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PSYCHO-SOCIAL INTERVENTION FOR MANAGING DEPRESSION AMONG OLDER ADULTS – A META-ANALYSIS

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Abstract

Depression is the most frequent mental health problem in older people, and it's tough to manage because of late-life health issues and cognitive impairment. The study aim to investigate the efficacy of psycho-social intervention for managing depression in older adults and to explore whether types of interventions, specific aspects of the study, and research participants moderate the magnitude of the effectiveness of interventions. we searched different database and followed PRISMA guidelines. Include studies from 2001 to 2021 conducted among the elderly population aged 60 and above. The quality assessment technique developed by the Cochrane Collaboration was used to look for potential sources of bias. Comprehensive meta-analysis is used to analysing effect size. It is found that Psychosocial interventions are effective in reducing depression among older adults. The overall intervention effect size (hedges' g) was found to be 1.118 (95% CI: 0.835-1.402), significant at the 0.0001 level. Based on subgroup analysis it is clear that experimental design and severity of depression do not play changes in the effect size of intervention but cognitive impairments can influence the intervention effectiveness.

Keywords: Psycho-social intervention, Depression, older-adults, Meta- analysis.

The process of becoming old or obtaining the appearance and traits of old age is referred to as the ageing process. Ageing is an objectively defined process that begins at birth and is defined by the chronological age criterion. Behavioral and self-

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perception changes, as well as reactions to bodily changes, are all signs of ageing. Aging, in its most basic sense, relates to a person's ability to function in society. The term "older people" refers to those who are 60 years or older. Some people, however, live for more than 100 years. In most developed countries, the term "elderly" refers to those who are 65 years old or older, with those 65 to 74 years old referred to as "early elderly" and those above 75 years old referred to as "late elderly."

There are 600 million people over the age of 60 in the world today. By 2025, the elderly population will have more than doubled. Longer lives provide opportunities for elderly persons and their families, as well as for society as a whole. Additional years allow exploring new interests, such as higher education, a new career, or pursuing a long-neglected passion. Older individuals contribute to their families and communities in a variety of ways. In actuality, elderly persons contribute significantly to society. Health and social care expenditures for the elderly are an investment rather than a cost. These investments benefit older persons while also benefiting society as a whole. The scope of these opportunities and contributions, however, completely depends on their health. Nowadays researchers gave importance to older people above 60, and those researches are more related to their mental health issues. Especially depression, anxiety, insomnia, cognitive change, and degenerative disorders. A vast amount of intervention studies is published in the area. Intervention studies for the treatment of depression have received a lot of attention in recent years. Psychotherapy and psycho-social treatment is the most common nonpharmacological intervention for depression. The current study focuses on the effectiveness of non-pharmacological interventions such as psychotherapy and other psycho-social intervention for managing depression.

Many meta-analysis studies show that psychological interventions are effective for managing depression in adult population. Based on the previous meta-analysis, well established effective intervention includes cognitive behaviour therapy (Cuijpers et al., 2013), interpersonal psychotherapy (Cuijpers et al., 2011), brief psychodynamic therapy (Driessen et al., 2010), behavioural activation therapy (Ekers, Richards & Gilbody, 2008), problem-solving therapy (Malouff, Thorsteinsson & Schutte, 2007), and non-directive supportive counselling (Cuijpers et al., 2012). These studies focused on the effectiveness of specific interventions. Several reviews also summarized the existing evidence for psychological treatment for managing depression. There has been limited evidence indicating psychological intervention efficacy for managing depression among older adults. Depression is more chronic in elderly people than it is in younger people. Depression in older adults is difficult to manage due to its chronic nature such as medical condition,

cognitive impairment, loss, and grief, decreasing social support and so on. Weak health conditions and cognitive impairments are common in the elderly population. Psychotherapies and psycho-social intervention may be less effective in older adults than in the younger and middle adult population. The focus of this study was to understand the efficacy of non-pharmacological intervention for older adults.

Pinquart, Duberstein and Lyness, (2006) conducted a meta-analytic comparison of pharmacotherapy and psychotherapy, investigated the effects of psychotherapy and other behavioural therapies on clinically depressed older persons. Psychotherapeutic treatments for older depressed people (Wilson, Mottram & Vassilas, 2008), Cognitive behavioural therapy for depression (Gould, Coulson & Howard, 2012) reveal the development of research work in this area. Previous meta-analysis mostly focuses on the specific type of psychotherapy only, such as behavioural therapy (Samad, Brealey & Gilbody,2011), reminiscence interventions (Pinquart & Forstmeier,2012), group psychotherapy (Krishna eta al., 2011), cognitive behavioural therapy (Gould, Coulson, & Howard,2012). Many intervention studies for older adults are reporting day by day. Hence, decided to conduct meta-analysis by incorporating newly published studies and to investigate the effectiveness of the psycho-social intervention. The study also focusses on the subgroup analysis to understand the moderating effect of intervention type, selected design, and the difference in the effectiveness of the psycho-social intervention on clinical population, non-clinical population but having mild to moderate depression symptoms, and the cognitively impaired depressed elderly. In these subgroup analyses, we can investigate whether specific study characteristics, such as different types of psychotherapy, experimental design, depression severity in the sample population, and the presence of cognitive impairment are associated with higher or lower effect sizes.

Objective

To examine the efficacy of psychosocial treatments for the management of depression in older people and also to investigate whether there are any differences in the efficacy of psychotherapy and other psychosocial treatments for the management of depression in older people based on intervention type, selected design in the reported study, depression severity, and population characteristics such as clinical population with depression, normal population with depression symptoms, and depression with cognitive impairment.

Methods

Electronic database search

Followed PRISMA guidelines for selecting studies for meta-analysis and searched the different databases such as Ebsco, Elsevier, PubMed, Springer, J-store, ProQuest, and Psy Info for collecting relevant articles to conduct meta-analysis in the last 20 years (2001-2021). The search terms were "aged," "elderly," "geriatrics," "older," "depressive disorder," "depression," "psychosocial intervention" and "Psychotherapy". The process for selection and inclusion of studies is shown in the given figure.

