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Theeffectsofbibliotherapyonthementalwell-beingofinformal

caregiversofpeoplewithneurocognitivedisorder:Asystematic

reviewandmeta-analysis

ShanshanWanga,b,DanielThomasBressingtona,AngelaYeeManLeunga, PatriciaM.Davidsonc,DaphneSzeKiCheunga,∗

a*SchoolofNursing,TheHongKongPolytechnicUniversity,HungHom,Kowloon,HongKongSAR,China* b*SchoolofNursingandHealth,ZhengzhouUniversity,#101ScienceAvenue,Zhengzhou,China,450001* c*SchoolofNursing,JohnsHopkinsUniversity,525N.WolfeStreet,Baltimore,Maryland,UnitedStates,21205*

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| articleinfo | abstract |
| *Articlehistory:*  Received22November2019  Receivedinrevisedform29April2020 Accepted8May2020 | *Background:*Thenumberofpeoplewithneurocognitivedisorderisincreasing,andthemajorityofthem arecaredforbyinformalcaregiversinthecommunity.Mentalhealthproblemsarecommonamongcare-givers,however,professionalsupportforthemisoftenlimited.Non-pharmacologicalself-helpinterven-tions,suchasbibliotherapy,mayimprovementalwell-beingandhasthepotentialforbeingintegrated |
| *Keywords:*  Bibliotherapy  caregiver  meta-analysis  mentalhealth  neurocognitivedisorder systematicreview | intoclinicalorsocialservices.  *Objectives:*Toexplorewhattypesofbibliotherapyhavebeenusedforimprovingthementalwell-being ofinformalcaregiversofpeoplewithneurocognitivedisorders,andtheeffectonmentalwell-beingout-comes.  *Design:*Asystematicreviewandmeta-analysis.  *Reviewmethods:*SixdatabasesweresearchedforrelevantarticlesonJuly1,2019.Clinicaltrialregistries andthereferencelistsofincludedstudieswerealsosearched.Bothrandomizedcontrolledtrialsand |

quasi-experimentalstudieswereincluded.TheCochraneCollaborationriskofbiastoolforrandomized controlledtrialswasusedtoassessthequalityofstudies.ReviewManager5.3wasusedtoanalyzedata, standardizedmeandifference(SMD)and95%confidenceinterval(CI)wereusedtoestimatethepooled treatmenteffect.Randomeffectsmodelswereusedformeta-analyses.Funnelplotwasnotperformeddue tothelimitednumberofstudies.ThissystematicreviewwasregisteredatPROSPERO(CRD42019129152). *Results:*Ninerandomizedcontrolledtrialswith1036informalcaregiverswereincluded.Mostofthein-cludedstudieshadsomeaspectsofbias.Threetypesofbibliotherapywereused.Bibliotherapyhadasig-nificantpooledmediumtolargeeffectonreducingdepressionatZ=1.99(SMD=-0.74,95%CI=-1.47to-0.01,*p*=.05),however,theheterogeneitywashigh(I2=94%).Forthesubgroups,onlythevideo-based bibliotherapysignificantlyreduceddepressionatZ=2.78(I2=83%,SMD=-2.11,95%CI=-3.6to-0.62, *p*=.005).Bibliotherapyhadasignificantsmalltomediumeffectoncaregiver’sself-efficacyfordealing withproblembehavioursatZ=2.44(I2=0,SMD=0.36,95%CI=0.05to0.67,*p*=.02),however,the effectonself-efficacyforobtainingrespitewasnotsignificant(I2=0,SMD=0.17,95%CI=-0.16to0.49, *p*=.32).TheeffectondecreasingstateanxietywassignificantatZ=2.30(I2=22%,SMD=-0.22,95% CI=-0.41to-0.33,*p*=.02).

*Conclusions:*Bibliotherapyshowedpositiveeffectsonreducingdepression,improvingself-efficacyfor dealingwithproblembehaviorsandreducinganxietyamonginformalcaregivers.Theeffectsonreduc-ingdepressionshouldbeviewedwithcautionduetohighheterogeneity.Theeffectsonothermental well-beingoutcomesareinconclusiveduetolimitednumberofstudiesandthisunderscorestheneed forfurtherresearch.

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∗ Correspondingauthor:DaphneSzeKiCheung,RoomGH526,SchoolofNursing,HongKongPolytechnicUniversity.

*E-mailaddresses:*[shanshan.wang@connect.polyu.hk](mailto:shanshan.wang@connect.polyu.hk)(S.Wang),[dan.bressington@polyu.edu.hk](mailto:dan.bressington@polyu.edu.hk)(D.T.Bressington),[angela.ym.leung@polyu.edu.hk](mailto:angela.ym.leung@polyu.edu.hk)(A.Y.M.Leung), [pdavidson@jhu.edu](mailto:pdavidson@jhu.edu)(P.M. Davidson), [daphne.cheung@polyu.edu.hk](mailto:daphne.cheung@polyu.edu.hk)(D.S.K. Cheung).

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| *Socialmedia:* |  | (S.Wang), |  | (A.Y.M.Leung), |  | (P.M.Davidson) |

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**Whatisalreadyknownaboutthetopic?**

• Thementalwell-beingofinformalcaregiversofpeoplewith neurocognitivedisorderisofconcern.

• Differentkindsofbibliotherapyhavebeenusedwithinformal caregiversofpeoplewithneurocognitivedisorderssuggestinga potentiallyaccessible,lowcostintervention.

• Previousstudiessuggestthatbibliotherapymightimprove thewell-beingoutcomesofinformalcaregivers.However,the strengthofrecommendationisinconclusive.

**Whatthispaperadds**

• Threekindsofbibliotherapy,i.e.,thewrittenmaterialbased, video-basedandweb-basedbibliotherapy,havebeenused amonginformalcaregiversofpeoplewithneurocognitivedis-orders.

• Bibliotherapyhadsignificantpooledeffectsonimprovingde-pression,self-efficacyfordealingwithproblembehaviors,and stateanxiety.

• Duetothelimitednumberofstudies,thepooledeffectofbib-liotherapyonothermentalwell-beingoutcomeswasinconclu-sive,yetworthexploring.Morerigorouslydesignedlargescale randomizedcontrolledtrialsareneeded.

Non-pharmacologicalinterventionshavebeendevelopedfor informalcaregiversofneurocognitivedisorder.Severalsystematic reviewsforinformalcaregivershavebeenpublished(Kwon,Ahn, Kim,&Park,2017;Thompsonetal.,2007).Psychoeducationalap-proacheshavebeenfoundtobemosteffectiveinreducingnegative mentalwell-beingoutcomes(i.e.,depression)andincreasingposi-tivewell-beingoutcomes(i.e.,caregiversatisfactionandsubjective well-being).However,theseeffectswerereportedininterventional studiesthatinvolvedactiveparticipationandbehaviormanage-mentskills-building(Pinquart&Sorensen,2006).Psychotherapy hasalsobeenwidelyused,however,thistendstohavedomain-specificeffects,suchasreducingcaregivingburdenandimproving subjectivewell-being(Pinquart&Sorensen,2006).Respitecare wasnoteffectiveinreducingcaregiver’sdepressionandanxiety (Maayan,Soares-Weiser,&Lee,2014).Supportgroupsledbypro-fessionalswerealsoshowntobeeffectiveinimprovingcaregiver mentalwell-being(Piersoletal.,2017),butboththeinvolvement ofprofessionalsandpeersarerequired,whichwouldlimitthedis-seminationtocaregiverswhohavelimitedaccesstoprofessional andsocialsupport.Acomprehensivereviewofseveralsystematic reviewssuggestedthatfutureinterventionsshouldbetailored,and especiallyshouldhavethepotentialforbeingintegratedintoclini-calorsocialservicepractices(Gitlin&Hodgson,2015).Inaddition,

**1.Introduction**  apartfromlimitedhumanresourcesinreallifesettings,caregivers

alsofacefinancialburdenscausedbythelong-termcare(Leszko,

Neurocognitivedisorderisageneraltermdescribingaspectrum ofconditionsthatleadtoanimpairmentofcognitivefunctions, includingmemoryproblems,difficultyinunderstanding,behavior change,andtroublewithperformingdailyactivities.Neurocog-nitivedisorderiscausedbyphysicalormedicaldiseasesrather thanpsychologicalillnesses.ThefiftheditionoftheDiagnosticand StatisticalManualofMentalDisordersdefinesneurocognitivedis-orderintothreetypesofsyndromes:delirium,mildandmajor neurocognitivedisorder(AmericanPsychiatricAssociation,2013). Specifically,neurocognitivedisordermaybeduetodeliriumcaused bymultiplereasons:traumaticbraininjury,Alzheimer’sdisease, vasculardisease,Lewybodydisease,frontotemporallobardegen-eration,HIVinfection,Huntingtondisease,Parkinsondiseaseand Priondisease(Sachdevetal.,2014).Forthemajorityofthetime, individualswithneurocognitivedisorderarecaredforbyinfor-

2019).Inthisregard,pragmaticcost-effectiveself-helpapproaches whichrequireminimumprofessionalinvolvementhavegreat potentialinreallifesettings.Bibliotherapyissuchanintervention.

Bibliotherapyisaself-helpnon-pharmacologicalintervention requiringminimuminvolvementofprofessionals.Originally,it usedguidedreadingofwrittenmaterialstosolveproblems relevanttoanindividual’sdevelopmentalortherapeuticneeds (Riordan&Wilson,1989).Withthedevelopmentoftechnology, othermediumshavebeenutilized.Thedefinitionofbibliotherapy wasthereforedevelopedinto“theuseofwrittenmaterialsorcom-puterprograms,orthelistening/viewingofaudio/videotapesfor thepurposeofgainingunderstandingorsolvingproblemsrelevant toaperson’sdevelopmentalortherapeuticneeds” (Marrs,1995,p. 846).Theformatsofaudios,videos,computers,andwebsiteshave becomeincreasinglypopularinrecentyears(Xin,Chen,Jin,Cai,&

malcaregiverswithincommunity/homesettings(Chietal.,2019). Feng,2017).

