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**Eficácia da Telemedicina Para Depressão e Ansiedade nos Idosos:
Revisão Sistemática e Metanálise**

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Orientador: Dra. Analuiza Camozzato

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RESUMO

INTRODUÇÃO: Sintomas ansiosos e depressivos são prevalentes nos idosos e acarretam perda de funcionalidade e aumento da mortalidade. Embora o uso de antidepressivos e psicoterapias presenciais sejam indicados, o atual contexto de telemedicina possibilita uma alternativa, com a vantagem de facilitar o acesso ao atendimento. **OBJETIVO:** avaliar a eficácia de intervenções por telemedicina para redução de ansiedade e depressão em idosos por meio de uma revisão sistemática com metanálise. **MÉTODOS:** A revisão sistemática, por meio de uma busca em 7 bases de dados, incluiu estudos que avaliaram o uso de intervenções por telemedicina para sintomas depressivos ou ansiosos em idosos, comparada com outro tipo de teleintervenção ou com tratamento usual ou lista de espera. A avaliação quantitativa foi realizada por meio de metanálise. **RESULTADOS:** Um total de 30 artigos identificados na busca preencheram os critérios de elegibilidade e quatro foram incluídos para metanálise. Os estudos mostraram que intervenções por telemedicina são viáveis e vários destes estudos demonstraram melhora significativa em sintomas depressivos ou ansiosos. Quatro estudos avaliaram a eficácia da terapia cognitivo comportamental por internet para depressão e ansiedade em idosos comparados com lista de espera e os tamanhos de efeito agrupados foram -1,20 (IC 95% -1,60 a -0,81) e -1,14 (IC 95% -1,56 a -0,72), respectivamente, com baixa heterogeneidade. **CONCLUSÃO:** intervenções por telemedicina podem ser uma alternativa para tratamento de sintomas de humor em idosos, não só para aqueles com dificuldade de mobilidade ou moradores de áreas rurais, mas como forma de expandir o acesso ao tratamento especializado, alcançando uma maior parcela da população. Estudos de efetividade e protocolos padronizados para aplicação de intervenção por telemedicina são necessários.

Palavras-chave: idosos; depressão; ansiedade, telemedicina, revisão sistemática; metanálise.

ABSTRACT

INTRODUCTION: Anxiety and depressive symptoms are prevalent in the elderly and lead to loss of functionality and increased mortality. Although the use of antidepressants and face-to-face psychotherapies are indicated, the current context of telemedicine provides an alternative, with the advantage of facilitating access to care.

OBJECTIVE: To evaluate the efficacy of interventions by telemedicine to reduce anxiety and depression in the elderly through a systematic review with meta-analysis.

METHODS: The systematic review, through a search in 7 databases, included studies that evaluated the use of telemedicine interventions for depressive or anxious symptoms in the elderly, compared with another type of virtual intervention or with usual care or waiting list. Quantitative assessment was performed through meta-analysis.

RESULTS: A total of 30 articles identified in the search met the eligibility criteria and four were included for meta-analysis. Studies showed that telemedicine interventions are feasible and several studies demonstrated significant improvement in depressive or anxiety symptoms. Four studies evaluated the efficacy of internet-delivered cognitive behavioral therapy for depression and anxiety in older adults, compared with a waitlist, and found pooled effect sizes of -1,20 (95% CI -1,60 to -0,81) and -1,14 (95% CI -1,56 to -0,72), respectively, with low heterogeneity.

CONCLUSION: Telemedicine interventions can be an alternative for the treatment of mood symptoms in the elderly, not only for those with mobility impairments or residents of rural areas, but also to expand access to specialized treatment, reaching a greater population. Effectiveness studies and guidelines for the application of telemedicine intervention are needed.

Keywords: elderly; depression; anxiety, telemedicine, systematic review; meta-analysis.

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LISTA DE ABREVIATURAS E SIGLAS

BA	Behavioral Activation
BDI	Beck Depression Inventory
CBT	Cognitive Behavioral Therapy
CES-D	Center for Epidemiology Studies Depression Scale
CHF	Chronic Heart Failure
COPD	Chronic Obstructive Pulmonary Disease
DM	Diabetes Mellitus
DVD	Digital Video Disc
GAD	Generalized Anxiety Disease
GAS	Geriatric Anxiety Scale
GDS	Geriatric Depression Scale
HAM-A	Hamilton Anxiety Rating Scale
HAM-D	Hamilton Depression Rating Scale
IBGE	Instituto Brasileiro de Geografia e Estatística
iCBT	Internet-delivered CBT
IPT	Interpersonal Psychotherapy
MADRS	Montgomery Åsberg Depression Rating
MH	Mental Health
OMS	Organização Mundial da Saúde
PHQ-9	Patient Health Questionnaire
PMR	Progressive Muscle Relaxation
PST	Problem-Solving Therapy
RCT	Randomized Clinical Trial
RoB2	Cochrane Collaboration's Risk of Bias Tool for Randomized Controlled Trials
SAH	Systemic Arterial Hypertension
TCC	Terapia Cognitivo Comportamental
UFCSPA	Universidade Federal de Ciências da Saúde de Porto Alegre
UNECE	United Nations Economic Commission for Europe

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1. INTRODUÇÃO

Sintomas depressivos e ansiosos em idosos representam um problema de saúde pública, são prevalentes e muitas vezes coexistem (1). Esses sintomas muitas vezes são minimizados e até normalizados pelos profissionais de saúde como um desfecho inerente ao envelhecimento. No entanto, alguns autores consideram os sintomas depressivos e ansiosos no final da vida como uma síndrome geriátrica semelhante à fragilidade, quedas, incontinência e cognição prejudicada (2). Além disso, aumento da mortalidade e morbidade, perda da funcionalidade, redução da qualidade de vida e aumento do risco cardiovascular têm sido associados à ocorrência de depressão e transtornos de ansiedade em idosos (3) (4). O tratamento eficaz desses transtornos pode melhorar a qualidade de vida, bem como reduzir a incapacidade e desfechos negativos de doenças médicas comórbidas (5) (6) (7).

Tanto a farmacoterapia quanto a psicoterapia podem ser utilizadas como tratamentos de primeira linha na depressão leve a moderada ou nos transtornos de ansiedade em idosos (1) (6) (7) (8). Embora o uso de antidepressivos seja uma importante opção de tratamento para sintomas de ansiedade e depressão, a incidência de eventos adversos tende a ser maior em idosos do que em adultos mais jovens (10). A psicoterapia pode ser uma alternativa eficaz, mais bem tolerada e mais segura (6) (7) (8) (11) e, dentre as psicoterapias, a terapia cognitivo-comportamental (TCC) tem melhores resultados quando comparada a outras intervenções psicoterapêuticas (8) (11).

Um tema interessante e recente nessa área é a psicoterapia por telemedicina, que pode ampliar ainda mais as opções de tratamento de transtornos de humor e ansiedade, mesmo para idosos. Os benefícios da telemedicina, aqui denominados como sinônimos de telessaúde, ficaram claros nos últimos anos e podem superar barreiras relacionadas a diferenças culturais, distância geográfica, deficiências físicas e custos (11). As intervenções de telepsiquiatria podem ser tão eficazes quanto as intervenções presenciais (12). Uma revisão sistemática examinou o uso da telepsiquiatria para idosos com o objetivo de aumentar o acesso a cuidados especializados de alta qualidade e reduzir custos e mostrou que essas intervenções

são viáveis e bem aceitas (13). A aplicação da telemedicina também se mostrou útil, integrando e melhorando o atendimento às complexas necessidades de saúde e sociais de pacientes com múltiplas morbidades (14), embora os custos dos programas de telepsiquiatria para atendimento em saúde mental tenham variado amplamente, de acordo com uma revisão sistemática anterior (15). Além disso, a recente pandemia de COVID-19 solidificou a telemedicina como forma de atenção à saúde e ampliou os limites do cuidado, antes destinado apenas a pacientes domiciliares ou residentes de áreas rurais (16) (17).