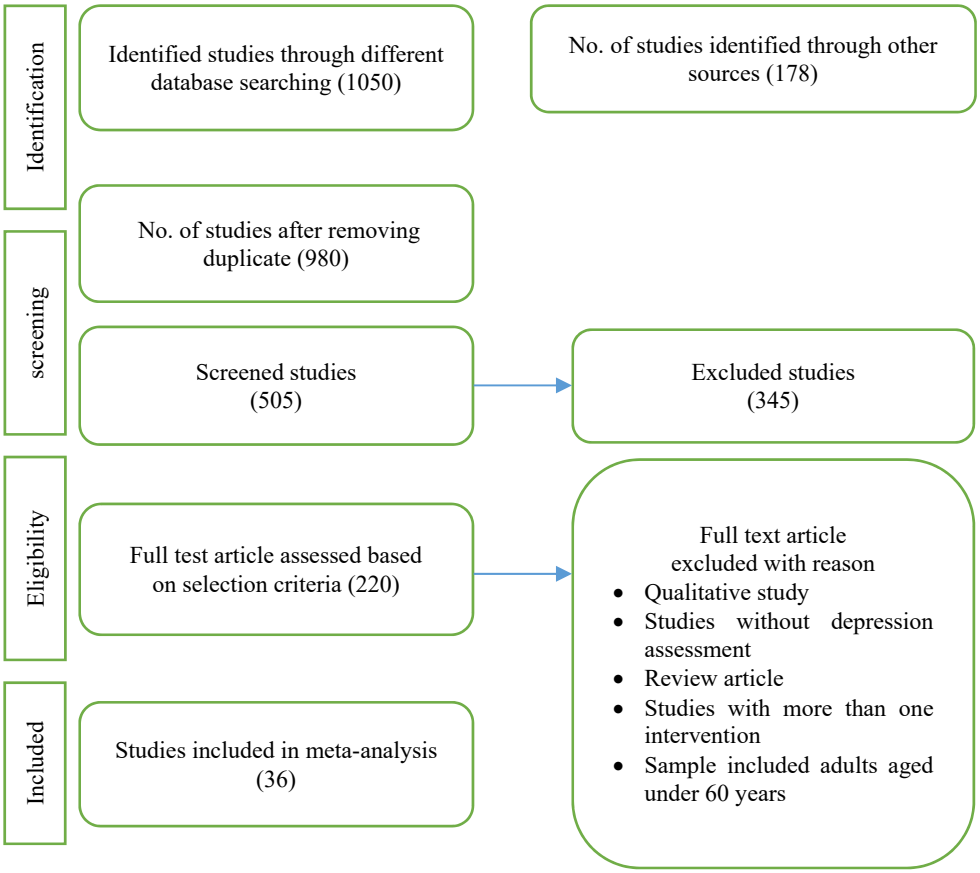

Figure 1: PRISMA flow chart

A total of 1050 citations were identified through different database searching and178 studies were identified through other sources. By removing duplicates from

980 titles screened, 505 studies are screened through abstract reading and 345 studies were removed. 220 full-text publications were retrieved for review. After a detailed review, 36 studies were found to match the criteria for inclusion and were incorporated in the meta-analysis.

Inclusion criteria

Randomized controlled trials (RCT) and quasi-experimental designs comparing psychosocial intervention to a control condition are included for meta-analysis. Control groups including any of the waitlist group or treatment as usual group, care as a usual group or placebo comparison group, or psychoeducation controls, etc Studies were restricted to older adults and age is 60 years and above. Where the majority of trial participants were diagnosed with depression using diagnostic criteria from the Diagnostic and Statistical Manual of Mental Disorders or a predefined cut-off score on a standardized depression rating scale.

Exclusion criteria

Qualitative studies, theoretical studies, review articles, non-intervention studies, studies with more than one intervention are excluded in the final screening. A study with samples aged under 60 years was also not considered. Excluded studies with more than one intervention and studies with improperly reported data. The article did not provide sufficient data for meta-analysis also excluded during the quality assessment process.

Quality assessment

The quality assessment tool developed by the Cochrane Collaboration was used to assess potential sources of bias in included studies (Higgins & Green, 2008). Each study was evaluated using the tool's six criteria: randomization, concealment of allocation, blinding of participants and outcome assessors, and reporting of incomplete data or selective outcomes. Based on the criteria outlined in the tool, each domain was assigned a low, high, or unclear risk of bias. Table 1 shows the details of the quality assessment.

Table 1. Quality Assessment of the Included Study

No.	Study	Year	Selection bias		Performance bias	Detection bias	Attrition bias	Reporting bias	Other bias
			Random sequence generation	Allocation of concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data addressed	Selective reporting	
1.	Lynch et al	2003	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
2.	Bruce et al	2004	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
3.	Serrano et al	2004	Low Risk	Unclear	Unclear	Unclear	Low Risk	Low Risk	Low Risk
4.	Haringsma et al	2006	Low Risk	Unclear	Unclear	Unclear	Low Risk	Low Risk	Low Risk
5.	Chao et al	2006	High Risk	High Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
6.	Van-schaik et al	2006	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
7.	Smith et al	2007	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
8.	Wang et al	2007	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
9.	Laidlaw et al	2008	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
10.	Serfaty et al	2009	Low Risk	Low Risk	Low Risk	High Risk	Low Risk	Low Risk	Low Risk
11.	Heisel et al	2009	Not Applicable	Not Applicable	Unclear	Unclear	Low Risk	Low Risk	Low Risk
12.	Sharif et al	2010	Not Applicable	Not Applicable	Unclear	Unclear	Low Risk	Low Risk	Low Risk
13.	Pot et al	2010	Low Risk	Unclear	Unclear	Unclear	Low Risk	Low Risk	Low Risk
14.	Lamers et al	2010	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
15.	Snarski et al	2010	Low Risk	Unclear	Unclear	Unclear	Low Risk	Low Risk	Low Risk
16.	Joling et al	2011	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
17.	Ekkers et al	2011	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
18.	Korte et al	2011	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
19.	Zhou et al	2011	Low Risk	Unclear	Unclear	Unclear	Unclear	Low Risk	Low Risk
20.	Serrano et al	2012	Low Risk	Unclear	Unclear	Unclear	Low Risk	Low Risk	Low Risk
21.	Preschl et al	2012	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
22.	Gallegos et al	2013	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
23.	O'Connor, et al	2013	High Risk	High Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk

No.	Study	Year	Selection bias		Performance bias	Detection bias	Attrition bias	Reporting bias	Other bias
			Random sequence generation	Allocation of concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data addressed	Selective reporting	
24.	Wuthrich	2013	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
25.	Gitlin et al	2013	Low Risk	Low Risk	Low Risk	High Risk	Low Risk	Low Risk	Low Risk
26.	Chan et al	2013	Low Risk	Low Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk
27	Escolar-chua, et al	2014	Low Risk	Unclear	Unclear	Unclear	Low Risk	Low Risk	Low Risk
28.	Mallya et al	2015	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
20.	Xie et al	2017	Low Risk	Low Risk	Unclear	Unclear	Low Risk	Low Risk	Low Risk
30.	Lee et al	2017	High Risk	High Risk	Low Risk	Unclear	Low Risk	Low Risk	Low Risk
31.	Ciasca et al	2018	Low Risk	Unclear	Low Risk	High Risk	Low Risk	Low Risk	Low Risk
32.	Sadler et al	2018	Low Risk	Low Risk	Low Risk	Unclear	Low Risk	Low Risk	Low Risk
33.	Siverova et al	2018	High Risk	Unclear	Unclear	Unclear	Low Risk	Low Risk	Low Risk
34.	Ching-Teng et al	2019	Low Risk	Unclear	Unclear	Unclear	Low Risk	Low Risk	Low Risk
35.	Carandan et al	2020	High Risk	High Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk
36.	Heidari et al	2020	Low Risk	Low Risk	Low Risk	Unclear	Low Risk	Low Risk	Low Risk