Althougheachtypeofneurocognitivedisorderhasitsownfea-tures,thecommonalityofsymptomsoftenleadtosharedcaregiv-ingsituations,feelingsandexperiencesfortheinformalcaregivers

Althoughmanyformsofbibliotherapyexist,problem-focused approachesthatutilizecognitive-behavioraltechniqueshave receivedmuchempiricalattention(Harwood&L’abate,2010).

(Agronin,2015). Bibliotherapyhasalsobeenregardedasapragmaticeconomical

Informalcaregiversarenon-professionalcaregiverswhoprovide unpaidcareforpeoplewithcaregivingneeds(Roth,Fredman,& Haley,2015).Theyarethebackbonesofthehealthandsocialcare systemworldwide.Withlimitedcognitivefunctions,peoplewith neurocognitivedisorderaredependentontheircaregiverstosur-vive.Caregivingforapersonwithaneurocognitivedisordercanbe afull-timejob,rangingfrompersonalcaretobehavioralsymptoms managementtodecisionmaking.Infaceofthecomplexneuropsy-chiatricsymptomsofneurocognitivedisorder,informalcaregivers shouldbeprovidedwithtrainingandsupport.However,theed-ucationandsupportfromthehealthinstitutionsdoesnotalways meetcaregivers’needs(Wang,Cheung,&Leung,2019).Duetothe socialstigmaofneurocognitivedisorder,somecaregiversarereluc-tanttoseekhelpandmentalhealthproblemshavebeenfoundin almosthalfofthem,suchasdepressionandpsychologicaldistress (Borsjeetal.,2016),andanxiety(Louetal.,2015).Astudyhasalso foundthatworsecaregivermentalwell-beingpredictsgreaterpa-tientmortality(Lwi,Ford,Casey,Miller,&Levenson,2017).There-fore,interventionsforimprovingthementalwell-beingofinfor-malcaregiversofneurocognitivedisorderareessentialforboththe caregiver’sandcare-recipient’shealth.

treatmentthattypifiesanewwaytodelivercognitivebehav-ioraltherapyinclinicalsettings(Hogdahl,Birgegard,&Bjorck, 2013).Alternativeapproachesareunderpinnedbythepsychody-namicmodelforbibliotherapy,whichisoftenusedincreative formsoftheinterventionandincludesthreeprogressivestages: identification,catharsisandinsight(Shrodes,1949).Byread-ing/listening/watchingthedesignatedmaterials,theclientsare guidedtoidentifytheirdistortedthinking,haveemotionalre-lease,andgenerateinsightsintotheirownsituation.Thesestages promotegreaterawarenessofrealisticwaystoreframetheir experiences,andfinallymotivatethemtodeveloppositivefeelings andattitudes(McKenna,Hevey,&Martin,2010).Duringthis process,theindividuals’self-efficacyinmanagingandcopingwith specificchallengesisalsoenhanced,resultinginimprovements intheiremotionalwell-being.Althoughtheself-helpapproach inbibliotherapyhasmainlyadoptedcognitivebehavioraltherapy techniques,itdiffersfromtheoriginalface-to-facemodelinterms ofbeingprimarilyself-administered,i.e.,cognitivebehavioralther-apyisaprocessofcollaborationbetweenthetherapistandthe clienttoidentifymaladaptivebeliefs,gatherrelevantinformation onbeliefsandbehaviors,andmodifybeliefs(Beck,1979).Whereas,

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bibliotherapydoesnotrequireintensivecollaborationbetweenthe *3.3.Inclusionandexclusioncriteria*

clientsandtherapists,therolesoftherapistsareauxiliary(Floyd,

2003). Randomizedcontrolledtrialsandquasi-experimentalstudies

Bibliotherapywasoriginallydevelopedfortreatingdepression, andhasbeenusedamonginformalcaregiversinrecentyears (Chien,Thompson,Lubman,&McCann,2016).Theefficacyofbib-liotherapyforinformalcaregivershasbeenevaluatedbyarangeof differentstudies.Itwasdemonstratedtobeeffectiveinimproving thecaregivingexperiencesofinformalcaregiversofpeoplewith psychosis(Chien,Thompson,etal.,2016),aswellastheresilience ofcaregiverswhocareforapersonwithdepression(McCann, Songprakun,&Stephenson,2017).Studiesusingbibliotherapyfor improvingthementalwell-beingofinformalcaregiversofneu-

(e.g.,pre-test,post-test,andnon-equivalentcomparisongroup studies)thatadoptedindividualbibliotherapyasamaininterven-tioncomponentforcaregivers,andmeasuredtheeffectivenessof it,andwritteninEnglishwereincluded.Conferencepaperswith abstractonlyandinformationpublishedinlettersorbookswere excludedbecausetheywouldnotprovideenoughreliabledatafor analysis.Forpublishedpaperswithnofull-textonline,thefull-text wasrequestedbyemailingthecorrespondingauthor.Theother studyinclusioncriteriawereoutlinedfollowingthepopulation,in-tervention,comparator,outcomesandsetting(PICOS)formatas

rocognitivedisorderhavealsobeenconducted.However,different follows: kindsofbibliotherapyhavebeenusedwithinformalcaregivers,   
thestrengthofevidenceisunclear,andtodatenosystematicre- *3.3.1.Population*

viewhasbeenpublished.Therefore,weconductedasystematicre-viewandmeta-analysistodeterminewhatkindsofbibliotherapy havebeenusedamonginformalcaregiversofneurocognitivedis-order,andcalculatetheeffectsizeofbibliotherapyonthemen-talwell-beingofinformalcaregiversofpeoplewithneurocognitive disorder.ThePreferredReportingItemsforSystematicReviewsand Meta-Analyseschecklistwasusedtoguidethissystematicreview (Moher,Liberati,Tetzlaff,&Altman,2009).

Thestudypopulationconsistedofinformalcaregiversaged18 yearsorabovewhoareresponsibleforassistingwithactivitiesof dailylivingandsupportingthecare-recipientwithneurocognitive disorder.Inordertoensurethecomprehensivenessofliterature retrievalandascertainwhatkindofpsychologicalwell-beingout-comeshavebeenstudied;nospecificexistingmentalhealthprob-lemsweresetasaninclusioncriterionforthepopulation.Study populationswhowereprofessionalorpaidcaregivers,including nursesordomestichelperswereexcluded.

**2.Objectives**  *3.3.2.Intervention*

Reviewquestions:

• Whatkindsofbibliotherapyinterventionshavebeenusedfor improvingthementalwell-beingofinformalcaregiversofpeo-

plewithneurocognitivedisorder?

• Whataretheeffectsofbibliotherapyoncaregivers’mental well-being?

Inthisstudy,bibliotherapyisdefinedasaself-helpinterven-tionbasedoncognitivebehavioraltherapytechniques,whichoffers strategiesinproblemidentification,enhancesemotionalrelease, enablesinsightgeneration,replacemaladaptivethinkingpatterns withrationalthinking,andstimulateproblemsolving(McKenna etal.,2010).Bibliotherapyinterventionsutilizingcognitive-behavioraltechniqueswereincluded.Groupinterventionswereex-cluded.

|  |  |  |  |  |  |  |  |
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| **3.Methods** | | review | was | registered | at | PROSPERO | *3.3.3.Comparators* |
| Bothstudieswithinactivecontrol(usualcare,waitlist)andac- |
| *3.1.Registration* | | tivecontrolsasthecontrolgroupwereincluded. |
| This | systematic | *3.3.4.Outcomes* |
| (CRD42019129152). | | Basedonthetherapeuticmechanismofbibliotherapy,clinically |
| relevantmeasureswereregardedasthemainoutcomes.Depres- |

sionwasassessedasprimaryoutcomesbecausebibliotherapywas

|  |  |
| --- | --- |
| *3.2.Searchstrategies* | morelikelytoproduceemotionalexperience(Silverberg,2003) anddepressionishighlyprevalentincaregiversofpeoplewith |

AsystematicliteraturesearchwasconductedinCINAHL,Sco-pus,EMBASE,MEDLINE,PsycINFO,andWebofScience,covering allstudiespublishedfrominceptiontoJuly1,2019.Thesearch strategywassupervisedbyahealthlibrarian.Keywordsusedin-cluded(informalORunpaidORspous∗ORfamily)AND(carer∗ORcaregiver∗)AND(neurocognitivedisorderORdementiaOR Alzheimer’sdiseaseORvasculardiseaseORtraumaticbraininjury ORLewybodydiseaseORmildcognitiveimpairmentORdelir-

neurocognitivedisorders.Whereas,otherimportantoutcomesre-latingtodifferenttypesofemotionaldistress(i.e.stress,anxi-ety)oroutcomesreflectingpotentialmechanismsresponsiblefor improvementsindistress(i.e.self-efficacy)wereincludedassec-ondaryoutcomes.Studieswereincludediftheyassessedatleast oneoftheaforementionedoutcomes.Studiesfocusingontheout-comesofcarerecipients,butnotcaregiverswereexcluded.

iumORfrontotemporallobardegenerationORHIVinfectionOR *3.3.5.Setting*

HuntingtondiseaseORParkinsondiseaseORPriondisease)AND (bibliotherap∗OR“readingtherap∗” OR“therapeuticreading” OR manualORworkbookORself-helpOR“selfhelp” ORpoetryORfic-

Studiesthatrecruitedparticipantsfromallsettingsandwith theinterventionconductedinthehome/communitysettingwere included.

tionORliterat∗ORvideo∗ORaudio).Toensurethecomprehensive-

nessofthesearch,andtoavoidpotentialpublicationbias,clinical trialregistry,i.e.,theWorldHealthOrganizationInternationalClin-icalTrialsRegistryPlatformwasalsosearched.Thereferencelists ofincludedstudiesweresearchedforrelevantstudies,andtheau-thorsofincludedstudieswerecontactedforadditionalinformation