2. REVISÃO DE LITERATURA

2.1 Envelhecimento da População

O fenômeno do envelhecimento populacional é novo na humanidade e a proporção de pessoas com 60 anos ou mais está aumentando em velocidade sem precedentes, especialmente em países em desenvolvimento. Portanto, países como o Brasil precisam se adaptar mais rapidamente ao envelhecimento da população, se comparado a países desenvolvidos (18).

Segundo dados do Instituto Brasileiro de Geografia e Estatística (IBGE), a expectativa de vida da população brasileira chegou a 76,8 anos em 2020_(19). Neste contexto de envelhecimento populacional, a Organização Mundial da Saúde (OMS) desenvolveu o plano da Década de Envelhecimento Saudável 2020-2030 (20), que envolve diversas áreas de cuidado para que os idosos tenham uma vida melhor, assim como suas famílias e a sociedade. Dentre as áreas de ação, o combate ao “*ageism*”, definido como preconceitos e discriminação com base na idade (21), e o cuidado integrado incluem – especialmente – aspectos relacionados a saúde mental (20).

2.2 Transtorno de Ansiedade em Idosos

Os transtornos de ansiedade ocorrem em cerca de 8% dos idosos (1), frequentemente são comórbidos com transtornos depressivos (22) (23) e, muitas vezes, minimizados e até mesmo normalizados pelos profissionais de saúde como um desfecho inerente ao envelhecimento.

Sintomas ansiosos estão presentes em 65% dos idosos deprimidos (23). Os transtornos de ansiedade comórbidos estão associados a depressão mais grave, aumento da tendência suicida e maior incapacidade funcional (24). Idosos com transtorno de ansiedade são mais propensos a procurar atendimento de emergência e serem hospitalizados do que adultos mais jovens (25).

Os transtornos de ansiedade comumente estão associados a comorbidades clínicas (1). Doença pulmonar obstrutiva crônica (DPOC) e doença cardiovascular (DCV) são mais frequentemente associadas com ansiedade (26) (27). Em pessoas com DCV, a ansiedade confere maior risco de doença cardíaca do que os transtornos depressivos e aumentam o risco de eventos coronarianos para pessoas com DCV estabelecida (27). Pacientes com DPOC e transtornos de ansiedade comórbidos costumam apresentar mais limitações funcionais autorrelatadas, menor tolerância ao exercício e maior frequência de exacerbações agudas da DPOC (28)).

Terapia cognitivo-comportamental, treinamento de relaxamento e terapia de suporte podem ser uma alternativa à farmacoterapia no tratamento da ansiedade. Especialmente para idosos que não toleram o uso de psicofármacos devido a efeitos colaterais e outras complicações da polifarmácia (29). A terapia cognitivo-comportamental também é eficaz na redução dos sintomas de preocupação e depressão entre idosos com Transtorno de Ansiedade Generalizada (TAG) na atenção primária (30).

2.3 Transtornos Depressivos em Idosos

A depressão em idosos é um transtorno psiquiátrico comum. A prevalência de transtorno depressivo maior em amostras comunitárias de adultos com 65 anos ou mais varia de 1 a 5% nos Estados Unidos e internacionalmente (31). A ocorrência de sintomas depressivos que não preenchem os critérios para o diagnóstico de transtorno depressivo maior é bastante importante entre os idosos, com taxas entre 10% e 15% (32). Idosos deprimidos costumam apresentar mais queixas cognitivas, sintomas somáticos, distúrbios de sono, fadiga e anedonia do que pacientes jovens (31).

As taxas de depressão são elevadas nos pacientes com comorbidades clínicas, com aumento proporcional ao número e à gravidade das comorbidade, com taxas variando de 5 a 10% na atenção primária (33), e até 37% após internações de cuidados intensivos (34). A depressão é particularmente prevalente em doenças cardiovasculares. Aproximadamente 20-25% dos pacientes com doença cardíaca têm

depressão maior, e outros 20-25% relatam sintomas depressivos (35). As consequências da depressão em pacientes com doença cardíaca incluem reinternação, recuperação mais lenta, incapacidade, mortalidade e aumento dos custos de saúde (36). O risco de diabetes mellitus é maior em pacientes com sintomas depressivos ou transtorno depressivo maior e parece ser independente de comportamentos de saúde e de outros fatores de risco (37). A depressão associada a comorbidades gera preocupações com a polifarmácia, incluindo os efeitos das drogas psicotrópicas nas condições médicas e no metabolismo de outros medicamentos. Declínios no metabolismo de drogas, relacionados à idade, também podem contribuir para o aumento dos efeitos colaterais de medicamentos (38).

A depressão em idoso é mais grave, persistente e difícil de tratar quando combinada com ansiedade (39). As taxas de sintomas somáticos, incapacidade e suicídio são maiores em idosos com ansiedade sobreposta à depressão do que naqueles com depressão isolada (40). O suicídio entre os idosos está mais associado à depressão do que em qualquer outra idade (41). Os idosos tendem a usar meios mais letais, e o comportamento suicida é mais provável de ser fatal do que em qualquer outra idade. Além disso, as mortes por suicídio de adultos mais velhos refletem um nível mais alto de intenção e mais planejamento. Idosos são menos propensos a verbalizar pensamentos suicidas. Apesar disso, há registros que de idosos geralmente visitam um médico pouco antes da morte (42).

O tratamento da depressão em pacientes idosos é abordado da mesma forma que para pacientes mais jovens. Os principais tratamentos são antidepressivos e psicoterapias específicas para depressão, como terapia cognitiva e terapia interpessoal (43). No entanto, a eficácia dos medicamentos antidepressivos entre os idosos é muitas vezes insatisfatória e a prevalência de efeitos colaterais tende a ser maior em comparação aos adultos mais jovens (44). Fatores protetores incluem escolaridade, renda e espiritualidade, entre outros. Intervenções preventivas, incluindo educação para indivíduos com doenças crônicas, ativação comportamental, reestruturação cognitiva, treinamento de habilidades para resolução de problemas, terapia de apoio em grupo, podem ser úteis (43).

2.4 Definição de Telemedicina

Conhecimentos da tecnologia de informação e comunicação têm sido incorporados, nas últimas décadas, aos cuidados em saúde (45) (46) seja para prevenção, diagnóstico, tratamento, monitoramento, educação ou gestão da saúde. O uso de tecnologias digitais na saúde tem se destacado como um campo de implementação inovadora da tecnologia de informação e comunicação para atender às necessidades de saúde (47).

Neste campo, há uma falta de consenso a respeito de uma definição clara e única de cada termo utilizado (48) (49) (50) , por exemplo, um estudo de 2007 encontrou 104 definições da palavra telemedicina (51). A Organização Mundial da Saúde (OMS) adota a seguinte descrição ampla de telemedicina: “A prestação de serviços de saúde, onde a distância é um fator crítico, por todos os profissionais de saúde que utilizam tecnologias de informação e comunicação para a troca de informações válidas para diagnóstico, tratamento e prevenção de doenças e lesões, pesquisa e avaliação, e para a educação continuada dos prestadores de cuidados de saúde, tudo no interesse de melhorar a saúde dos indivíduos e suas comunidades” (50).