Table 2. Basic characteristic of the selected study

First Author	Year	Country	No of sample	Age	Tool	Intervention	Design	Popu-lation	Outcomes
Lynch, et al	2003	USA	Ex=15 Cg=16	age 60 and older	HAM-D	Dialectical behaviour therap	Randomized Controlled Trial	CD	Patients receiving DBT showed significant improvement
Bruce et al	2004	Pennsylvania USA	Ex=320 Cg=278	67-74	HAM_D	Primary care intervention	Randomized Controlled Trial	CD	Statistically significant deduction in outcome measure.
Serrano et al	2004	Spain	Ex=20 Cg=23	Age 65=93	CES-D	life review therapy	Randomized Controlled Trial	NCD	The results indicated significant differences between experimental and control groups after 4 weeks of autobiographical retrieval practice. showed fewer depressive symptoms, less hopelessness, improved life satisfaction, and retrieval of more specific events.
Haringsma et al.	2006	Netherlands	EX=21 Cg=22	aged 55–85 years	CES-D	CWD- coping with depression course	Randomized Controlled Trial	CD	Older adults in the intervention group showed a significant decrease in depression symptoms. Gains were maintained over 14 months. The course was beneficial for participants with mild or severe depression, and treatment acceptability was high
Chao et al	2006	Taiwan	Ex=12 Cg=12	65 to 85 years	GDS	Group reminiscence therapy,	Quasi-experimental study	NCD	Results indicated that group reminiscence therapy significantly improved self-esteem, although effects on depression and life satisfaction were not significant.
Van-schaik et al	2006	The Netherlands	Ex=69 Cg=74	Mean age 65	MADRS	Interpersonal Psychotherapy	Randomized Controlled Trial	CD	IPT was more effective than care as usual for elderly patients with moderate to severe major depressive disorder in general practice
Smith et al	2007	US	Ex=15 Cg=16	≥60 years old	BSI	Reminiscence therapy	Randomized Controlled Trial	NCD	The research supports the Life Story Workshop as an effective intervention for improving depressive symptoms in older adults.
Wang et al	2007	Taiwan	Ex=51Cg =51	≥65 years old	GDS	Group reminiscence therapy	Randomized controlled trial	Cog D	Study indicating that the cognitive function of the experimental subjects increased and their depressive symptoms diminished following intervention.
Laidlaw et al	2008	UK	Ex=20 Cg=20	age 60 years and over	HAM_D	CBT- cognitive behavioural therapy	Randomized Controlled Trial	CD	CBT on its own is shown to be an effective treatment procedure for mild to moderate late life depression and has utility as a treatment alternative for older people who cannot or will not tolerate physical treatment approaches for depression.

First Author	Year	Country	No of sample	Age	Tool	Intervention	Design	Popu-lation	Outcomes
Serfaty et al	2009	London	Ex=70 Cg=67	aged 65 years & above	BDI	Cognitive behavioural therapy	Randomized Controlled Trial	CD	Cognitive behavioural therapy is an effective treatment for older people with depressive disorder
Heisel et al	2009	London,	EX= 17	adults 60 years & above	HAM-D	Interpersonal Psychotherapy (IPT	One group pre post design	CD	Findings indicate a substantial reduction in participant suicide ideation, death ideation, and depressive symptoms; controlled trials are needed to further evaluate these findings
Sharif, et al	2010	Iran	Ex=49	60+ years	GDS	Group reminiscence therapy	One group Quasi design	NCD	Study showed a statistically significant difference in depression scores comparing before and after the intervention.
Pot et al.	2010	Netherlands	Ex=83 Cg= 88	>50 years	CES-D	life review	Randomized Controlled Trial	NCD	Depressive symptoms, a decrease that was retained during follow-up
Lamers et al	2010	The Netherlands	Ex=183 Cg=178	aged 60 year & older	BDI	MPI Minimal psychological intervention	Randomized Controlled Trial	CD	Result shows reductio in depression
Snarski et al	2010	US	Ex =16 Cg=13	65 years of age & above	GDS	Behavioral Activation Therapy (BAT)	Randomized Controlled Trial	CD	Behaviour activation therapy shows rapid treatment effect, the majority of the improvement in depressive symptoms occurred between pre- and mid treatment sessions.
Joling et al	2011	Netherland	Ex=86 Cg=84	aged 75 year&older	CES-D	Bibliotherapy	Randomized Controlled Trial	NCD	Bibliotherapy as a stand-alone intervention for the elderly (aged 75 years and older) did not reduce depressive symptoms more than usual care. This might indicate that bibliotherapy can only be effective for patients who are motivated and acknowledge their depression.
Ekkers et al	2011	Netherlands	Ex=53 Cg=38	aged _65 years	GDS	COMET-Competitive Memory Training	Randomized Controlled Trial	CD	COMET with TAU showed a significant improvement in depression and rumination compared with TAU alone.
Korte et al	2011	Netherlands	Ex=100Cg=102	≥65 years old	CES-D	Life review therapy	A pragmatic randomized controlled trial	CD	This study shows the effectiveness of life review therapy as an early intervention for depression. The intervention is also effective in reducing anxiety symptoms and strengthening positive mental health.
Zhou. et al	2011	China	Ex=59 Cg=66	≥60 years old	GDS	RT reminisce therapy	Randomized Controlled Trial	NCD	Group reminiscence therapy was effective in reducing symptoms of depression, improving affect balance, and promoting mental health of community-dwelling elderly

First Author	Year	Country	No of sample	Age	Tool	Intervention	Design	Popu-lation	Outcomes
Serrano et al	2012	Spain	Ex=9 Cg=8	Agw 63-82	GDS	life review therapy	Randomized Controlled Trial	CD	Found that life review therapy produced a significant improvement in depressive symptoms and also indicate that specific autobiographical retrieval practice can reduce symptoms of depression in older adult outpatients.
Preschl et al	2012	Switzerland	Ex=20 Cg=16	adults aged 65 and over.	BDI	Life-review therapy(RT)	Randomized Controlled Trial	CD	the results indicate that the life-review therapy in this combined setting could be recommended for depressive older adults
Gallegos et al	2013	Newyork, USA	Ex=100 Cg=100	Mean age 60	HAM-D	MBSR (mindfulness-based stress reduction)	Randomized Controlled Trial	NCD	MBSR improves positive affect for older adults with lower depressive symptom severity
O'Connor, et al	2013	Denmark	Ex=18 Cg=18	65 - 80 years	BDI	Mindfulness-Based Cognitive Therapy	Quasi experimental design	NCD	The study suggests that MBCT may be an effective intervention for reducing symptoms of distress, and especially depressive symptoms, as well as for possibly improving working memory function among elderly bereaved with problematic grief reactions.
Wuthrich	2013	Australia	Ex=27 Cg=35	Aged over 60 years	GDS	group cognitive behavioural therapy	Randomized Controlled Trial	CD	Group cognitive behavioural therapy is efficacious in reducing comorbid anxiety and depression
Gitlin et al	2013	African American	Ex= 106 Cg=102	≥60 years old	CES-D	A multicomponent, home-based intervention	Randomized Controlled Trial	NCD	A home-based intervention delivered by social workers could reduce depressive symptoms and enhance quality of life in older African Americans
Chan et al	2013	Singapore	Ex=14 Cg=12	Aged over 60 years	GDS	Life story -review	Randomized Controlled Trial	NCD	This study supports the life storybook creation process as an effective intervention for depressed older Chinese adults living in the community.
Escolar chua, et al.	2014	Philippines	Exp=20 Cg=20	60 to 80 years	GDS	Third Age Learning Programs	Quasi experimental design	NCD	The results of t tests showed statistically significant group differences between the experimental and control group, with the higher life satisfaction, self-esteem, and lower depression level compared to the control group.
Mallya et al	2015	Canada	Exp=57 Cg=40	≥60 years old	GDS	Mindfulness Training	Randomized Controlled Trial	NCD	The MBSR group would display significant improvements in measures of executive function, episodic memory, mindfulness, mood, self-esteem, and quality of life.