*3.4.Datascreening,extractionandanalysis*

Thetitlesandabstractswerescreenedbythefirstauthorand doublecheckedbythecorrespondingauthor.Relevantarticlespro-ceededtothefull-textreviewstage,werereviewedwiththein-

whererequired. clusionandexclusioncriteriabytwoindependentreviewers(the

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firstandlastauthors).Thereviewersreachedconsensusonthefi-nalincludedfull-textsviadiscussionandre-readingofthearticles ifnecessary.Adataextractionsheetspecificallydesignedforthis systematicreviewwasused.Extracteddataincludedtheresearch design,country,sample,intervention,comparison,outcomemea-sures,mainfindings,interventionattendanceratesandstudyattri-

(recruitingstartedinJanuary(Bruno,2017)andApril2019(Salinas, 2018)respectively)withnoresultspublished.Therefore,ninestud-ieswereincludedforqualitativesynthesis.Amongtheninestudies, sixofthemexploredsameoutcomesofinterest.Therefore,meta-analysiswasconductedfortheseresults(Fig.1).

tionrates. *4.2.Characteristicsoftheincludedstudies*

*3.5.Riskofbias*  Overall,theninearticlesincluded1036informalcaregiversof

neurocognitivedisorder.Thetypeofrelationshipincludesboth

TworeviewersusedtheCochraneCollaborationriskofbias toolsforRCTs(Higginsetal.,2011)toassessthequalityofstudies independently.Thistoolappraisestheriskofbiasfromsevenas-pects:randomsequencegeneration,allocationconcealment,blind-ingofparticipantsandpersonnel,blindingofoutcomeassessment, incompleteoutcomedata,selectivereporting,andotherbias.Each onewasratedas“lowrisk”,“unclearrisk”,or“highrisk” accord-ingly.Anydiscrepanciesbetweenthetworeviewerswerediscussed withathirdreviewertoreachconsensus.Theassessmentofstudy qualitywasperformedinordertocontextualizeandsummarize theriskofbiaswithinandacrossstudies,ratherthantodetermine eligibilityforstudyinclusioninthereview.

familymembersandnon-familymembercaregivers,intermsof friends,neighbors,orpeoplewiththesamereligion,etc.Thechar-acteristicsofinformalcaregiverswere:informalcaregiversofper-sonswithdementia(8studies)andolderadultswithneurocogni-tivedisorder(Alzheimer’sdiseaseorotherprogressiveneurocogni-tivedisorder)(1study).AsthestudybyBeauchamp,Irvine,See-ley,andJohnson(2005)didnotprovideinformationonthemean agefortheparticipants,theaverageageofcaregiversintheother studiesis61.67±12.12.Theagerangewasalsonotprovidedin theoriginalpapers,exceptBlometal.’s(2015)study(rangedfrom 26to87).ThestudieswereconductedintheUS(7studies),The Netherlands(1study)andFrance(1study).Thetypesofbiblio-therapyincludedweb-basedbibliotherapy(4studies),video-based

*3.6.Dataanalysis*  bibliotherapy(4studies)andbibliotherapybasedonwrittenmate-

rial(1study).Dosagesrangedfrom3to12sessions,lastingfrom

ReviewManager5.3wasusedtoanalyzetheextracteddata. Forthecontinuousdata,standardizedmeandifference(SMD)was usedratherthanthemeandifference(MD),becauseSMDmani-festsbettergeneralizabilityandexternalapplicabilitysothatitcan beappliedtosimilarpopulationsandSMDisalsolessvulnerable toover-orunderestimation(Takeshimaetal.,2014).Therefore,to bettereasethecomparisonsforalloutcomesinthereview,SMD (Hedges’adjustedg)and95%confidenceintervals(CI)wereused toestimatethepooledtreatmenteffectofcontinuousoutcomes, regardlessofthespecificoutcomeinstrumentused.Asdifferent

1monthto5~6months.Theoutcomemeasuresincludestress(3 studies),caregiverdistressrelatedtodementiarelatedbehavioural symptoms(4studies),self-efficacy(6studies),depression(8stud-ies),anxiety(5studies),positiveaffect(2studies),negativeaffect (2studies),anger(3studies),andstrain(1study).Onlythreestud-ieshadfollow-upsbeyondpostintervention,oneofthemwas3 months(Cristancho-Lacroixetal.,2015),twootherswere6months (Steffen&Gant,2016;Williamsetal.,2010).Theotherstudies measuredoutcomesimmediatelypostintervention.Comparisons includedbothinactivecontrol(usualcare,waitlist)andactivecon-

kindsofbibliotherapyaswellasthedifferentdosageswereused trol(educationDVD).

amongstudies,itwasimpossibletoassumethestudiestobeclini- Theoverallattritionratesofincludedstudiesrangedfrom7.8%

callyhomogenous,therefore,randomeffectsmodelswereusedfor to30.6%.Theattritionratesofthebibliotherapygroupsranged

meta-analyse. from10%to39.6%.Intermsofthedifferenttypesofbibliother-

Chi-squareandI-squared(I2)statisticwereusedtoassessthe statisticalheterogeneityofthestudiesincludedformeta-analysis. P*<*0.05wasconsideredassuggestionofheterogeneity,whileI2≥50%wastakenassubstantialheterogeneity(Higgins,Thompson, Deeks,&Altman,2003).Themagnitudeofstandardizedmeandif-ference(SMD)≥0.8wasregardedaslarge,=0.5wasregardedas medium,=0.2wasregardedassmall(Egger,Davey-Smith,&Alt-man,2008).Zscorewascalculatedforoveralleffectsizeofpooled outcomes.Fortheoutcomeswhichhadatleasttwostudiesper subgroup,subgroupanalysiswasconductedtoexplorethehetero-geneityandtocomparetheeffectsofdifferentkindsofbibliother-apy.Rsoftwarewasusedtocalculatethepooledmeanandstan-darddeviationforthecaregiverage.

apy,theattritionrateofthebibliotherapybasedonwrittenma-terialwas18.6%(Burgio,Stevens,Guy,Roth,&Haley,2003).The attritionratesofthevideo-basedbibliotherapyrangedfrom10% to23.5%(Gallagher-Thompsonetal.,2010;Gant,Steffen,&Laud-erdale,2007;Steffen,2000;Steffen&Gant,2016;Williamsetal., 2010).Theattritionratesofweb-basedbibliotherapyrangedfrom 32%to39.6%(Blometal.,2015;Cristancho-Lacroixetal.,2015).As Beauchampetal.(2005)didnotreportthenumberofparticipants allocatedineachgroup,theattritionratewasnotcalculateddue tothelackofdata(Table1).

*4.3.Riskofbiasoftheincludedstudies*

Allofthestudiesusedarandomizedcontrolledtrialdesign,

**4.Results**  however,onlyfiveofthem(Blometal.,2015;Cristancho-Lacroix

etal.,2015;Steffen,2000;Steffen&Gant,2016;Williamset

*4.1.Searchresults*  al.,2010)mentionedhowtherandomizationwasdoneorthe

randomizationstrategiesforensuringtheoreticallycomparable

Atotalof481resultswereidentifiedfromthesearch.Fourhun-dredandsevenarticlesremainedafterremovingtheduplicates.Af-tertitleandabstractscreening,35papersproceededtofull-textre-view.Finally,ninearticlesremainedafterfull-textreview.Wealso searchedtheWorldHealthOrganizationInternationalClinicalTri-alsRegistryPlatformwiththesearchstrategyofthissystematic review,eightrecordsforseventrialswerefound.Amongtheseven trials,fivedidnotmeettheinclusioncriteriaofthisstudy.Forthe twotrialsmeetingtheinclusioncriteria,botharestillrecruiting

groups.Theotherfourstudies(Beauchampetal.,2005;Burgioet al.,2003;Gallagher-Thompsonetal.,2010;Gantetal.,2007)were ratedasunclearriskofbiasduetoinsufficientinformation.Only threestudies(Blometal.,2015;Gallagher-Thompsonetal.,2010; Steffen&Gant,2016)mentionedabouttheallocationconcealment intermsofseparateindividualssettinguptherandomizationand enrollment,whichwereratedaslowriskofbias.Theotherswere ratedashavinganunclearriskofbiasforallocationconcealment. Itisdifficultforpsychosocialinterventionstoblindparticipants,

**Table1**

Characteristicsofincludedstudiesandtheirmainfindings(n=9).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Study | Design | Country | Sample | Intervention | Comparison | OutcomesandMeasures | Mainfindings | Attritionrate |
| Beauchamp,Irvine, | 2-armRCTUS | | 299employed | Webbasedbibliotherapy | Inactivecontrol: | • **Stress**(Primary   Appraisal):twoinitial | • Thereweresignificant   improvementsindepression, | • Overall:9% •  Bibliotherapy: |
| Seeley,and | familycaregivers | **MainComponents:**textmaterialand | Waitlistcontrol |
| Johnson(2005) | ofpeoplewith | videosthatmodelpositivecaregiving | screeningquestions | anxiety,levelandfrequencyof |
| dementia | strategies,i.e.,*BeingaCaregiver,* |
| • **Self-Efficacy**   (SecondaryAppraisal): | stress,caregiverstrain, | Not |
| *CopingWithEmotions*,and*Common* | self-efficacy,andintentionto | mentioned |
| *Difficulties.* |
| sixself-efficacy | seekhelp,aswellas |
| **Dosage:**3moduleslastingfor30 | questionsregarding | perceptionsofpositiveaspects |
| days,abletopartakerepeatedly | areasofcaregiving | ofcaregiving. |

• **Waysofcoping**:RWC  
• **Caregiverstrain**:CSI  
• **Positiveaspectsof**   
 **caregiving**:PAC