As diversas definições destacam que a telemedicina é uma ciência aberta e em constante evolução, pois incorpora novos avanços na tecnologia e se adapta às necessidades de saúde e contextos em mudança das sociedades. Para os fins deste trabalho, telemedicina e telessaúde são tratados como sinônimos e usados de forma intercambiável (51), assim como as estratégias de busca utilizadas nas bases de dados incluíram os termos acima, entre outros, tornando-as mais amplas.

2.5 Exclusão Digital

A lacuna entre aqueles que têm acesso à tecnologia da informação e comunicação e aqueles que não têm pode ser entendida como exclusão digital. (36).

Portanto, alguns indivíduos se beneficiam do cenário mundial, enquanto outros sofrem com as iniquidades sociais e estruturais (53)

Embora a literatura indique que a idade pode estar associada negativamente ao uso de recursos de telemedicina e à exclusão digital, o conceito de diferenças geracionais no uso da tecnologia com base apenas na idade deve ser contestado (54) (55). O uso de tecnologia entre adultos de todas as idades é influenciado por vários fatores, incluindo gênero, educação e status socioeconômico (56), bem como fatores não demográficos, como sensação de autoeficácia e ansiedade ao utilizar meios digitais (57).

Um estudo publicado em 2018, comparou a eficácia de uma intervenção por telemedicina para depressão entre pessoas de 18 a 35 anos e de 50 a 65 anos. A intervenção foi superior ao controle e igualmente efetiva entre as duas faixas etárias. Além disso, os adultos com idade entre 50 e 65 anos tiveram atitudes mais positivas se comparados aos jovens (58).

A OMS, por meio da sua Comissão Econômica para a Europa (UNECE) (59), destaca que as deficiências físicas, como visuais e auditivas, e cognitivas podem ser barreiras ao uso das tecnologias pelos idosos e salienta a importância de promover, não só a inclusão digital entre os idosos por meio do aprendizado intergeracional e do desenvolvimento de habilidades digitais, mas também a adaptação das tecnologias digitais às necessidades dos idosos.

2.6 Eficácia da Telemedicina

Os benefícios da telemedicina ficaram claros nos últimos anos e podem superar barreiras relacionadas a diferenças culturais, distância geográfica, deficiências físicas e custos (60). A telemedicina era particularmente valiosa para aqueles que viviam em áreas remotas, para grupos vulneráveis e populações em envelhecimento (61) (62). Entretanto, a recente pandemia de COVID-19 solidificou a telemedicina como forma de atenção à saúde e ampliou os limites do atendimento (17).

A área da saúde mental é, particularmente, adequada ao uso de telemedicina, pois envolve principalmente o contato audiovisual e depende menos do exame físico. A telepsiquiatria para pacientes idosos têm o potencial de aumentar o acesso a cuidados especializados e de alta qualidade, reduzindo custos (63). Há um crescente corpo de evidências mostrando que a telepsiquiatria é altamente eficaz para uma variedade de diagnósticos e é bem aceita por pacientes de diversas origens e idades (64). Além disso, estudos demonstraram que a telepsiquiatria fornece resultados clínicos equivalentes aos serviços presenciais (65) (66).

Intervenções psicológicas *online* representam uma abordagem alternativa e já são recomendadas por algumas diretrizes de tratamento de depressão para adultos com sintomas depressivos leves (60). A TCC guiada pela Internet (ICBT) é uma abordagem inovadora para fornecer tratamento, que tem o potencial de aumentar acessibilidade dos serviços de saúde mental para idosos. Alguns estudos apoiaram a eficácia clínica do ICBT no tratamento de problemas de saúde mental em idosos, incluindo sintomas depressivos e ansiosos (67) (68).

3. JUSTIFICATIVA

Devido à alta frequência e coexistência de depressão e ansiedade em idosos, é necessário que se conheça o atual “estado da arte” ou o grau de evidência em relação à eficácia das intervenções por telemedicina para tratamento de sintomas depressivos e ansiosos em idosos.

Recentemente, uma revisão sistemática (69) avaliou a eficácia da telemedicina para sintomas depressivos em idosos e descobriu que intervenções como terapia cognitivo comportamental por internet ou telefone foram viáveis, com alguns estudos mostrando efeitos significativos deles sobre os sintomas depressivos. Essa mesma revisão apontou para a escassez de estudos examinando intervenções virtuais em idosos com depressão e a necessidade urgente de explorar melhor essa questão.

O presente estudo buscou ampliar a investigação avaliando a eficácia de intervenções por telemedicina sobre sintomas ou transtornos depressivos e também sobre sintomas ou transtornos de ansiedade em idosos por meio de uma revisão sistemática; conduzindo uma meta-análise e, comparando a eficácia entre a telemedicina e o atendimento presencial usual, ou lista de espera ou entre diferentes tipos de telemedicina.

4. OBJETIVOS

4.1 Objetivo Geral

Avaliar o efeito de intervenções por telemedicina na redução de sintomas ansiosos e depressivos na população idosa por meio de uma revisão sistemática e, se possível, de uma metanálise.

4.2 Objetivos específicos

- Fazer uma busca sistemática abrangente da literatura existente sobre intervenções por telemedicina para sintomas depressivos e depressivos em idosos.
- Avaliar e interpretar todas as pesquisas identificadas.
- Sumarizar as evidências existentes
- Comparar a eficácia das intervenções por telemedicina em relação às intervenções usuais presenciais ou à lista de espera
- Avaliar se há superioridade entre diferentes tele intervenções.
- Fazer uma metanálise dos dados encontrados, se possível, para gerar dados mais precisos e robustos.
- Identificar as possíveis razões para eventual heterogeneidade dos resultados, se for o caso.
- Identificar possíveis lacunas com vistas a novas pesquisas a serem feitas.

5. HIPÓTESE

Nossa hipótese é que as intervenções por telemedicina serão eficazes na redução de sintomas ansiosos e depressivos em idosos; e que a TCC por telefone ou internet será melhor do que outras intervenções virtuais.

6. ARTIGO

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Efficacy Of Telemedicine Interventions For Depression And Anxiety in Older People: A Systematic Review And Meta-Analysis

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Abstract

Introduction: Anxiety and depression are prevalent in the elderly and lead to loss of functionality and increased mortality. Although the use of antidepressants and face-to-face psychotherapies are indicated, the current context of telemedicine provides an alternative, with the advantage of facilitating access to care.

Objective: To evaluate the efficacy of telemedicine interventions to reduce anxiety and depression in the elderly through a systematic review with meta-analysis.

Methods: The systematic review, through a search in 7 databases, included studies that evaluated the use of telemedicine interventions for depressive or anxious symptoms in the elderly, compared with usual care or waiting list or with another type of virtual intervention. Quantitative assessment was performed through meta-analysis.

Results: A total of 30 articles identified in the search met the eligibility criteria and four were included for meta-analysis. Studies showed that telemedicine interventions are feasible and several studies demonstrated significant improvement in depressive or anxiety symptoms. Four studies evaluated the efficacy of internet-delivered cognitive behavioral therapy for depression and anxiety in older adults, compared with a waitlist,

and found pooled effect sizes of -1.20 (95% CI -1.60 to -0.81) and -1.14 (95% CI -1.56) to -0.72), respectively, with low heterogeneity.

Conclusion: Telemedicine interventions can be an alternative for the treatment of mood and anxiety symptoms in the elderly. Effectiveness studies and guidelines for the application of telemedicine intervention are needed.

Keywords: older adults; depression; anxiety, telemedicine, systematic review; meta-analysis.