First Author	Year	Country	No of sample	Age	Tool	Intervention	Design	Popu-lation	Outcomes
Xie et al	2017	China	Ex=37 Cg=36	Age over 65	GDS	MBAT- Modified behavioural activation treatment	Randomized Controlled Trial	NCD	BAT produced a significantly greater reduction in depressive symptoms than regular care in rural left-behind elderly.
Lee et al	2017	Taiwan	Exp=11 Cg= 10	≥60 years old	GDS	Exercise	Quasi experimental design	NCD	Exercise can help adults older than 80 to ameliorate depressive symptoms and enhance body balance ability
Ciasca et al	2018	Brazil.	Ex=31 Cg= 25	≥60 years	GDS	Art therapy	Randomized Controlled Trial	CD	Treatment is effective to Reduce depressive and anxiety symptoms
Sadler et al	2018	Australia.	Exp=25 Cg=23	Aged 65 years old or above	GDS	cognitive behavior therapy	Randomized Controlled Trial	CD	Differences between outcomes of the two treatment conditions were not statistically Significant
Siverova et al	2018	Czech Republic	Ex=31 Cg=33	≥60 years	GDS	Reminiscene therapy with narrative approach	Quasi-experimental design	Cog D	Reminiscence therapy can positively affect selected aspects of quality of life, attitudes towards old age, and symptoms of depression in the elderly in long-term healthcare facilities
Ching-Teng et al	2019	Taiwan	Ex= 29 Cg=26	aged 65 years or older	GDS	Art therapy	A quasi-experimental design with random assignment	NCD	The art therapy programs showed promising effects in improving the depression and self-esteem of older adults
Carandan, et al	2020	Philippines,	Ex=65 Cg=68	≥60 years old	GDS	Peer counselling, social engagement combined intervention	Quasi experimental design	NCD	Significant improvements were seen in psychological Resilience, social support. Effective for depression but No interventions, however, significantly improved the loneliness score
Heidari, et al.	2020	Iran.	Ex=45 Cg=45	60-99 years	GDS	Laughter therapy	Quasi experimental design	NCD	Improve the mental status, depression and Quality of life

Note. HAM-D: Hamilton depression rating scale, CES-D: Center for Epidemiologic Studies Depression Scale, GDS: Geriatric depression scale, BDI: Beck depression inventory, MADRS- Montgomery Ashberg Depression Rating Scale, Brief Symptom Inventory-BSI,CD: Clinical depression, NCD: No- Clinical depression, CogD-Cognitive impairment with depression.

Data extraction

Data extracted from included studies. Participant characteristics including age, gender, assessment tool used, intervention, population, study design, etc are recorded for each study. Scores of the standardized measures of depression were also recorded for analysis. Some studies use more than one outcome measure depression questionnaire. To balance similarity in outcome measures of different studies most commonly used depression measure scores are extracted for data analysis. The most commonly used depression questionnaires are GDS- Geriatric depression scale, BDI- Beck depression inventory, CES-D = Center for epidemiologic studies depression scale, and HAM-D- Hamilton depression rating scale. The primary outcome of the study was a change in depressive symptoms by using psychosocial intervention when compared to control conditions. The mean difference between the pretest and the first score point immediately after the intervention was used to assess change in depressive symptoms. Apart from outcome measures number of samples, experimental design, population characteristics, presence of cognitive impairment, and types of the invention for managing depression were coded for subgroup analysis. Summarized the characteristics of included studies are given in Table 2.

Data synthesis and Statistical analysis

All data were analyzed using comprehensive meta-analysis and effect size for outcome measures were reported using hedges g. Efficacy of the intervention outcomes assessed using the mean difference from pre-test to first measured score immediately after the intervention. Secondary and tertiary preventive intervention, relapse prevention intervention, and pharmacological intervention were not considered. Hence Follow-up data were not included for analysis. The effect size is calculated by the standardized mean differences between the experimental group or intervention group and the control group. some studies use control comparison group as weighting list group, treatment as usual group, care as a usual group or placebo comparison group, etc. In quasi one group, the pre-post design used studies, t value, and pre-post differences are used for calculating the effect size. All the statistical analyses are done by using a comprehensive meta-analysis. Some of the studies reported hedges' g value. In such cases, comprehensive meta-analysis software is used to confirm the reported effect size value. Effect sizes were calculated using standardized mean differences using hedges 'g'. A hedge's g of 0.2, 0.5, 0.8 represents a small, medium, and large effect size, respectively. To assess the degree of statistical heterogeneity between studies, the Q and I-squared statistics were computed. A value of 0% indicates no observed heterogeneity, while higher values

indicate increasing heterogeneity, with 25% indicating low, 50% indicating moderate, and 75% indicating higher heterogeneity (Higgins et al., 2003). Two-tailed P values of <0.05 were used to define statistical significance.

Conducted sub-group analyses of studies based on whether participants in clinical population, normal population such as community-dwelling older adults with depression symptoms and depression with cognitive impairment. The study also analyzes whether the differences in effect size are based on the type of psychosocial intervention, and the type of experimental design used. Subgroup analysis was performed according to the mixed effect model, that pooled studies within subgroups with the random-effects model, but tested for significant differences between subgroups with the fixed effects model

Publication bias is assessed through funnel plot, Egger test, and Begg and Mazumdar rank correlation test. Orwin's fail-safe number was used to calculate the number of unpublished nonsignificant studies required to reduce the overall significant effect to non-significance (Orwin,1987). Trim and fill are methods for adjusting the pooled effect size to account for the results of missing studies.

Results

The study aims to find out the effectiveness of different psychosocial interventions in older adults for reducing depression and which intervention technique is more effective based on the published study result. For comprehensive meta-analysis 36 studies are included from a different database. Overall, 4148 subjects were included for analysis, among them, 2224 participants were in the intervention group and 1924 participants in control groups. All 34 studies have at least two groups, one group as an intervention group and another group as a control group. Most of the studies are RCT and a few of them are Quasi-experiment. Out of 36 studies, two studies are carried out using quasi one group pre-post design.

The types of intervention included are Cognitive behaviour therapy, Behavioural activation therapy, Dialectical behaviour therapy, Art therapy, Laughter therapy, Bibliotherapy, Interpersonal psychotherapy, Life review or reminiscence therapy, Mindfulness-based intervention such as mindfulness-based cognitive therapy (MBCT), and mindfulness-based stress reduction training (MBSR). and other psychosocial interventions such as Exercise, Third age learning programs, Peer and social engagement intervention, (PI) Primary care intervention, (COMET) Competitive memory training, (MPI) Minimal psychological intervention, (CWD) Coping with depression course, A multicomponent home-based intervention. Table

3 shows, overall effect size value, and figure 2 show the forest plot of each 36 selected studies.