• **Depression**:CES-D  
• **Stateanxiety**:STAI-10

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Blom,Zarit,Groot | 2-armRCTThe | 245family | Webbasedbibliotherapy | Inactivecontrol: | • **Depressivesymptoms:**  CES-D | • Caregiversintheexperimental groupshowedsignificantly | • Overall: 28.6% | |
| Zwaaftink, | Nether- | caregiversof | **MainComponents:**(a)copingwith | Digitalnewsletterthat |
| Cuijpers,andPot | lands | peoplewith | behavioralproblems(problem | didnotoverlapwith |
| • **Stateanxiety**:HADS-A | lowersymptomsofdepression | • | Bibliotherapy |
| (2015) | dementia | solving);(b)relaxation;(c)arranging | theintervention | (p=.034)andanxiety   (p=.007)postintervention• Effectsizesweremoderatefor symptomsofanxiety(.48)and |
| helpfromothers;(d)changing | contents | group: | |
| non-helpingthoughtsintohelping | 39.6% | |
| thoughts(cognitiverestructuring); |
| and(e)communicationwithothers |
| smallfordepressive |
| (assertivenesstraining). | symptoms(.26). |

**Dosage:**8sessionsandabooster

sessionduring5to6months

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Burgio,Stevens, | 2-armRCTUS | 118family | SkillsTrainingCondition | Writtenmaterial | • **CGappraisalof**   **problembehaviors**: | • Bothgroupsreported   decreasinglevelsofproblem | • Overall: 15.7% | |
| Guy,Roth,and | caregiversof | Agroupworkshopfollowedby16 | bibliotherapy: |
| Haley(2003) | individualswith | in-hometreatmentsessionsovera | **MainComponents:** | RMBPC | behaviorsandappraisalsof | • | Bibliotherapy |
| Alzheimer’s | 12-monthperiod | generalinformationon |
| • **Positiveaspectsof caregiving**:PAC | behavioralbother,and |
| diseaseandrelated | dementiaand | increasedsatisfactionwith | group: | |
| disorders | dementiacaregiving, | • **Socialsupport**:LSNI• **Depressive**   **symptoms**:CES-D | leisureactivitiesovertime. | 18.6% | |
| caregiver’svoiced | • Onappraisalofdistress   relatedtobehaviorproblems, |
| concernabouta |
| specificproblem(on | • **Stateanxiety**:STAI-10• **Desireto**   **Institutionalize**:A | Whitecaregiversshowed |
| demand). | moreimprovementinthe |
| **Dosage:**2(77%)to3 |
| minimalsupportcontrol |
| (23%)sessions | seven-itemscale | condition,andAfrican |
| createdbyMorycz, | AmericanCaregiversshowed |
| 1985 | thegreatestimprovementsin |

theskillstrainingcondition.

(*Continuedonnextpage*)

**Table1**(*Continued*).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Study | Design | Country | Sample | Intervention | Comparison | OutcomesandMeasures | Mainfindings | Attritionrate | |
| Cristancho-Lacroix | 2-armRCTFrance | | 49informal | Webbasedbibliotherapy&usualcare | Inactivecontrol:Usual | • Perceivedstress: PSS-14 | • Intention-to-treatanalysisdid notshowsignificant | • Overall: 30.6% | |
| etal.(2015) | caregiversofa | **MainComponents**:(a)caregiver | care |
| personwith | stress;(b)understandingthedisease; | • Self-efficacy:RSCS • Caregiverappraisalof problembehaviors: | differencesinself-perceived | • | Bibliotherapy |
| Alzheimer’s | (c)maintainingthelovedones’ | stressbetweenthe |
| disease | autonomy;(d)understandingtheir | experimentalandcontrol | group:32% | |
| reactions;(e)copingwithbehavioral |
| RMBPC | groups(P=.98).  • Theexperimentalgroup   significantlyimprovedtheir |
| andemotionaltroubles;(f) | • Subjectiveburden:ZBI• Depressivesymptoms: BDI-II |
| communicatingwithlovedones;(g) |
| improvingtheirdailylives;(h) | knowledgeoftheillness |
| avoidingfalls;(i)pharmacologicaland | • Self-perceivedhealth: NHP | (d=.79,P=.008)from baselinetomonth3. |
| nonpharmacologicalinterventions;(j) |

socialandfinancialsupport;(k)about   
thefuture;and(l)inanutshell.

**Dosage:**12weeklythematicsessions

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gallagher- | 2-armRCTUS | 70caregiversof | Videobasedbibliotherapy | Activecontrol: | • Depressivesymptoms: CES-D | • ForCGsintheintervention group,levelofnegative | • Overall: 7.9% | |
| Thompsonetal. | peoplewith | **MainComponents:**(a)education | EducationDVD |
| (2010) | dementia | aboutdementiaandcaregivingstress, | • Positiveaffect:Positive affectsubscaleofthe | depressivesymptomsdidnot | • | Bibliotherapy |
| appraisal,andcoping;(b)techniques | change,butpositiveaffectwas |
| formanagingtroublesomeand | CES-D | higher,andpatientbehaviors | group:10% | |
| disruptivebehaviorsofthe |
| • Caregiverappraisalof problembehaviors: | wereappraisedasless |
| care-recipient;(c)howtodealwith | stressfulandbothersome. |
| one’sownnegativefeelingsand |
| RMBPC |

thoughtsassociatedwithcaregiving;   
(d)developingskillstoimprove   
communicationwithotherfamily   
membersandprofessionalsinthe   
healthcaresystem;(e)behavioral   
activationtechniquestoincrease   
pleasurableeventsinthedailylivesof   
thecaregiverandthecare-recipient;   
and(f)end-of-lifeissues.

**Dosage:**6sessionsextendingovera   
12-to16-weekinterval&anaverage   
of3times’non-problemsolving   
phonecalls

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gant,Steffen,and | 2-armRCTUS | 32malefamily | Videobasedbibliotherapy | Writtenmaterial | • Self-efficacy:RSCS• Positive&negative affect:PANAS | • Resultsdidnotsupportthe greaterefficacyofthevideo | • Overall: 12.5% | |
| Lauderdale(2007) | dementia | **MainComponents:**(a)behavioral | bibliotherapy |
| caregivers | activation,(b)behavioral | **MainComponents:**a | conditioninreducing | • | Bibliotherapy |
| management,(c)stressreduction | 37-pagebooklet*Basic* | psychosocialdistress(eg, |
| throughrelaxationtraining. | *DementiaCareGuide* | negativeaffect,upsetand | group: | |
| **Dosage:**10sessions&12weekly | whichincluded | annoyancefollowingbehavior | 23.5% | |
| telephonecoach | informationon | problems)orincreasing |
| dementiaand |
| positiveaffectorcaregiving |
| suggestionsfordealing | self-efficacy. |
| withavarietyof | • Therewasastatistically significanteffectfor |
| caregivingchallenges |
| **Dosage**:Not | postinterventionimprovement |
| mentioned& | inconditions. |

approximately7   
biweeklycheck-in-calls

(*Continuedonnextpage*)

**Table1**(*Continued*).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Study | Design | Country | Sample | Intervention | Comparison | OutcomesandMeasures | Mainfindings | Attritionrate | |
| Steffen(2000) | 3-armRCTUS | | 33womenand | Videobasedbibliotherapy | Inactivecontrol: | • **Angerintensity**:CAI• **Depression**:BDI • **Self-efficacy**:RSCS | • Comparedtothecontrol   condition,caregiversinboth | • Overall: 15% | |
| mencaringfora | IG1:home-basedviewingwithweekly | Waitlistcontrol |
| relativewith | telephonesessions | ofthetreatmentconditions | • | Bibliotherapy |
| dementia | IG2:class-basedviewingledbya | hadlowerposttreatment |
| trainedfacilitator(notbibliotherapy) | levelsof**angerand** | group:20% | |
| **MainComponents:**instructionand | **depression**,andhigherratings |
| homeworkassignmentson(a) | **ofcaregivingself-efficacy**. |

awarenesstraining;(b)   
tension-reductionstrategies;(c)   
cognitivechangestrategies;and(d)   
assertiontraining.

**Dosage**:8weeklysessions&8weekly   
telephonecoach

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SteffenandGant | 2-armRCTUS | 74womencaring | Videobasedbibliotherapy | Inactivecontrol:a | • **Depressive**   **symptoms**:BDI-II | • Atpost-treatment,depressive symptoms,upsetfollowing | • Overall: 14.9% | |
| (2016) | foranolderadult | **MainComponents:**(a)behavioral | basiceducationand |
| witha | activationforboththecaregiverand | supportconditionact | • **Negativeaffect**: PANAS | disruptivebehaviors,and | • | Bibliotherapy |
| neurocognitive | carerecipient;(b)managementof | asusualcare |
| negativemoodstateswere |
| disorder | disruptivebehaviors;(c)relaxation | • **Stateanxietyand**  **hostility**:MAACL-R | statisticallylowerinthe | group: | |
| duringcaregivingsituations;and(d) | interventiongroupthaninthe | 18.2% | |
| caregivingself-efficacy. | • **Self-efficacy**:RSCS • **Caregiverappraisalof**  **problembehaviors:** | controlgroup. |
| **Dosage:**10weeklysessions&weekly | • Caregivingself-efficacyscores forobtainingrespiteandfor |
| telephonecoach |
| RMBPC | managingpatientbehavioral |

disturbanceswere   
significantlyhigherinthe   
interventiongroup.

• Effectsizesweremoderatebut   
notmaintainedatthe   
6-monthfollow-up.