Introduction

Depressive and anxious symptoms in the elderly are prevalent, frequently comorbid, and represent a public health problem (Mackenzie *et al.*, 2011). These symptoms are often minimized and even normalized by health professionals as inherent to aging. However, some authors consider depressive and anxious symptoms in late life as a geriatric syndrome like frailty, falls, incontinence, and impaired cognition (Kastenschmidt *et al.*, 2011). Additionally, increased mortality and morbidity, loss of functionality, reduced quality of life, and increased cardiovascular risk have been associated with the occurrence of depression and anxiety disorders in the elderly (Scott *et al.*, 2013; Lin *et al.*, 2010; Katon *et al.*, 2005). Effective treatment of these disorders can improve quality of life (Lenze *et al.*, 2003), as well as reduce disability and poorer outcomes of comorbid medical illness (Kastenschmidt *et al.*, 2011; Taylor *et al.*, 2014; Kok *et al.*, 2017; Aggarwal *et al.*, 2017; Zenebe *et al.*, 2021).

Either pharmacotherapy or psychotherapy may be used as first-line treatments in mild-moderate geriatric depression or late anxiety disorders (Mackenzie *et al.*, 2011; Taylor *et al.*, 2014; Kok *et al.*, 2017; Aggarwal *et al.*, 2017). Although the use of antidepressants is an important treatment option for anxiety and depressive symptoms, the incidence of adverse events tends to be higher in elderly than in younger adults (Coupland *et al.*, 2011), also the occurrences of drug interactions due to polypharmacy in older are often seen (Vrdoljak *et al.*, 2015). Psychotherapy can be an effective, better tolerated, and safest alternative (Taylor *et al.*, 2014; Kok *et al.*, 2017; Aggarwal *et al.*,

2017; Sadler *et al.*, 2018) and cognitive behavior therapy (CBT) showed better results when compared to other psychotherapeutic interventions (Aggarwal *et al.*, 2017; Sadler *et al.*, 2018).

An interesting and recent topic in this field is psychotherapy delivered by telemedicine, which can further expand the options for treating mood and anxiety disorders, even for elderly people. The benefits of telemedicine, here named as synonyms of telehealth and eHealth, became clear in recent years, and may overcome barriers related to cultural differences, geographic distance, physical disabilities, and costs (Katon *et al.*, 2005). Telemental health interventions can be as effective as face-to-face interventions (O'Reilly *et al.*, 2007). A systematic review (Gentry *et al.*, 2018) examined the use of geriatric telemental health to increase access to high-quality specialty care and to reduce costs and showed that these interventions as feasible and well accepted. The application of telemedicine has also proved to be useful, integrating and improving care for the complex health and social needs of multimorbid patients (Kraef *et al.*, 2020), although the costs of telepsychiatry programs for mental health care varied widely, according to a previous systematic review (Naslund *et al.*, 2022). In addition, the recent COVID-19 pandemic solidified telemedicine as a way of health care and expanded the limits of care, previously intended only for homebound patients or residents of rural areas (Brignell *et al.*, 2007; Patel *et al.*, 2020).

Recently, a systematic review evaluated the efficacy of telemedicine for depressive symptoms in the elderly and found that interventions such as internet-delivered or telephone CBT had been feasible with some studies showing significant effects of them on depressive symptoms (Goodarzi *et al.*, 2022). This same review pointed to the paucity of studies examining virtual interventions in older adults with depression and the urgent need to better explore this issue. Considering the high frequency and co-occurrence of depression and anxiety in older subjects, the present study aimed to extend this investigation by evaluating the efficacy of interventions by telemedicine on reducing depressive and anxious symptoms or disorders in older people through a systematic review and meta-analysis. Moreover, we aimed to compare the efficacy between telemedicine interventions and usual care or waitlist, and among different types of telemedicine on these symptoms. We hypothesized that telemedicine interventions will be effective in reducing geriatric anxiety and depressive

symptoms and that CBT phone or internet-delivered (iCBT) will be more effective than other telemedicine interventions.

Methods

This systematic review and meta-analysis are presented as suggested by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Statement (Page *et al.*, 2021). It was registered on PROSPERO CRD42021254304 (Oliveira *et al.*, 2021).

Eligibility Criteria

The PICO strategy (Santos *et al.*, 2007) was used for the search in databases and elaboration of the search strategy. The population of the study was individuals 60 years or older. The intervention was any type of telemedicine, here treated as synonyms of broader concepts as telehealth and eHealth (Fatehi *et al.*, 2012). The comparison was usual care/standard care, waitlist, or different types of telemedicine interventions. The outcome was the reduction of depressive and/or anxious symptoms identified by any assessment instrument designed to evaluate these symptoms. Randomized controlled trials (RCT), quasi-experimental studies, interrupted time series analysis, and pre-test and post-test experiments could be included. Exclusion criteria were studies that included participants with dementia, severe hearing or visual impairment, or any other condition that was not related to depression or anxiety. There was no restriction regarding language or year of publication.

Data Sources and Strategy

We searched MEDLINE, EMBASE, PsycINFO, CINAHL, Web of Science, LILACS, and The Cochrane Library from inception to August 2021. The following search terms were used for all databases: “Depression, Depressive Disorder, Anxiety, Anxiety Disorders” com “Aged” e “Telemedicine”. Complete search strategy used for the PubMed database is presented in the Supplement Material.

Study Selection

Two reviewers (PBFO and TMD) independently screened titles and abstracts identified by the initial search. Abstracts that did not provide sufficient information about the inclusion and exclusion criteria were selected for full-text evaluation. Disagreements between the two reviewers were resolved by consensus or involving a third reviewer (AC). In the second phase, the same reviewers (PBFO and TMD) independently assessed the full texts of the articles according to the eligibility criteria specified above.

Data Extraction

The same reviewers (PBFO and TMD) independently extracted data from the selected articles, recording the following information, if available: study characteristics (site, inclusion and exclusion criteria, sample size, age, and population characteristic), study design, intervention (type, self or therapist guided, professional expertise, duration, frequency), and control characteristics (type, duration, frequency), diagnostic criteria, assessment scales for depressive and anxious symptoms and results. Any discrepancies were solved by discussion and consensus among reviewers.

Outcomes

This review evaluated two outcomes: reduction of depressive and/or anxious symptoms rated by any assessment scale designed to evaluate these symptoms and whether they were primary or secondary outcomes in the primary studies.

Risk of bias assessment

Version 2 of the Cochrane Collaboration's Risk of Bias Tool for Randomized Controlled Trials (RoB 2) (Sterne *et al.*, 2019) was applied to assess the risk of bias in studies included in this systematic review. Two raters answered independently the “signaling questions” regarding the set of domains of bias, focusing on different

aspects of trial design, conduct, and reporting. The RoB 2 gives a judgment about the risk of bias for each domain through its algorithm classifying these domains as “Low” or “High” or with “Some concerns”.

Statistical analysis

A pairwise meta-analysis was performed. Efficacy was estimated as standardized mean difference (SMD). The standardized mean change for each intervention group was first calculated by subtracting the initial score from the final scores of anxiety and depressive symptoms. After, the standardized mean change from psychotherapy was subtracted from that shown by wait list interventions (Morris *et al.*, 2007) assuming a correlation between initial and final means of 0.25, based on previous reports (Cuijpers *et al.*, 2017) of outcome measures concerning mental health assessments SMDs values of 0.2, 0.5, and 0.8 were judged as small, moderate, and large size differences (Cohen *et al.*, 1988), respectively, and the estimated effect sizes were reported through forest plots. An *a priori* statistical power analysis was conducted using the following parameters: total number of studies of four, average of 20 individuals per intervention arm, expected effect size of 0.8, and moderate heterogeneity (Valentine *et al.*, 2010). This analysis indicated a statistical power of 85%, suggesting that models with similar parameters would have adequate statistical power. Heterogeneity was measured through I^2 and Cochran's Q test. Given the limited number of studies included, it was not possible to formally evaluate the possibility of publication bias. A corresponding 95% confidence interval (CI) was estimated for all measures. Two-sided P values < 0.05 were considered statistically significant. Analyses were performed using R (version 4.2.1), with the package 'metafor' (Viechtbauer *et al.*, 2010).