Table 3. Result of A Meta-Analysis Examining Overall Effect Size

Analysis	No. of studies	Effect size			Heterogeneity			
		Hedge's g	95% CI	p-value	Q-value	p-value	I^2	Tau^2
Main effect	36	1.118	0.835-1.402	0.0001	797.309	0.0001	95.610	0.668

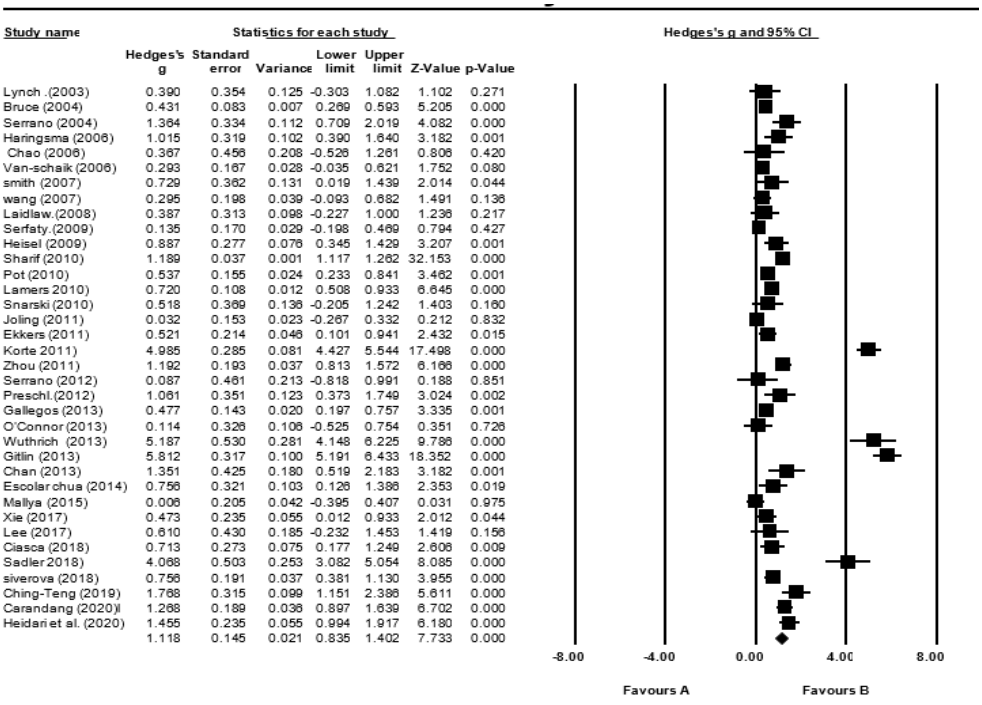

Figure 2. Forest plot of effect on psychosocial intervention for depression in older adults

The mean overall effect size (Hedge's g) of the psycho-social intervention on depression was found to be g=1.118 (95% CI: 0.835-1.402) which is significantly large. From the above forest plot, it is clear that four studies show a very high effect size compared to other studies, and it's above 4. Overall, the pooled analysis shows that psychosocial intervention had a strong and statically significant effect on reducing depression symptoms. The assessment for heterogeneity was determined using the Q statistic. In test for heterogeneity (Q value = 797.309, I square = 95.610, tau square= .668). A high Heterogeneity value indicates that the variation in effect

size between studies was caused by a large amount of heterogeneity rather than a random error.

Subgroup analysis

A series of subgroup analyses were performed to investigate potential sources of heterogeneity. There was sometimes a significant impact on the effect sizes and heterogeneity levels of the subgroups.

The study focused on three major subgroups for analysis, it includes moderating effect of different intervention types, moderating effect of selected experimental design in a study, and moderating effect of the sample population.

Moderating effect of intervention

The analyses of moderating effect of intervention provide the effect size of studies for different intervention types. Figure 3 shows the forest plot and Table 4 shows the result of moderating effect of intervention type by using subgroup analysis.

Table 4. Result of Subgroup Analysis
Showing the Moderating Effect of the Intervention

		Effect size			Heterogeneity			
Subgroup based on intervention	**No.**	**Hedge's g**	**95% Cl**	**p-value**	**Q value**	**p-value**	**I^2**	**Tau^2**
Art therapy	2	1.247	0.197-2.296	0.020	6.403	0.011	84.382	0.484
Behaviour activation therapy	2	0.493	-0.099-0.888	0.014	0.015	0.901	0.000	0.000
Bibliotherapy	1	0.032	-0.268-0.333	0.832	0.000	1.000	0.000	0.000
Cognitive behavioural therapy	4	2.432	0.250-4.613	0.029	127.973	0.0001	97.656	4.788
Dialectical behaviour therapy	1	0.400	-0.311-1.111	0.271	0.000	1.000	0.000	0.000
Interpersonal psychotherapy	2	0.569	-0.049-1.187	0.002	3.598	0.058	72.206	0.146
Laughter therapy	1	1.468	1.002-1.933	0.0001	0.000	1.000	0.000	0.000
Mindfulness-based intervention	3	0.247	-0.088-0.582	0.149	3.873	0.144	48.355	0.042
Other psycho-social intervention	8	1.390	0.59-2.189	0.001	279.491	0.0001	97.495	1.253
Reminiscence therapy	12	1.190	0.676-1.705	0.0001	230.528	0.0001	95.228	0.728

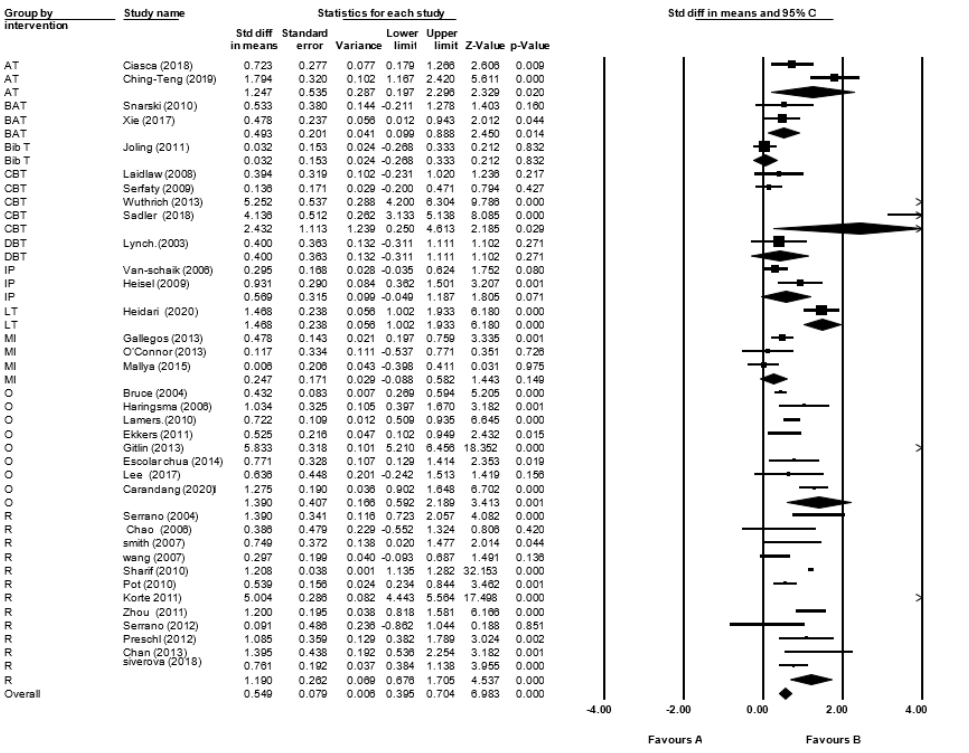

Figure 3. Forest plot of Moderating effect of psycho-social intervention for depression in older adults

