression or diagnosed. The non-invasive therapies such as music therapy, Whell of Wellness Counseling, Home-Delivered Problems Adaptation Therapy, cognitive behaviour therapy in treatment as well as Competitive Memory Training (COMET) proved to be able to reduce the level of depression in the elderly.

Music therapy may reduce the level of depression by increasing feeling of enjoy and fun by listening selected music that occurs cortisol level reduction. Whell of Wellness Counseling which performed by online chat with elders that involved good relation and health promotion between nurse and client. The intervention by changing behaviour with cognitive behaviour therapy in group potentially reduced the level of depression by giving support during healing process and also enhancing physical function. The Home- delivered Problems Adaptation Therapy requires family support as caregiver can help older people with depression to

deal with problem and resolve together. Furthermore, good relation between care giver and elders may resulted in feeling of loneliness reduction. Competitive Memory Training helped elder to deal with depression by giving motivation, rational treatment, awarenees enhancement, support letting go precess, combine the previous successful and generalization in letting go of rumination in the furture

The common main tool depression level evaluation which is used in this study is Geriatric Depression Scale. The therapeutic relationship is beneficial to lower depression in elderly with impaired cognitive disorders and major depression globally by relying on the ability of therapists in communicating with elderly who suffered depression disorders. Qigong exercises as physical activity treatment requiring special skills by therapists trained in delivering the intervention.

A wide variety of forms of non-invasive interventions might be applied not only on institutional health services, but also on community. These interventions are not only beneficial to decrease the level of depression. In additions, some of the other benefits that are brings in effect quality of life, self-esteem, cognitive function and decrease the occurrence of suicide and rumination.

Each intervention requires skill for any therapist to be able to achieve optimal results. Therefore, the nurse as the care giver of non-invasive intervention need support through a policy applied means of service delivery. The application of related techniques of intervention have the advantages of minimal trauma on the elderly and cost-effective.

## 5 CONCLUSIONS

This systematic review reveals various non-invasive treatments to treat elders with depression. These therapies can apply in symptomatic depression, major depression, mild cognitive disorder, dementia and patient with a history of chronic illness. The non-invasive treatment need a role of nurse in reducing elder depression level by giving intervention and conduct therapeutic relation.

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