(*Continuedonnextpage*)

**Table1**(*Continued*).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Study | Design | Country | Sample | Intervention | Comparison | OutcomesandMeasures | Mainfindings | Attritionrate | |
| Williamsetal. | 2-armRCTUS | | 116Alzheimer’s | Videobasedbibliotherapy | Inactivecontrol: | • **PerceivedStress**:PSS• **Anxiety**:STAI • **Anger**:STAXI • **Depressive**   **Symptoms**:CES-D | • Participantsinthe   interventiongroupshowed | • Overall: 7.8% | |
| (2010) | Diseaseorrelated | **MainComponents:**(a)Increasing | Waitlistcontrol |
| dementia | awarenessofandobjectivityin | significantlygreater | • | Bibliotherapy |
| caregivers | distressingsituations;(b)Evaluating |
| improvementsindepressive |
| one’sreactionstothosesituationsto | symptoms,traitanxiety, | group: | |
| decidewhethertotrytochangeone’s | • **Hostility**:CMHS • **Self-efficacy**:CGSE• **Sleep**:PSQI | perceivedstress,andaverage | 11.9% | |
| reactionsortotakeactionstotryto | systolicanddiastolicblood |
| changethesituations;(c)Changing | pressurethatweremaintained |
| one’sreactiontodistressing | overthesix-monthfollowup |
| situations;(d)Usingassertiontoget | period. |

otherstochangetheirbehavior;(e)   
Problemsolvingtochangedistressing   
situations;(f)SayingNotoreduce   
exposuretodistressingsituations;(g)   
Speakingclearlysoothersreally   
listen;(h)Listeningskillstomake   
sureyouhearwhatothersaresaying;   
(i)Empathizingtoincrease   
understandingofothers’behavior;(j)   
Increasingthepositivesinyour   
interactionswithothers.

**Dosage:**10modulesduring5weeks   
(2modules/week)&weeklytelephone   
coach

*Note:*BDI:BeckDepressionInventory;BDI-II:BeckDepressionInventory;CAI:Caregiverangerinterview;CES-D:theCenterforEpidemiologicStudies–Depression;CGSE:theRevisedScaleforCaregivingSelf-Efficacy;CMHS: theMMPI-basedCook-MedleyHostilityScale;CSI:threesubscalesfromtheCaregiverStrainInstrument;HADS-A:The7itemanxietysubscaleoftheHospitalAnxietyandDepressionScale;LSNI:LubbenSocialNetwork Index;MAACL-R:theshortversionoftheMultipleAffectAdjectiveCheckList-Revised(MAACL-R)AnxietyandHostilitysubscales;NHP:theFrenchversionoftheNottinghamHealthProfile;PAC:positiveaspectsofcaregiving inventory;PANAS:thePositiveandNegativeAffectScale;PSQI:thePittsburghSleepQualityIndex;PSS:theperceivedstressscale;PSS-14:the14-itemPerceivedStressScale;RMBPS:Revisedmemoryandbehaviorproblem checklist;RSCS:RevisedScaleforCaregivingSelf-Efficacy;RWC:twospecificsubscalesoftheRevisedWaysofCoping;STAI:theState-TraitAnxietyInventory;STAI-10:10-itemsubscaleoftheState-TraitAnxietyInventory; STAXI:theSpielbergerState-TraitAngerInventory;ZBI:theFrenchversionoftheZaritBurdenInterview.

|  |  |  |
| --- | --- | --- |
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|  |

**Fig.1.**PRISMAFlowDiagram.

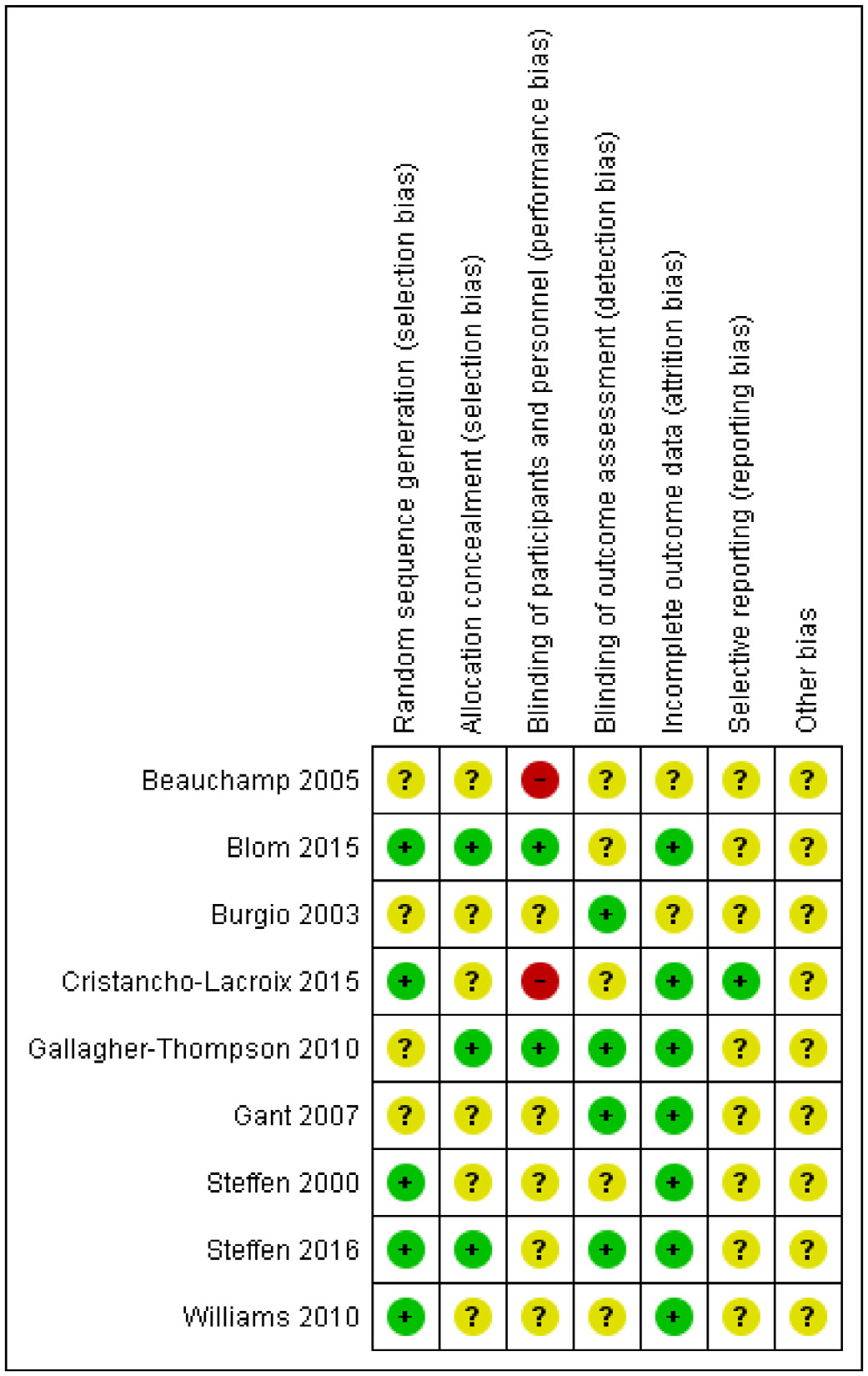
especiallywhenthecomparisonisusualcare.Twoofthestudies (Beauchampetal.,2005;Cristancho-Lacroixetal.,2015)didnot blindparticipants,thuswereratedashighriskofbiasinthis area.Onlytwostudies(Blometal.,2015;Gallagher-Thompson etal.,2010)blindedtheparticipantsandkeystudypersonnel, andtheywereratedaslowriskofbias.Theotherstudieswere rankedasunclearriskofbiasduetoinsufficientinformationto permitthejudgmentofloworhighrisk.Fourstudies(Burgio etal.,2003;Gallagher-Thompsonetal.,2010;Gantetal.,2007; Steffen&Gant,2016)blindedtheoutcomeassessment,which wereratedaslowriskofbias,theotherswereratedashavingan unclearriskofbiasduetotheinsufficientinformationprovided. Onlytwostudies(Beauchampetal.,2005;Burgioetal.,2003)did notreportattrition,whichwereratedasunclearriskofbiasfor incompleteoutcomedata,theothersreportedreasonsformiss-ingdataorstrategiesinhandlingmissingdata.Onlyonestudy (Cristancho-Lacroixetal.,2015)hasaprotocolpublishedandwas thereforeratedashavingalowriskofbiasinselectivereporting, theotherswereratedasunclearasitwasimpossibletocheck thatalla-priorioutcomeswerereported.Onlytwostudies(Burgio

etal.,2003;Steffen,2000)mentionedstrategiesinavoidingor minimizingbias,however,therewasstillinsufficientinformation onwhetheranimportantriskofbiasexists,soallthestudies wererakedasunclearriskofbiasintheassessmentofotherbias. (Fig.2).Astherewerefewerthan10studiesinthemeta-analysis, conductingafunnelplotorEgger’sregressionasymmetrytest weregenerallynotrecommendedtoevaluatepotentialpublication bias(Sterne,Egger,&Moher,2008;Sterneetal.,2011).