Results

Study identification and selection

The literature searches yielded 822 potentially relevant publications after duplicates were removed (Figure 1). After screening of the title and abstracts, 728 studies were excluded due to no fulfillment of the inclusion criteria. Ninety studies were assessed for eligibility and 60 were excluded. Reasons for exclusion are shown in Figure 1. Most of them were excluded because they did not include only older people and did not present results by age subgroup. A total of 30 articles met inclusion criteria and were included in the systematic review. Two studies with the same sample and methods described separately the results from shorter (Brenes *et al.*, 2015) and longer follow-ups (Brenes *et al.*, 2017).

Characteristics of eligible studies

Studies and participants characteristics are presented in Table 1. All analyses were carried out in developed countries, most of them in the USA, the majority enrolling community samples, and they were published after 2003. Most of them were randomized clinical trials, with only 2 being quasi-experimental designs.

The sample size of studies ranged from 21 to 1018 participants, 12 studies (40%) had more than 100 subjects, 12 studies (40%) showed sample sizes varying from 50 to 99 subjects, and six studies (20%) reported small samples (< 50 participants at baseline). There was a female sex preponderance, approximately 64%.

From the total 30 included studies, 17 (57%) had participants with anxiety and/or depressive symptoms at baseline (six studies with depressive, seven with anxiety, and four with both symptoms) (Table 1). In other studies, the diagnosis at baseline was a clinical disease, mainly heart disease, while anxiety or depressive symptoms were secondary outcomes. The most frequent rating scales for depressive symptoms were the *Patient Health Questionnaire* (PHQ-9) (N=20) (Aburizik *et al.*, 2013; Bakas *et al.*, 2018; Choi *et al.*, 2020_1; Gustafson *et al.*, 2021; Mavandadi *et al.*, 2015; Silfvernagel *et al.*, 2018; Stahl *et al.*, 2020; Titov *et al.*, 2016; Dear *et al.*, 2015; Gellis *et al.*, 2012; Gellis *et al.*, 2014; Gould *et al.*, 2019; Jones *et al.*, 2016; Read *et al.*, 2020; Riegel *et al.*, 2006; Schoene *et al.*, 2015; Shapira *et al.*, 2021; Titov *et al.*, 2015; Tomasino *et al.*, 2017; Villani *et al.*, 2014) and for anxiety were *Generalized Anxiety Disorder-7 items scale* (GAD-7) (N=10) (Brenes *et al.*, 2015; Brenes *et al.*, 2017; Mavandadi *et*

al., 2015; Silfvernagel *et al.*, 2018; Titov *et al.*, 2016; Dear *et al.*, 2015; Jones *et al.*, 2016; Riegel *et al.*, 2006; Titov *et al.*, 2015; Tomasino *et al.*, 2017).

In half of included studies (Aburizik *et al.*, 2013; Bakas *et al.*, 2018; Brenes *et al.*, 2012; Brenes *et al.*, 2015; Brenes *et al.*, 2017; Choi *et al.*, 2020; Choi *et al.*, 2020_1; Gellis *et al.*, 2012; Gellis *et al.*, 2014; DiNapoli *et al.*, 2017; Hartke and King, 2003; Kornblith *et al.*, 2006; Mavandadi *et al.*, 2015; Riegel *et al.*, 2006; Shapira *et al.*, 2021) the telemedicine intervention was totally interactive and, in seven of them (Aburizik *et al.*, 2013; Brenes *et al.*, 2012; Brenes *et al.*, 2015; Brenes *et al.*, 2017; DiNapoli *et al.*, 2017; Hartke and King, 2003; Mavandadi *et al.*, 2015) participants were in contact with mental health professionals, like psychologists. In the other studies, the virtual intervention was self or professional-guided by monitoring, was delivered by app or website including a brief contact with professionals or was planned by health professionals. The use of psychotropic drugs was not reported in half of the studies (N=15) (Aburizik *et al.*, 2013; Bakas *et al.*, 2018; Bott *et al.*, 2019; Choi *et al.*, 2020; DiNapoli *et al.*, 2017; Gellis *et al.*, 2012; Gustafson *et al.*, 2021; Kenealy *et al.*, 2015; Mavandadi *et al.*, 2015; Schoene *et al.*, 2015; Hartke and King, 2003; Kornblith *et al.*, 2006; Schwarz *et al.*, 2008; Shapira *et al.*, 2021; Villani *et al.*, 2014). The use of antidepressants, if not on a stable dose for at least 1 month, was an exclusion criteria for some included studies (N= 8) (Brenes *et al.*, 2012; Brenes *et al.*, 2015; Brenes *et al.*, 2017; Choi *et al.*, 2020_1; Dear *et al.*, 2015; Jones *et al.*, 2016; Silfvernagel *et al.*, 2018; Titov *et al.*, 2015), while another six trials described current use of antidepressant varying from 8 to 32%, without more details (Gellis *et al.*, 2014; Riegel *et al.*, 2006; Tomasino *et al.*, 2017; Gould *et al.*, 2019; Read *et al.*, 2020; Titov *et al.*, 2016). Patients who had recently received psychotherapy were excluded from several trials (N=14) (Aburizik *et al.*, 2013; Brenes *et al.*, 2012; Brenes *et al.*, 2015; Brenes *et al.*, 2017; Choi *et al.*, 2020_1; Dear *et al.*, 2015; DiNapoli *et al.*, 2017; Tomasino *et al.*, 2017; Titov *et al.*, 2015; Titov *et al.*, 2016; Gould *et al.*, 2019; Hartke and King, 2003; Read *et al.*, 2020; Silfvernagel *et al.*, 2018).

The most frequent causes of participants dropouts were illness, death, institutionalization and being unable to contact. Of all the included studies, only one (Bott *et al.*, 2019) does not present data about dropouts.

Table 2 shows the study outcomes with depressive and/or anxious symptoms or disorders. The results were subgrouped into trials comparing two or more types of telemedicine intervention (N=11/36,7%) and studies that made comparisons between telemedicine intervention and non-telemedicine intervention (N=19/63,4%). Most studies reported immediate post-intervention outcomes at 8 to 12 weeks, and five trials reported outcomes at 24 to 52 weeks.

Study outcomes

Trials comparing two or more telemedicine interventions

In six studies intervention was delivered by phone (Aburizik *et al.*, 2013; Brenes *et al.*, 2015; Brenes *et al.*, 2017; DiNapoli *et al.*, 2017; Mavandadi *et al.*, 2015; Stahl *et al.*, 2020), while the others used internet (Choi *et al.*, 2020; Choi *et al.*, 2020_1; Gustafson *et al.*, 2021; Silfvernagel *et al.*, 2018; Titov *et al.*, 2016). In six trials, cognitive behavioral therapy delivered by Internet (iCBT) (Choi *et al.*, 2020; Choi *et al.*, 2020_1; Silfvernagel *et al.*, 2018) or by phone (Brenes *et al.*, 2015; Brenes *et al.*, 2017; DiNapoli *et al.*, 2017), during 5 to 16 weeks, was significantly better than supportive telemedicine intervention in reducing depressive (Brenes *et al.*, 2015; Brenes *et al.*, 2017; Choi *et al.*, 2020; Choi *et al.*, 2020_1; DiNapoli *et al.*, 2017; Silfvernagel *et al.*, 2018) and anxiety symptoms (Brenes *et al.*, 2015; Brenes *et al.*, 2017; DiNapoli *et al.*, 2017; Silfvernagel *et al.*, 2018). Behavioral activation only was applied in two studies (Choi *et al.*, 2020; Choi *et al.*, 2020_1), and full CBTs protocols were used in four studies (Brenes *et al.*, 2015; Brenes *et al.*, 2017; DiNapoli *et al.*, 2017; Silfvernagel *et al.*, 2018). The work of Titov and colleagues (Titov *et al.*, 2016), compared clinician-guided and self-guided versions of a transdiagnostic iCBT for symptoms of anxiety and depression in older adults living in the community (N=433) and showed significant and sustained reductions for all groups.