Moderating analysis reveals that out of 10 intervention categories. Cognitive behaviour therapy shows a high effect size. Four trials used cognitive behaviour therapy as a treatment method and analyzed effect size showed high value (Hedge's g= 2.432). Here the variation in the lower limit (0.250) and upper limit (4.613) is very high. In cognitive behaviour therapy studies, two of them show low effect size and two of them show very high effect size. Art therapy, life review reminiscence therapy, and laughter therapy show a higher effect size compared to other intervention techniques. Laughter therapy shows the next higher effect size (Hedge's g= 1.468). but only one trial used laughter therapy intervention hence the heterogeneity is low. Reminiscence therapy also shows a higher effect size (Hedge's g=1.190). Compared to other interventions reminiscence therapy reported studies are more in this last 20 years period. Two trials used art therapy intervention, showing a high effect size (Hedge's g= 1.247). Behaviour activation therapy, bibliotherapy,

dialectical behaviour therapy, interpersonal psychotherapy, and mindfulness-based intervention show a low effect size compared to other psychotherapy and psycho-social interventions. For, computing effect size of psychosocial intervention we included all the 8 psycho-social interventions such as exercise, Third Age Learning Programs, Peer and social engagement intervention, (PI) Primary care intervention, (COMET) Competitive Memory Training, (MPI) minimal psychological intervention, (CWD) coping with depression course, A multicomponent home-based intervention in a single group as other psychosocial intervention. The overall effect size of other psychosocial interventions was found to be high value (Hedges's g= 1.390) and in the test for heterogeneity (Q value =279.491, I square =97.495. tau square=1.253) High Heterogeneity value shows that, the between studies variability in effect size. In the florest plot of moderator analysis, it is clear that primary care intervention (PI) effectiveness is low compared to other psycho-social interventions. A multicomponent home-based intervention shows a very high effect size. Peer and social engagement intervention, and (CWD) coping with depression course also show high effect size, and its effect size score is found to be above one. All other psych-social intervention shows a moderate level of effectiveness.

Moderating effect of the sample population

Analyzing the moderating effect of a subgroup based on sample population's depression level and characteristics, after classifying three groups as studies of clinical population trial, normal population with depression symptoms and depression with cognitive impairment. Table 5shows the result of moderating effect of subgroups based on a sample population and Figure 4 shows the forest plot on moderating analysis.

Table 5. Result of Subgroup Analysis
Showing the Moderating Effect of Severity of Depression

Sub group-based sample population	No. of studies	Effect size			Heterogeneity			
		Hedge's g	95% Cl	p-value	Q value	p-value	I^2	Tau^2
Clinical population	16	1.296	0.761-1.832	0.0001	377.469	0.0001	96.026	1.088
Normal population	18	1.088	0.687-1.490	0.0001	368.439	0.0001	95.386	0.673
Depression with cognitive impairment	2	0.532	0.077-0.986	0.022	2.806	0.094	64.361	0.069

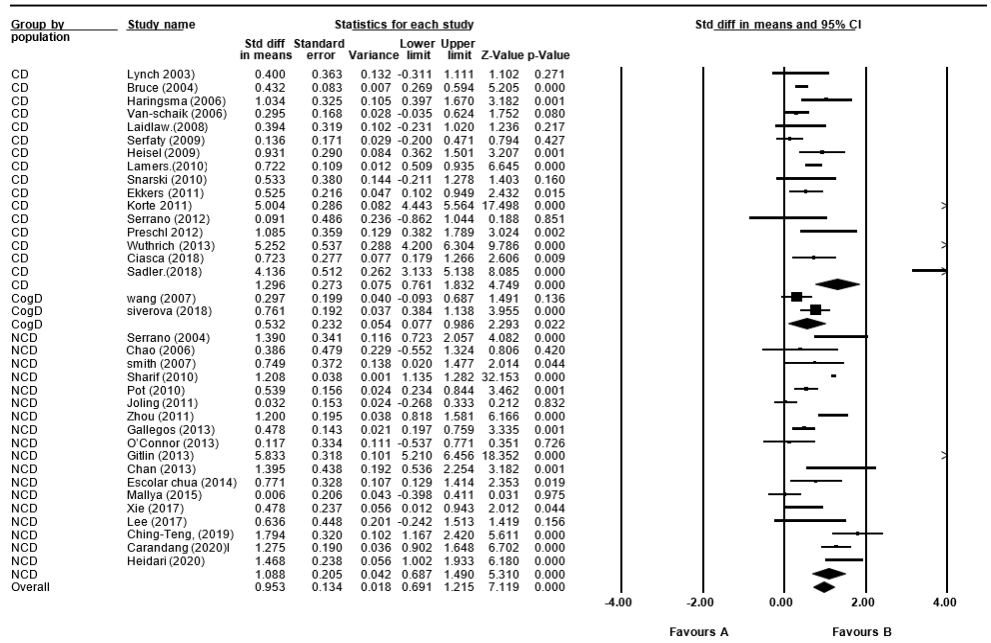

Figure 4. Forest plot on Subgroup analysis-based on sample population's depression level

Results show that out of 36 studies, 16 studies were conducted in the clinical population, 18 studies used non-clinical population but had depression symptoms, and two studies were conducted in depression with cognitive impairment group. The moderator analysis reveals that the effect size was found to be higher for the clinical depression subgroup (Hedge's g=1.296) compared to the non-clinical population (Hedge's g=1.088) and depression with cognitive impairment (Hedge's g=0.532). The heterogeneity value was also found to be very higher for the clinical population and non-clinical population compared to the depression with cognitive impairment subgroup.

Moderating effect of selected experimental design

From the selected studies, 27 studies were RCT, 7 studies were quasi-experimental design with two groups, 2 studies used quasi-experiment with one group pre-post design, and no control group is included in these two studies. Except for two studies, other studies have both control group and experimental group for comparing the intervention effectiveness. Table 6 shows the Result of subgroup analysis on moderating effect of experimental design and figure 5 portrait forest plot.