*4.4.Effectsofbibliotherapy*

Onestudy(Burgioetal.,2003)onlyreportedtheresultsin subgroups(i.e.,WhiteandAfricanAmericanethnicity),thesub-groupswerecombinedintoasinglegroup,andthesamplesize, meanandstandarddifferencewerecalculatedaccordingly(Higgins &Green,2011).Forthestudyinwhichmorethanonecom-parisongroupwasused(Steffen,2000),thecomparisongroup whichwasmostsimilartothatinotherstudieswasselectedfor analysis(Bahar-Fuchs,Clare,&Woods,2013).Asonlythreestud-iesmeasuredfollow-upsbeyondpost-intervention,i.e.,3month

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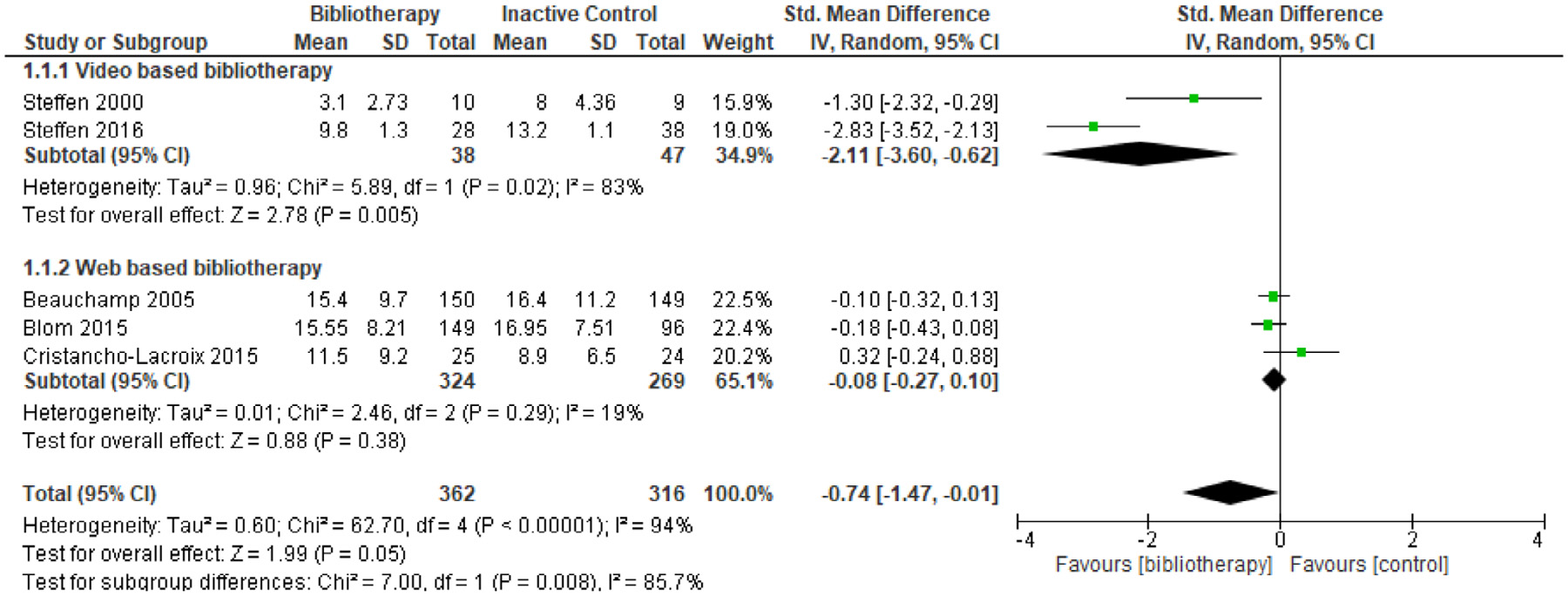
**Fig.2.**Riskofbiassummary:reviewauthors’judgementsabouteachriskofbias itemforeachincludedstudy.

follow-up(Cristancho-Lacroixetal.,2015)and6monthfollow-up (Steffen&Gant,2016;Williamsetal.,2010),onlydatacollected immediatelypostinterventionwereanalyzedfortheeffectsize.

*4.4.1.Effectsofbibliotherapyondepression*   
 Eightstudiesmeasuredtheeffectofbibliotherapyonreducing depression.However,astwostudies(Burgioetal.,2003;Gallagher-Thompsonetal.,2010)usedanactivecontrol,amongwhichthe controlconditionsdiffered,theywerenotincludedinthemeta-analysis.Amongthesixstudiesusinginactivecontrol,onestudy (Williamsetal.,2010)didnotreportdataatpost-intervention, therefore,onlyfivestudieswereincludedinmeta-analysis,two kindsofbibliotherapywereused(videoandwebbased);therefore, subgroupanalysiswasconductedtoexploretheeffectsofeach kind.

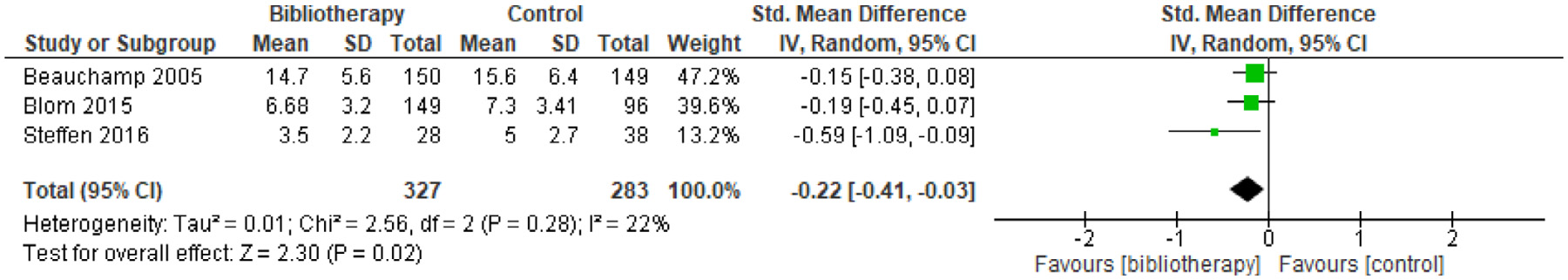
Theoveralleffectforthetwotypesofbibliotherapywassignifi-cantatZ=1.99(randomeffectmodel,SMD=-0.74,95%CI=-1.47 to-0.01,p=0.05).Subgroupanalysisshowedtherewashighhet-erogeneityamongthesubgroups(I2=94%,p*<*0.001),andthere wassignificanteffectdifferencebetweenthem(p=0.008).How-ever,whenconsideredseparately,onlythevideobasedbibliother-apysignificantlyreduceddepressionatZ=2.78(randomeffect model,SMD=-2.11,95%CI=-3.6to-0.62,p=0.005),however, theheterogeneitywashigh(I2=83%,p=0.02).(Fig.3)   
 Forthetwostudiesusinganactivecontrol,individualbetween groupeffectsizeswerecalculatedforeach.Theeffectofbiblio-therapyondepressionwasnotsignificantwhencomparedwitha skillstrainingcondition(Hedges’g=0.153,P=0.4042,95%CI=-1.810to2.115)(Burgioetal.,2003),oreducationDVD(Hedges’g=-0.3333,P=0.1662,95%CI=-2.531to1.864)(Gallagher-Thompsonetal.,2010).

*4.4.2.Effectsofbibliotherapyonself-efficacy*   
 Sixstudiestestedtheeffectofbibliotherapyonself-efficacyas comparedwithinactivecontrol.Fourofthestudies(Cristancho-Lacroixetal.,2015;Gantetal.,2007;Steffen,2000;Steffen& Gant,2016)usedrevisedscaleforcaregivingself-efficacy(RSCS)as themeasurement,andonlyreportedtheresultsofsubscales(self-efficacyforobtainingrespite,self-efficacyfordealingwithprob-lembehaviours,andself-efficacyforcontrollingthoughts).Steffen (2000)onlyreportedthesubscaleofself-efficacyfordealingwith problembehaviours,andSteffenandGant(2016)onlymeasured thesubscalesofself-efficacyforobtainingrespiteandself-efficacy fordealingwithproblembehaviours.Therefore,ameta-analysis wasconductedforeachsubscale.Beauchampetal.’s(2005)study didnotuseRSCSasthemeasurementandonlyreportedtheto-talscoreofsixself-efficacyquestionsregardingareasofcaregiving, wecalculatedtheHedges’g(Hedges’g=0.283,95%CI=-0.596to 1.162).Williamsetal.(2010)reportedthattherewasnosignificant effect,withnodatareported,soitwasnotfeasibletocalculatethe



**Fig.3.**Effectsofbibliotherapyversusinactivecontrolondepressionpostintervention.

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**Fig.4.**Effectsofbibliotherapyversusinactivecontrolonstateanxietypostintervention.

effectsize.Subgroupanalysiswasnotapplicableduetothelim-itednumberofstudiesoninterventionsubgroup(Deeks,Higgins, &Altman,2008).

*4.4.2.1.Effectofbibliotherapyonself-efficacyforobtainingrespite.* Therewaslowheterogeneityamongthethreestudies(Cristancho-Lacroixetal.,2015;Gantetal.,2007;Steffen&Gant,2016) measuringself-efficacyforobtainingrespite(I2=0%).Theover-alleffectofbibliotherapyoncaregiver’sself-efficacyforobtaining respitewasnotsignificant,Z=1.00,P=0.32(randomeffect model,SMD=0.17,95%CI=-0.16to0.49).

*4.4.2.2.Effectsofbibliotherapyonself-efficacyfordealingwith problembehaviours.*Theheterogeneityamongthefourstudies (Cristancho-Lacroixetal.,2015;Gantetal.,2007;Steffen,2000; Steffen&Gant,2016)measuringself-efficacyfordealingwithprob-lembehaviourswaslow(I2=0%).Theoveralleffectofbiblio-therapyoncaregiver’sself-efficacyfordealingwithproblembe-

(2003)studyusedactivecontrol,itwasnotincludedinthemeta-analysis.TheeffectsizeofthisstudywasHedges’g=0.358 (P=0.053),95%CI=-1.000to1.716,whichdemonstratednosta-tisticaldifferencebetweenbibliotherapyandaskilltrainingcon-ditionindecreasingstateanxiety.Williamsetal.(2010)didnot reportthemeanandstandarddeviation,soitwasalsonotin-cludedinthemeta-analysis.Theheterogeneityofthethreestud-iesincludedinmeta-analysiswaslow(I2=22%),theoverallef-fectofbibliotherapyonstateanxietywassignificantatZ=2.30, P=0.02(randomeffectmodel,SMD=-0.22,95%CI=-0.41to-0.33)(Fig.4).SummaryofpooledeffectsareintheSupplementary Table.