In the study of Mavandadi and colleagues (Mavandadi *et al.*, 2015) telephone care was delivered by health technicians or behavioral health providers to 1018 older, community-dwelling, low-income adults prescribed an antidepressant or anxiolytic. They compared the efficacy of telemonitoring alone with the telemonitoring plus care management that used algorithm-based management strategies for depression and

anxiety and demonstrated a statistically significant group-by-time interaction between interventions reporting greater improvement in the care management group.

Two studies (Aburizik *et al.*, 2013; Stahl *et al.*, 2020) did not show differences between telemedicine interventions, and, one study (Gustafson *et al.*, 2021) reported no efficacy of any telemedicine intervention for depressive symptoms in older individuals with health challenges.

Trials comparing telemedicine intervention with non-telemedicine intervention

Seventeen RCTs and 2 quasi-experimental studies compared the effectiveness of some telemedicine interventions with usual care, waitlist, or other intervention not delivered by phone or internet on reducing depressive or anxiety symptoms in older people (Table 2). Internet, video, or phone-delivered CBT was the most frequently used therapy, applied in 10 studies (Brenes *et al.*, 2012; Dear *et al.*, 2015; Gellis *et al.*, 2012; Gellis *et al.*, 2014; Gould *et al.*, 2019; Jones *et al.*, 2016; Read *et al.*, 2020; Shapira *et al.*, 2021; Titov *et al.*, 2015; Tomasino *et al.*, 2017). Some of them used at least one CBT component, such as mindfulness, problem-solving skills, BA, interpersonal skills, progressive muscle relaxation (PRM), diaphragmatic breath, and psychoeducation, while other studies used full CBT protocols. In general, CBT by telemedicine was more effective than non-telemedicine interventions. A smaller and marginally significant efficacy of a short-term digital group CBT intervention for depressive symptoms in older individuals during the COVID-19 outbreak was observed in the work of Shapira and cols (Shapira *et al.*, 2021).

Two studies evaluated telemonitoring of vital and clinical symptoms and education about comorbidities were done for elderly patients with comorbidities such as diabetes, heart failure (HF), and chronic obstructive pulmonary disease (COPD) in comparison with usual care (Kenealy *et al.*, 2015; Schwarz *et al.*, 2008). There was no reduction of depressive symptoms in both studies, while anxiety symptoms improved only when they were measured by HAD scale (Kenealy *et al.*, 2015). Similar results were observed in other two trials that compared telemonitoring of anxious and depressive symptoms, besides clinical telemonitoring, at intervals from 1 to 3 months, for frail elderly people, due to serious clinical diseases (Kornblith *et al.*, 2006) or with

a high risk of heart failure (Villani *et al.*, 2014), compared with usual care. One study (Kornblith *et al.*, 2006) included phone monitoring by a health professional, while in the other (Villani *et al.*, 2014) the monitoring was done by software installed on digital devices such as cell phones and tablets. Telemonitoring was effective when evaluated by the HAD scale, but the same effect was not maintained when evaluated by the GDS-15 scale in the Kornblith study. There were no significant differences due to telemonitoring for any outcomes in the other trial (Villani *et al.*, 2014).

Other studies used more personalized and interactive telemedicine intervention, telepresence robots (Bakas *et al.*, 2018), and a telephone approach (Riegel *et al.*, 2006) to create action plans to manage chronic clinical conditions in older people compared with a waitlist and usual care, respectively. The study of Bakas and cols (Bakas *et al.*, 2018), in a small sample, showed moderate improvement in depressive symptoms for the T-CHAT group. In the study of Riegel and cols (Riegel *et al.*, 2006) telemedicine intervention and usual care were both effective, but there was no difference between them. In addition, there was no superiority of a protocol-driven bedside digital conversational agent (animal avatar) on loneliness, depression, delirium and falls among hospitalized older adults in comparison with nurse face-to-face visits (Bott *et al.*, 2019). Neither interactive cognitive-motor training (Schoene *et al.*, 2015) nor a supportive telephone conference group (Hartke and King.; 2003) was effective for depressive symptoms in community-dwelling older or older stroke caregivers, respectively.

A meta-analysis was performed with 4 clinically homogeneous studies (Dear *et al.*, 2015; Jones *et al.*, 2016; Titov *et al.*, 2015; Tomasino *et al.*, 2017). They applied the same outcomes measures (eg, reduction of depressive symptoms was measured by PHQ-9 and of anxiety symptoms by GAD-7), similar intervention (iCBT) and comparison (waitlist), and we could access mean and standard deviation of each study arm in baseline and follow-up assessment. The pooled effect size for depressive and anxiety symptoms was -1.20 (95% CI -1.60 to -0.81) and -1.14 (95% CI -1.56 to -0.72), respectively, with a mean number of 24 participants per intervention arm and low heterogeneity (Figure 2 and 3), presenting adequate statistical power, as indicated by the statistical power analysis. All of them reported immediate post-intervention outcomes at 8 to 12 weeks. None included older participants with severe or psychotic

mood or anxiety disease, suicide risk, substance use, and significant clinical disease. Half of them (Dear *et al.*, 2015; Jones *et al.*, 2016) had anxiety as the main outcome, while in the other two, depression was the main outcome (Titov *et al.*, 2015; Tomasino *et al.*, 2017). The trials of Dear and Titov applied 8-week iCBT (“Managing Stress and Anxiety Course” and The “Managing Your Mood Course”, respectively) to older Australian residents who self-reported difficulties with anxiety (Dear *et al.*, 2015) and depressive symptoms (Titov *et al.*, 2015). Jones and colleagues (Jones *et al.*, 2016) evaluated the efficacy of 7 weeks of guided iCBT (“GAD Online for Older Adults”) for older adults with diagnosed or subclinical Generalized Anxiety Disorder (GAD). In the work of Tomasino and colleagues (Tomasino *et al.*, 2017) the “MoodTech”, an 8-week online intervention for depression based on CBT principles, was evaluated for adults 65 years and older with depressive symptoms at screening. This study compared 3 groups: iCBT delivered individually, iCBT delivered individually with peer support (also digital), and a waitlist control group. For the meta-analysis, the results from the iCBT delivered individually with a peer support group were not included, since it uses a different component. A brief weekly contact (15-30min), by phone or email, with a clinical psychologist, was provided in all these iCBTs. The use of antidepressants, if not on a stable dose for at least 1 month, was an exclusion criteria in three studies (Dear *et al.*, 2015; Jones *et al.*, 2016; Titov *et al.*, 2015). The work of Tomasino and cols (Tomasino *et al.*, 2017) only describes that 32.6% of the total sample were currently using antidepressants, without a description of the time of use.