Table 6. Result of Subgroup Analysis
Showing the Moderating Effect of Experimental Design

Sub group-based design	No. of studies	Effect size			Heterogeneity			
		Hedge's g	95% CI	p-value	Q value	p-value	I^2	Tau^2
Randomized control trial	27	1.210	0.799-1.621	0.0001	689.711	0.0001	96.230	1.099
Quasi experimental design	7	0.975	0.566-1.383	0.0001	22.778	0.001	73.659	0.209
One group pre-post design	2	1.204	1.131-1.277	0.0001	0.895	0.344	0.000	0.000

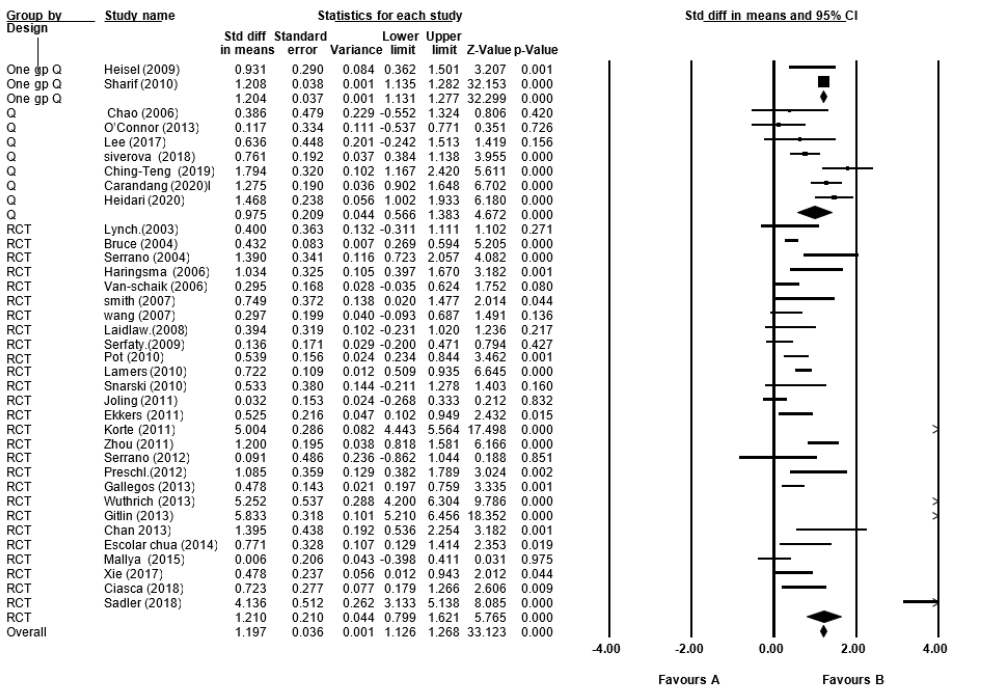

Figure 5. Forest plot on Moderating effect of experimental design

Results of moderator analysis reveal that effect size was found to be higher for quasi one group pre-post design (Hedge's g=1.204), and randomized control trial (Hedge's g=1.210) compared to a quasi-experimental design with two group designs (Hedge's g=0.975). but almost all subgroup shows a higher effect size irrespective

of the selected experimental design. The heterogeneity value was also found to be very higher for the subgroup with the greater number of studies.

Publication Bias Assessment

Funnel plots were used to assess publication bias and the possibility of study bias. When there is no publication bias, the observed studies should be distributed symmetrically around the pooled effect size in a funnel plot. The examination of the funnel plot presented in figure 6, revealed no risk of publication bias for reviewed studies related to depression.

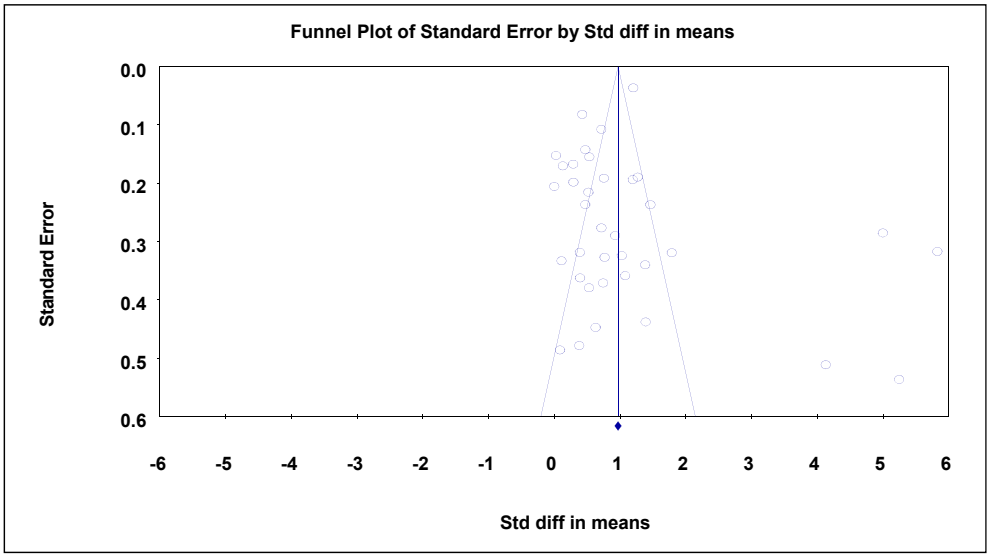

Figure 6: Funnel plot of standard error by Hedges's g

The funnel plot revealed no evidence of significant publication bias. Egger's test of the intercept was also not significant (intercept: 0.24331; 95% CI: -2.24~2.73; p=0.84). Duvall and Tweedie's trim and fill procedure indicated that no studies were missing and hence effect size have no significant change and it is g=0.96968 (95% CI: 0.91882~1.02054). According to Egger's test (p= 0.84335), and Duvall and Tweedie's trim and fill procedure, no studies were trimmed and hedges g shows no significant change. The Begg and Mazumdar rank correlation test also suggests a low risk of publication bias and it is significant at 0.01 level for the reviewed depression studies.

Discussion

The main objective of this meta-analytic evaluation was to directly investigate whether psychosocial interventions are useful in treating depression in older persons**.** Overall, 36 studies are selected for data analysis. Different prominent psycho-therapy and eight other psycho-social intervention studies are included for the meta-analysis. Comprehensive meta-analysis results reveal that cognitive behaviour therapy is the most effective psychotherapeutic treatment for depression. Cognitive behaviour therapy (CBT) is a well-known multicomponent treatment method that combines educational, cognitive, and behavioural interventions. Wuthrich (2013) and Sadler (2018) studies show a very high effect size value. Wuthrich et al., (2013), in their study, give importance to both depression and anxiety symptoms. The session includes psycho-education, cognitive restructuring, problem-solving, graded exposure, sleep hygiene, and assertiveness training, which is a core skill for anxiety treatment, as well as an activity schedule, which is a core skill for depression treatment. They also concentrated on issues pertinent to this stage of life, such as physical disability, dementia fear, bereavement, and loneliness. Sadler et al., (2018) use cognitive behaviour therapy standards and advanced for comparing the effectiveness of the treatment. The advanced CBT intervention was identical to the standard CBT intervention, but it included three additional CBT strategies some of which were specifically targeted to depression symptoms: daily positive activity scheduling, cognitive reframing or cognitive restructuring exercises (thought diaries), and positive affirmations exercises that used positive data logs and cue cards to increase hopefulness. Hence it may be the reason for the high effect size value in advanced cognitive behaviour therapy. But compared to other prominent psychotherapy, it is clear that cognitive behaviour therapy is the most prominent and well apt treatment for depression.

Art therapy, Reminiscence therapy, and Laughter therapy also show effectiveness for managing depression. Ciasca et al (2018), Ching-Ten et al., (2019) shows the effectiveness of art therapy. Art therapy interventions are effective in the management of depression and the improvement of self-esteem. Like art therapy, another expressive therapy such as laugher therapy also shows a high effect size value. Heidari et al., (2020) focus on depression and the quality of life of older adults. Laughter therapy was conducted in each session by playing musical or visual slides, humorous video clips, and also holding joyous games with a sense of humour or joke-telling, etc. Overall, from the study, it is clear that laughter therapy is one of the treatment alternatives for depression.