*4.4.4.2.Effectsofbibliotherapyontraitanxiety.*Onlyonestudy testedtheeffectofbibliotherapyontraitanxietyascompared withinactivecontrol(Williamsetal.,2010),however,asnopost-interventiondatawasreported,theeffectsizewasnotestimable.

|  |  |
| --- | --- |
| haviourswassignificant,Z=2.44,P=0.02(randomeffectmodel, SMD=0.36,95%CI=0.05to0.67). | **5.Discussion** |

*4.4.2.3.Effectsofbibliotherapyonself-efficacyforcontrollingupset-tingthoughts.*Onlytwostudiestestedtheeffectofbibliotherapy oncontrollingupsettingthoughts,bothofwhichusedinactivecon-trolgroups.Theeffectofweb-basedbibliotherapyonself-efficacy forcontrollingupsettingthoughtswasnotsignificant,Hedges’g=-0.174,P=0.5366,95%CI=-5.079to4.730(Cristancho-Lacroix etal.,2015).Theeffectofvideo-basedbibliotherapyonself-efficacy forcontrollingupsettingthoughtswasalsonotsignificant,Hedges’g=-0.456,P=0.1982,95%CI=-6.236to5.324(Gantetal.,2007).

*4.4.3.Effectsofbibliotherapyonstress*   
 Threestudiestestedtheeffectsofbibliotherapyonstress ascomparedwithinactivecontrol(Beauchampetal.,2005; Cristancho-Lacroixetal.,2015;Williamsetal.,2010).Thesam-plesizerangedfrom49to299.Threedifferentinstrumentswere used(twoinitialscreeningquestionswereusedasmeasurement inBeauchampetal.’s(2005)study,the14-itemversionand10-itemversionofPerceivedStressScaleinCristancho-Lacroixetal.’s (2015)andWilliametal.’s(2010)studyrespectively).Williamset al.(2010)didnotreportthemeanandstandarddeviation,soit wasnotapplicabletocalculatethepooledeffectsizeduetothe limitednumberofstudies.Boththeothertwostudiesusedweb-basedbibliotherapy,theeffectwasnotsignificantforboth(Hedges’g=-0.127,P=0.2732,95%CI=-0.841to0.587,(Beauchampetal., 2005);Hedges’g=-0.012,P=0.9644,95%CI=-2.218to2.193 (Cristancho-Lacroixetal.,2015)).

*4.4.4.Effectsofbibliotherapyonanxiety*   
*4.4.4.1.Effectsofbibliotherapyonstateanxiety.*Fivestudiesmea-suredstateanxiety.Burgioetal.(2003)usedbibliotherapyasthe control,theinterventiongroupwasaskillstrainingcondition.We convertedbibliotherapyastheinterventionandassumedtheskills trainingwasanactivecontrolforeaseofdataanalysis.AsBurgio’s

*5.1.Qualityofincludedstudies*

Thequalityofincludedstudiesisgenerallylow.Themainar-easofpotentialbiasarerelatedtoinsufficientdetailsonallocation concealment,difficultyinblindingofparticipantsandpersonnel fornon-pharmacologicalinterventions,aswellasunclearselective reportingandotherbiasduetonoregisteredclinicaltrialorpub-lishedprotocol.Therefore,thefindingsofnon-significanteffectsof bibliotherapyshouldbeinterpretedwithcaution.Futurehighqual-ityRCTsareneededtogeneratescientificevidenceofbibliotherapy.

*5.2.Attritionratesofincludedstudies*

Theoverallattritionratesoftheincludedstudiesarecompara-blewiththeattritionratesoftraditionalcognitivebehavioralther-apy(averageweightedattritionrate=26.2%)(Fernandez,Salem, Swift,&Ramtahal,2015).Theattritionratesoftheweb-based bibliotherapystudieswerehigherthan30%(rangedfrom32%to 39.6%).Oneofthepossiblereasonsforhighattritionandpoorad-herencewaslackofpersonalcontact(Todkill&Powell,2013).Min-imaltelephonecontactwithatherapistseemstobevitaltoen-courageparticipantstocompletetheintervention(Newman,Erick-son,Przeworski,&Dzus,2003).Anotherpossiblebarriertocom-pliancetoweb-basedinterventionwasthelackofskillsusingthe internetorlackofmotivation(Peelsetal.,2012).Venkateshand team’s(2003)UnifiedTheoryofAcceptanceandUseofTechnol-ogyindicatedthattheeffort,expectancyandperformanceofusers explainedvariationsintheintentiontousetechnology,therefore, whethercaregiver’seffortsmatchgainsmaybeanotherfactorin-fluencingtheirinvolvementinweb-basedbibliotherapy.However, whencomparedwithothertechnology-basedinterventions,theat-tritionrateofweb-basedbibliotherapywassimilar(Heynsbergh, Heckel,Botti,&Livingston,2018).

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*5.3.Effectsofbibliotherapyonmentalwell-beingoutcomes*

Thissystematicreviewshowedthatbibliotherapyhadmod-eratetolargepooledeffectsondepression,smalltomoderate pooledeffectsonstateanxietyandself-efficacyfordealing withproblembehaviors,andnon-significantpooledeffectson self-efficacyforobtainingrespiteininformalcaregiversofneu-rocognitivedisorder.Thepooledeffectonothermentalwell-being outcomeswereinconclusiveduetothelimitednumberofstudies. However,theeffectsizesofindividualstudieswerecalculated, indicatingalargeeffectinreducinganger;amediumtolarge effectsinreducingnegativeaffectanddistresscausedbyde-mentiarelatedbehaviouralsymptoms,andimprovingpositive

*5.3.2.Effectofbibliotherapyonimprovingcaregiverself-efficacy*  Amongallthesubscalesofself-efficacy,thepooledeffectof bibliotherapywasonlysignificantatasmalltomoderatelevelin improvingself-efficacyfordealingwithproblembehaviors.The sustainedeffectwasexaminedforindividualstudies,whichindi-catedasmalleffect(Hedges’g=0.4141)ofvideo-basedbibliother-apyat6month’sfollow-up(Steffen&Gant,2016),andasustained smalleffect(Hedges’g=0.1550)ofweb-basedbibliotherapyat3 month’sfollow-up(Cristancho-Lacroixetal.,2015).Asthesample sizeofinterventiongroupsrangedfrom10~28,thesmalleffectsize andnon-significantresultsmayalsobecausedbysmallsample sizesoftheincludedstudies.Otherpublishedsystematicreviews alsofoundthatpsychosocialinterventionsingeneralwereeffective

affect. inenhancingdementiacaregivers’self-efficacy,however,compared withthecoursemodeindividual-basedinterventions,thedistance- contact-interventionwasnotprominent(Tang&Chan,2016).In

*5.3.1.Effectofbibliotherapyondepressionreduction*   
 Oursystematicreviewfoundthat,incomparisonwithinac-tivecontrol,bibliotherapyhadamoderatetolargepooledeffect inreducingdepression(SMD=-0.74).Anothersystematicreview onchildrenandadolescentsalsofoundthatbibliotherapyhada moderateeffect(SMD=-0.52)ondepression(Yuanetal.,2018). However,bothsystematicreviewshadhighheterogeneity,indicat-ingthatindividualstudieswithdifferentinterventioncomponents, deliverymode,duration,andoutcomemeasuresmayhavediffer-entresults.Inconsiderationofthesubstantialheterogeneityinthe currentreview,subgroupanalysiswasconducted,andtheresults suggestedastatisticallysignificantsubgroupeffect(p=0.008), meaningthatthemodeofbibliotherapysignificantlymodifiesthe

addition,thisearlierreviewalsodemonstratedthatinvolvingthe care-recipientintheinterventioncouldimprovethequalityofthe intervention(Tang&Chan,2016).Coursemodebibliotherapyin-volvingboththecaregiverandcare-recipientmaybeexploredfor improvingcaregiverself-efficacyinthefuture.

*5.3.3.Effectofbibliotherapyonreducingstress*   
 Bothweb-basedandvideo-basedbibliotherapyhavebeenused forstressreductionamonginformalcaregiversofneurocognitive disorder,however,asthenumberofstudieswereinsufficientfor performingmeta-analysisitwasimpossibletocalculatethepooled effect.Morestudiescanbeconductedtoexploretheeffectofbib-liotherapyonreducingstressamonginformalcaregiversofneu-

effectofbibliotherapyascomparedwithinactivecontrolgroups, rocognitivedisorder.

andvideo-basedbibliotherapyworkedbetterthanweb-basedbib-liotherapy.However,thereisstillunexplainedheterogeneitybe-tweenthetrialswithinthevideo-basedbibliotherapysubgroups (I2=83%).Therefore,eventhoughahighpooledeffectsizehas beenidentified(SMD=-2.11),theindividualtrialresultsseemin-consistentinthevideo-basedsubgroup.

Bibliotherapyhasbeenshowntohavelongtermsustainedef-fectsincontrollingthedepressivesymptomsofpatientswithde-pression(Gualanoetal.,2017),howeverthissystematicreviewwas notabletoexaminethelong-termeffectsduetothelackoffollow-updata.Forindividualstudies,themedium-termeffectofvideo-basedbibliotherapywassustainedatmoderatetolargelevelsat 6month’sfollow-up(Steffen&Gant,2016;Williamsetal.,2010) andtheeffectofweb-basedbibliotherapywassustainedatsmall tomediumeffectlevelat3month’sfollow-up(Cristancho-Lacroix etal.,2015).Therefore,theeffectofbibliotherapyonreducingde-pressionmaybesustainedoverthemediumterm.