Risk of bias in eligible studies

Regarding the overall risk of bias according to the Cochrane RoB 2 version, seven studies (23,33%) were rated as “high risk”, 18 (60%) with “some concerns” and five (16,67%) as “low risk”. Most of the “some concern” judgments were in the measure of outcome (N= 15) and selection of the report result domain (N=10). Three studies in the meta-analysis (Dear *et al.*, 2015; Jones *et al.*, 2016; Titov *et al.*, 2015) were rated as “some concerns”, especially due to non-blinding outcome raters. The other study (Tomasino *et al.*, 2017) was rated as “high risk” due to the lack of proper randomization. A detailed rating of each domain is shown in Figure 4.

Discussion

We carried out a systematic review and meta-analysis to evaluate the efficacy of interventions by telemedicine in reducing depressive and anxious symptoms or disorders in older people. The frequency and the high morbimortality related to these symptoms in this population (Scott *et al.*, 2013; Lin *et al.*, 2010; Katon *et al.*, 2005), associated with challenges with transportation, mobility, lack of access to services, and costs justify the need of telemedicine for older people. And, recently the COVID-19 pandemic increased the use of virtual intervention (Patel *et al.*, 2021). We identified thirty studies showing that telemedicine interventions, delivered by phone or internet, are feasible. Additionally, some studies also demonstrated their efficacy. Although harm was not described in any study, we may hypothesize telemedicine is safe. However, the heterogeneity in the diagnosis and severity of depression or anxiety at baseline, the different populations (healthy or with clinical illnesses), and the diverse and poorly standardized interventions give insufficient evidence to conclude if telemedicine interventions are clinically meaningful for anxiety and depression in older people. Also, due to most studies reporting immediate post-intervention outcomes at 8 to 12 weeks, there is no information on long-term results.

Considering the heterogeneity of the sample, four studies were selected for meta-analysis. They compared iCBT with the waitlist, and the pooled effect size for depressive and anxiety symptoms favoring iCBT was large, with low heterogeneity. All studies include mild to moderate cases and confounding bias such as the use of antidepressants was done. However, this good result should be interpreted with some caution, due to the small mean number of participants in each arm and the risk of bias judged with “some concerns” for 3 studies (Dear *et al.*, 2015; Jones *et al.*, 2016; Titov *et al.*, 2015) due to non-blinding of outcome raters, and high for one (Tomasino *et al.*, 2017) due to lack of proper randomization. We believe that, with the consolidation of this type of intervention as a treatment of mood and anxiety symptoms in the elderly, new studies with better design and larger samples will be developed and future meta-analyses will confirm the positive results found in our investigation.

The finding that tele-delivered CBT was more effective than other telemedicine interventions is somehow expected given the established evidence of face-to-face CBT for anxiety and depressive symptoms in older people (Aggarwal *et al.*, 2017; Sadler *et al.*, 2018). Even so, no one CBT used the same course or program, and the need for standardization represents a challenge for further studies. Perhaps cultural aspects must be considered to develop appropriate CBT protocol, but the use of the same language and culturally adapted protocol allows for its higher external validity. Also, the positive effect of iCBT in either clinician-guided or self-guided formats highlights the option to invest in careful iCBT to reach and benefit more people.

The professional involvement in telemedicine interventions varies according to the technique chosen and the form of delivery, by phone or internet. According to our systematic review, a totally interactive intervention was not the determinant for good outcomes. Self-guided or professional-guided interventions, delivered via app or website or with brief professional contact can be effective. Treatments that require a small group of professionals are an alternative to reduce costs and increase access and equity in care. Also, telemedicine delivered by internet, like by phone, seems to be well accepted by older people and showed favorable outcomes in several studies, including those that were included in the meta-analysis.

This study has some limitations: gray literature was not included, the use of psychotropic drugs was not reported in half of the studies and no trial was carried out in countries with low incomes. We may hypothesize the scarcity of resources has a possible role in this gap. Furthermore, there were some concerns about the risk of bias in the studies included. Most of them reflected the non-blinding of the rater of the outcome and the lack of register of protocol that affects the domain of the selection of reported results. The risk of bias was high around 25% of the studies, but this finding can be judged as fair, given the recency of this research field.

Conclusion

Telemedicine interventions can be an alternative for the treatment of depressive and anxious symptoms in the elderly, not only for those with mobility impairments or

residents of rural areas but also for the general population, as a way to expand access to specialized treatment, minimize the distance between the elderly and health services, as well as bringing more equity to mental health care in the world. Future studies must assess the effectiveness of telemedicine interventions in general to facilitate their implementation in health centers. As well, guidelines must be developed to facilitate replication of telemedicine interventions, as well as to assist, individually, health professionals apply adequate intervention for the elderly.

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Figure 1. PRISMA Flowchart of Study Selection