Overall, 12 studies use reminiscence therapy as an intervention to manage depression. All most all the studies show the efficacy of reminiscence therapy for

depression in older adults. It includes life story review, reminiscence therapy with a narrative approach, etc. Reminiscence intervention is mainly focusing on cognitive aspects. Reminiscence therapy sessions were conducted using memory triggers such as home goods, old photographs, old-time music, old-time food flavours and other familiar items from the past etc. Based on the above findings, it is clear that reminiscence therapy is one of the effective intervention alternatives for the management of depression in older adults, quite apart from cognitive impairments related to dementia and Alzheimer's diseases. Korte et al., (2011) study on the life story review shows a very high effect size value similar to cognitive behaviour therapy intervention studies conducted by Wuthrich et al., (2013). The intervention consists of three main components. First, participants integrate difficult life events from the past; Second, they create life stories that help people cope with current circumstances and set new goals; third, they collect specific positive experiences that can be used to create new life stories. The first two components were created by incorporating a life review into narrative therapy. Narrative therapy facilitates the restoration of a sense of purpose in life. As a result, there is ample space for clients to experiment with different stories and preferences. In addition, therapists may ask questions that aid in the construction of alternative stories about negative life events. Clients are also consistently encouraged to express their beliefs, memories, or past experiences by comparing them to identity and future goals, and alternative stories are further extended by relating them to identity, future goals, and activities. During the intervention sessions, the participants were allowed to focus on new alternative stories, possibilities, and opportunities to exchange their experiences with the other participants, which may increase the therapeutic intervention's effectiveness in the treatment of depression in older adults.

Apart from prominent psychotherapy studies also analyses the effectiveness of other psychosocial interventions in the elderly. The study includes 8 interventions for this category. All the eight psychosocial interventions were grouped as other psychosocial interventions for examining effect size. Exercise, Third age learning programs, Peer and social engagement intervention, (PI) Primary care intervention, (COMET) Competitive memory training, (MPI) minimal psychological intervention, (CWD) Coping with depression course, A multicomponent home-based intervention is the selected psycho-social intervention based on the published studies. All together these psychosocial intervention shows an above-average effect size. Among them coping with depression course, Peer counselling with social engagement combined intervention and multicomponent home-based intervention shows higher effectiveness for managing depression compared to other psychosocial interventions. The course content for coping with depression is based on a social learning perspective of depression. Relaxation, pleasurable activities, social skills,

constructive thinking, and maintaining functional outcomes are some of the skills taught in the coping with depression intervention course. Peer counselling with social engagement combined intervention includes individual-focused counselling and social engagement activities such as 15–20 minutes dancing, group discussion, group activity, educational talk, games, and karaoke etc. Overall, both coping with depression course and peer counselling with social engagement focus not only on depressive symptoms but also on social relationship skill-building activities. Hence this intervention may enable older adults to expand their social network and enhance active social participation. Multicomponent home-based intervention is also called BTB (beat the blue) intervention. It consists of five interconnected components: care management, referral or linkage, depression symptom recognition, stress reduction techniques, and behavioural activation techniques. The goal of a home-based intervention activity is to manage chronic conditions, socialize, exercise, address unmet care needs, prepare family meals, travel, and attend classes. As a result, focusing on different areas may be the reason for the increased effectiveness of home-based intervention in managing depression.

To present study also examine the differences in the efficacy of the psycho-social intervention in a clinical population, non-clinical population but having mild depression symptoms, and the presence of cognitive impairments with depression symptoms. 16 studies are done in a clinical population and 18 studies are done in a non-clinical population such as community-dwelling older adults and institutional older adults. 2 studies are conducted in cognitively impaired depressed older adults. Both clinical population subgroup and non-clinical population subgroup show the effectiveness of intervention compared to depression with cognitive impairment. The clinical population sub-group shows a very higher effect size value. Clinical population groups include hospital patients and care center patient groups having clinical diagnoses with major depressive disorder and severe depression. Non-clinical normal population groups include community-dwelling older adults and institutionalized older adults but having depression symptoms by analyzing scores on any depression rating scale. Leger effect size in non-clinical depression may not be visible mainly because depression symptoms are already low range related to the clinically depressed group. significant improvement is, therefore, cannot be observable for non-clinical populations compared to psychological intervention for the treatment of clinical depression. Depression with cognitive impairment group shows moderate effect size only. Hence it is clear that cognitive impairment may influence the intervention's effectiveness. By analysing the population and intervention it is also clear that reminiscence therapy is the most commonly used effective intervention for cognitively impaired older adults with depression.

The study also examines differences in the efficacy of these interventions based on selected experimental design. Randomized control group, quasi-experimental two-group design, and quasi-experimental one-group pre-post studies were also included for the present study. After analyzing each experimental design separately, it is clear that one group pre-post design shows a higher effect size than quasi-experimental study with both control and experimental group. But randomized control trial also shows a high effect size. So, it is clear that experimental design selection does not play changes in the effect size of the intervention. No significant moderating effect was identified. Publication bias assessment revealed no risk for reviewed studies.

Strength and Limitation

To examine the effectiveness of psychosocial intervention for managing depression in the older adult current study uses a large number of eligible studies as per systematic searching and PRISMA guidelines. The studies from different countries have been included and all the collected studies are analyzed only after the detailed evaluation of methodological quality by using Cochrane criteria. Heterogeneity test, subgroup analysis, and publication bias were also performed for the current study. But this study is limited to English language journal articles only and this makes automatically excludes any studies that might have been reported in the non-English language. The studies were collected mainly from a few databases including Ebsco, Google Scholar, Elsevier, PubMed, Springer, J-store, ProQuest, and Psy Info. Various other databases also could be included to widen the search.

Summary & Conclusion

The aim of the study was to examine the efficacy of psychosocial treatments for the management of depression in older people and also to investigate whether there are any differences in the efficacy based on intervention type, selected design, depression severity and population characteristics. Searched the different databases and followed PRISMA guidelines for selecting studies. Comprehensive metanalysis software is used to analyse the collected data. subgroup analyses were also performed to investigate potential sources of heterogeneity. Meta-analysis result shows that psychotherapy and other psychosocial intervention are effective in reducing depression in older adults. Cognitive behaviour therapy is a very effective treatment for managing depression among older adults. Art therapy, Reminiscence

Therapy, Laughter therapy are also effective in reducing depression in older adults. Apart from prominent psychotherapy other psycho-social intervention also shows comparatively good effect size. Bibliotherapy and occupational therapy show less effective therapy compared to other psychosocial interventions based on the published studies in the last 20 years. The study also provides light on the effectiveness of psychological intervention in both clinically diagnosed depression and the person with no clinically significant depression but having depression symptoms. The person struggling with age-related cognitive impairment combined with depressive symptoms shows a moderate effect size compared to depressed older adults without cognitive impairment. Subgroup analysis for comparing studies with different experimental designs shows no significant difference in effect size.

Disclosure statement

The authors have no potential conflict of interest to disclose.

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