Whencomparedwithactivecontrolinterventions,theeffectof bibliotherapywasnotsignificant.Itiscommonthatinterventional studieswithdifferentcontrolgroupdesignsyielddifferenteffect estimates(Karlsson&Bergmark,2015).Researchershavealsoar-guedthatalthoughusingactivecontrolgroupsisappropriate,in-formativeandvaluableinmanysituations,itoftencannotprovide reliableevidenceoftheeffectivenessofanewtherapy(Temple& Ellenberg,2000).Inthisreview,althoughtherewasnostrongevi-dencesupportingthatvideo-basedbibliotherapyhasabettereffect thancommercialeducationDVD(Gallagher-Thompsonetal.,2010), bibliotherapybasedonwrittenmaterialswasshowntobecom-parablewithskilltrainingconditions,includinggroupworkshops followedby8homedeliveredface-to-facetreatmentsand2ther-apeuticphonecallsduring12months(Burgioetal.,2003).Both studiesdemonstratethepotentialofself-helptreatmentsforinfor-malcaregiversinreducingdepression.Asthenumberofstudies wereinsufficientformeta-analysis,morestudiesareneededinthe

Fromthetwostudiesincludedinthecurrentreview,thereis nostrongevidenceshowingtheeffectofweb-basedbibliother-apyonstressreduction.Bibliotherapyhasbeenshowntobeeffec-tiveinreducingstressforemployeesatmedicalcenters(Sharma etal.,2014),olderadults(Cho&Chang,2010)andcollegestu-dents(Hazlett-Stevens&Oren,2017).Thismaybebecausethe mainstressorforinformalcaregiversofneurocognitivedisorderis theprogressivelydegeneratingfunctionalstatusofcare-recipients, thereforetheirstressmaybestrongerandmorepersistentthan otherpopulations.Mindfulness-basedstressreductionbibliother-apyhasbeenfoundeffectiveinreducingstressamongadults (Wimberley,Mintz,&Suh,2015),andasmindfulnesshasalsobeen testedtobeeffectiveinreducingstressamongdementiacaregivers (Kor,Liu,&Chien,2019),itissuggestedthatincorporatingmind-fulnessintobibliotherapymayalsobeeffectiveforreducingstress ofinformalcaregiversofneurocognitivedisorder.Futurestudies canbeconductedinthisarea.

*5.3.4.Effectofbibliotherapyonreducinganxiety*   
 Stateanxietyisanindividual’stransitoryemotionalstatelinked toastimuliofaspecificsituation,whiletraitanxietyrefersto anindividual’spredispositiontorespondtostimuli(Endler&Ko-covski,2001).Fromthismeta-analysis,bibliotherapyhadasmall tomediumpooledeffectonstateanxietyascomparedwithin-activecontrol.Itisalsonotinferiorwhencomparedwithskill trainingworkshop.Themechanismmaybebecausestateanxiety isrelatedtoanindividual’sinterpretationofwhatishappening (Pacheco-Unguetti,Acosta,Callejas,&Lupiáñez,2010),whilebiblio-therapycanhelptheclientschangetheirinterpretationoftheirsit-uationbyinsightgeneration.However,asonlythreestudieswere includedinthemeta-analysis,conclusionsabouttheoveralleffi-cacyoftheinterventionsonimprovinganxietyshouldbeviewed asbeingtentative(Valentine,Pigott,&Rothstein,2010).Inthisre-view,onlySteffenandGrant’s(2016)studyreportedthefollow-up

future. resultsofstateanxiety,unfortunately,theeffectwasnotsustained

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atfollow-up(Hedges’g=0.0757).UnlikethefindingsinSteffen andGrant(2016)study,astudyonpatientswithanxietyandre-lateddisordersshowedthatbibliotherapycouldeffectivelyreduce theanxietywithalargeeffectsize,andthelargeeffectcouldbe maintainedat3month’sfollow-up(Woottonetal.,2018).There-fore,morestudiesonthesustainedeffectsofbibliotherapyonre-ducingcaregiver’sanxietyareneeded.

Onlyonestudyfocusedontraitanxiety,thepooledeffectwas notestimable.Astraitanxietyisrelatedtotheattitudesandstrate-gies,andbibliotherapyhasbeenprovedtobeeffectiveinimprov-ingthecaregivingattitudeamongcaregiversofpeoplewithpsy-chosis(McCannetal.,2013),itmayalsobeeffectiveamonginfor-malcaregiversofneurocognitivedisorder.

*5.4.Implicationsforresearchandpractice*

Fromthissystematicreview,mostofthestudiesinvolvedde-mentiacaregivers,andtherewasalackofstudiesoncaregivers ofothersubtypesofneurocognitivedisorder.Mostofthestud-iesusedvideo-basedorweb-basedbibliotherapy,whichcouldbe disseminatedtolargernumbersofcaregiversregardlessofwhere theyreside,however,thehighattritionrateofweb-basedinter-

ferentmeasurementscales.Duetothecommonalityofcaregiving experiences,thissystematicreviewdidnotlimitthepopulation intoaspecifictypeofneurocognitivedisorder,thismayalsoin-troduceclinicalheterogeneitytoacertainextent.Thestatistical heterogeneityoftheeffectsondepressionmayalsodecreasethe likelihoodofdrawingcorrectinferences.Secondly,thenumberof studieswasnotsufficientfordoingafunnelplotorEgger’sregres-sionasymmetrytest,sotheremaybesomeundiscoveredpublica-tionbias,whichmayalsodistorttheresultsofthissystematicre-view.Inaddition,astheclinicaltrialregistrywasfoundforonly onestudy,theremaybesomeunreportednon-significantfindings thathavenotbeenidentified.Thirdly,onlyarticleswritteninEn-glishlanguageweresearched,theremaybesomelanguageand publicationbias,whichmayhaveresultedinexcludingsomeim-portantstudiesreportedinotherlanguages.Fourthly,asallthe mentalwell-beingoutcomeswereassessedwithsubjectiveinstru-ments,theremaybesomereportingbias.Fifthly,theliterature searchwasconductedinJuly2019,someadditionalpapersmay havebeenpublishedafterthesearchdate.Finally,astherearea lackofhighqualityRCTsidentified,thelevelofevidenceisrela-tivelyweakandthusrecommendationsforpracticearetentative.

ventionsalsoneedsconsiderationinfuturestudies.Asthemajor- **6.Conclusion**

ityofcaregiversarespousalcaregiversofolderpeople(Richardson,

Lee,Berg-Weger,&Grossberg,2013),theiracceptabilityandgrasp oftechnologyneedstobetakenintoconsideration.Anumberof importantfactorshavebeenshowntoinfluenceolderadults’ac-ceptanceoftechnology,e.g.,age,gender,education,self-efficacyof usingtechnologyandfacilitatingconditions(Chen&Chan,2014), futurestudiesusingvideoorweb-basedbibliotherapymaytake thesefactorsintoconsiderationintheirstudydesign.Forthecare-giverswhomayfindtechnologyunacceptable,printedformsof bibliotherapymaybeagoodalternative.Inaddition,themajority ofincludedstudieswerenotofhighqualityandthesamplesizeof moststudieswassmall.Togeneratescientificevidenceforbiblio-therapy,morelargescaleandhigh-qualityRCTsareneededinthe future,particularlythosethataretheoreticallyderived.

Studieshaveshownthatthecaregiverscanreferbacktothe bibliotherapymaterialsasmanytimesastheylike,thereforethe effectscanbesustained(Chien,Yip,Liu,&McMaster,2016).How-ever,asonlythreeincludedstudiesreportedfollowupdata,with differentoutcomesatdifferenttimepoints,thesustainedeffect ofbibliotherapyoneachdiscreteaspectofmentalwell-beingout-comeneedstobeexploredinthefuturestudies.

Thissystematicreviewhasdemonstratedthatbibliotherapyhas positiveeffectsonreducingdepression,improvingself-efficacyfor dealingwithproblembehaviorsandreducingstateanxietyamong informalcaregiversofindividualswithneurocognitivedisorderas comparedwithinactivecontrol.Theeffectonreducingdepression andimprovingself-efficacymayalsobesustainedover3-6months. However,astheheterogeneityamongstudiesondepressionre-ductionwerehigh,andthenumberofstudiesonstateanxiety wassmall,theresultsshouldbeviewedwithsomecaution.When comparedwithanactivecontrol,theeffectofbibliotherapywas notfoundtobeinferiortogroupskilltrainingconditions,thusit mayprovidearesource-savingandeasilyimplementedinterven-tionforsupportinginformalcaregivers.Theeffectsofbibliother-apyonothermentalwell-beingoutcomesareinconclusivedueto thelimitednumberofstudies.Asthequalityofincludedstudies wasrelativelypoor,higherqualitystudieswithrigorousdesigns areneeded,indicatingafertileareaforfutureresearch.

**DeclarationofCompetingInterest**

Unlikethetraditionalgroupintervention,bibliotherapydoesnot None

requireaspecifictimeandplaceforcaregiverstoparticipate,it

alsorequiresminimuminvolvementofprofessionals,whichisin- **Acknowledgements**

expensiveandresource-saving.Therefore,ithaspotentialfordis-

seminationintothecommunitysettings,especiallyforareaswhere resourcesforinformalcaregiversarelimited.Communitynurses coulddisseminatethebibliotherapymaterialstoinformalcare-giversandencourageself-helpwithguidedreading/watching.As

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theguidedreading/watchingarenormallyconductedbyatele- **Fundingsources**

phonecoach,nursescouldalsofacilitatethetelephonefollow-up

incommunityhealthcaresettings. None

*5.5.Limitations*  **Supplementarymaterials**

Thissystematicreviewhasanumberoflimitationsthatshould beconsideredwheninterpretingthefindings.Firstly,substantial heterogeneityexistsintheincludedstudiesofthissystematicre-

Supplementarymaterialassociatedwiththisarticlecanbe found,intheonlineversion,atdoi:[10.1016/j.ijnurstu.2020.103643.](https://doi.org/10.1016/j.ijnurstu.2020.103643)

view.Althoughweseparatelycalculatedtheeffectsizesofstudies **References**

usingactiveandinactivecontrols,anddidsubgroupanalysisfor differentsubtypesofbibliotherapyifapplicable,substantialhetero-geneitystillexistsinsomeaspects,specificallyintermsofdiffer-entcontentsinbibliotherapymaterial,differentdosages,anddif-

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