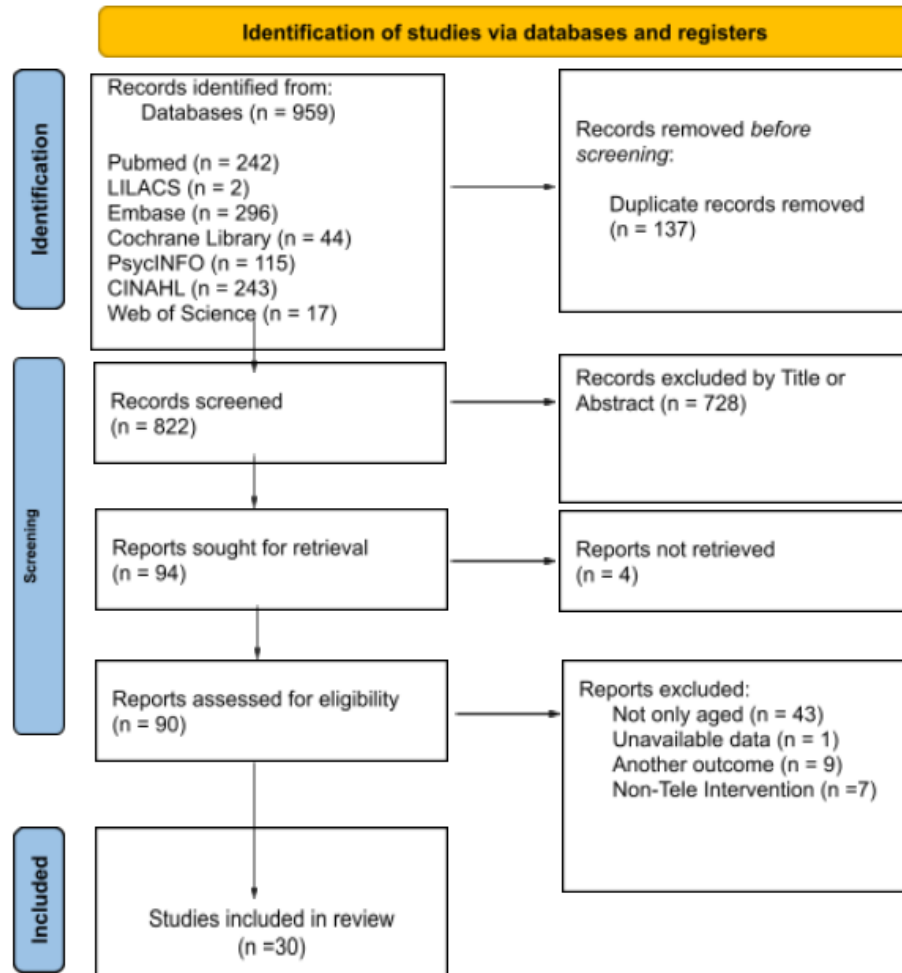


Table 1. Study and Population Characteristics

References	Country	Study Design	Study Sample Source and Characteristics	Sample Size	Mean Age (years)	Overall % Female Participants	Anxiety e/or Depressive Symptoms or Disorder at Baseline	Anxiety e/or Depressive Symptoms as Only Outcome
Aburizik, 2013	USA	RCT	Rural veterans, with depressive symptoms plus DM, SAH, or chronic pain	83	64,4	6,02	Yes	No
Bakas, 2018	USA	Quasi-experimental	Community, living independently	21	84	71,4	No	No
Bott, 2019	USA	Quasi-experimental	Hospitalized at a community hospital	95	76	54,7	No	No
Brenes, 2012	USA	RCT	Community, with anxiety disorders	60	69,15	83,3	Yes	No
Brenes, 2015 Brenes, 2017	USA	RCT	Rural, with GAD	141	66,8	81,6	Yes	Yes
Choi, 2020	USA	RCT	Homebound, with moderate to severe depressive symptoms	295	67,5	69,7	Yes	No
Choi, 2020 _1	USA	RCT	Homebound, with loneliness and mild depressive symptoms	89	74	62	Yes	No
Dear, 2015	Australia	RCT	Community, with symptoms of anxiety	72	65,45	60	Yes	No
DiNapoli, 2017	USA	RCT	Rural, with decreased quality of life and elevated psychological symptomatology	134	75,16	82,8	Yes	No
Gellis, 2012	USA	RCT	Homebound, with CHF or COPD	115	79	60	No	No
Gellis, 2014	USA	RCT	Community, receiving home care, and high hospital users. With depressive symptoms, CHF, or COPD	115	79	65,6	Yes	No
Gould, 2019	USA	RCT	Community, with an anxiety disorder	40	68,93	60	Yes	No
Gustafson, 2021	USA	RCT	Community, with at least one health challenges ^a	390	76,5	74,9	No	No

Hartke and King, 2003	USA	RCT	Community, spousal caregivers of stroke survivors	88	69,72	76	No	No
Jones, 2016	Canada	RCT	Community, with clinical or subclinical GAD	46	65,1	86,7	Yes	No
References	Country	Study Design	Study Sample Source and Characteristics	Sample Size	Mean Age (years)	Overall % Female Participants	Anxiety e/or Depressive Symptoms or Disorder at Baseline	Anxiety e/or Depressive Symptoms as Only Outcome
Kenealy, 2015	Australia	RCT	Community, with CHF or COPD	146	70	35,3	No	No
Kornblith, 2006	USA	RCT	Community, with advanced breast, prostate, and colorectal cancers, receiving treatment	69	73	48	No	No
Mavandadi, 2015	USA	RCT	Community and low-income, with anxiety or depressive symptoms.	1018	77,6	83,2	Yes	No
Read, 2020	Australia	RCT	Community, with two or more chronic physical conditions	302	73	70,2	No	No
Riegel, 2006	USA	RCT	Community, with CHF after recent hospital discharge	134	72,1	53,7	No	No
Schoene, 2015	Australia	RCT	Community, living independently	90	81,5	66,5	No	No
Schwarz, 2008	USA	RCT	Community, with HF and functionally impaired after recent hospital discharge	102	78	52	No	No
Shapira, 2021	Israel	RCT	Community, living independently	82	72	80	No	No
Silfvernagel, 2018	Sweden	RCT	Community, with anxiety symptoms or disorder	66	66,1	75,8	Yes	No
Stahl, 2020	USA	RCT	Community, bereaved ≤ 8 months and at high risk for depression ^b	45	75	NI	No	No
Titov, 2016	Australia	RCT	Community, with depressive or anxious symptoms	433	66	64	Yes	No
Titov, 2015	Australia	RCT	Community, with depressive symptoms	54	65,3	70	Yes	No
Tomasino, 2017	USA	RCT	Community, with elevated depressive symptoms	47	69,6	68,1	Yes	No
Villani, 2014	Italy	RCT	Community, with CHF after recent hospital discharge	80	72	25	Yes	No

Abbreviations: CHF (Chronic Heart Failure), COPD (Chronic Obstructive Pulmonary Disease), DM (Diabetes Mellitus), GAD (Generalized Anxiety Disorder), CHF (Chronic Heart Failure), HF(Heart Failure), RCT (Randomized Clinical Trial), SAH (Systemic Arterial Hypertension)

a: Health Challenges: falls, home health services, skilled nursing facility stay, emergency room visit, hospital admission or sustained sadness or depression

b: High Risk for Depression: medical comorbidity; low social support; impairment in activities of daily living; or subthreshold symptoms of depression, anxiety, and/or complicated grief.

Table 2. Intervention and Outcome of Included Studies

References	Intervention Duration	Anxiety and/or Depression Outcome Measure	Timing of Outcome Measure	Intervention 1	Sample Size	Depression or Anxiety Symptoms Score Mean (SD)	Intervention 2 or control	Sample Size	Depression or Anxiety Symptoms Score (Mean SD)	Intervention 3	Sample Size	Depression or Anxiety Symptoms Score
Tele Intervention Vs. Tele Intervention												
Aburizik 2013	10 weeks	PHQ-9	Baseline 10 weeks	IPT and BA + Illness Management by phone	29	12.5 (1.0) 8.2 (1.0) ^b	Usual Care	23	11.2 (1.1) 10.4 (1.1)	Illness Management by phone	31	13.2(1.0) 10.4 (1.0) ^b
		BDI	Baseline 10 weeks			19.1 (2.0) 15.3 (1.8) ^b			20.2(2.2) 21.0 (2.0)			23.9 (1.9) 20.5 (1.8) ^b
Brenes, 2015 / 2017	9 to 11 weeks	HAM-A	Baseline 16 weeks 60 weeks	CBT by phone	70	20.1 (7.14) -7.04 ^a -7,60 ^a *	Nondirective Supportive Therapy by phone	71	21.9 (8.18) -5.53 ^a -4.29 ^a			
		GAD-7	Baseline 16 weeks 60 weeks			11.1 (4.25) -5.63 ^a * -5.29 ^a			12.3 (4.28) -3.27 ^a -3.64 ^a			
		BDI	Baseline 16 weeks 60 weeks			21.6 (8.84) -10.77 ^a * -11.3 ^a			24.4 (9.18) -7.54 ^a -8.37 ^a			

Choi, 2020	5 weeks	HAM-D	Baseline 12 weeks	BA by videoconference	90	23.2 (5.7) 15.13 (7.6) *	Support calls by phone	94	22.9 (5.7) 18.88 (7.238)	PST by videoconference	93	22.7 (5.7) 12.75 (6.3) *
Choi, 2020 _1	5 weeks	PHQ-9	Baseline 6 weeks 12 weeks	BA by videoconference	43	7.2 (4.0) 5.9 (3.8) * 4.7 (3.0) *	Friendly Visits videoconference	46	7.7 (4.5) 8.3 (4.9) 8.0 (5.5)			
DiNapoli, 2017	12 to 16 weeks	SCL-90-R	Baseline 12 to 16 weeks	CBT by phone	70	55.47 (9.84) 49.71 (9.85) *	Telephone support calls	64	57.29 (0.12) 54.98 (10.79)			

References	Intervention Duration	Anxiety and/or Depression Outcome Measure	Timing of Outcome Measure	Intervention 1	Sample Size	Depression or Anxiety Symptoms Score Mean (SD)	Intervention 2 or control	Sample Size	Depression or Anxiety Symptoms Score (Mean SD)	Intervention 3	Sample Size	Depression or Anxiety Symptoms Score
Gustafson, 2021	48 weeks	PHQ-8	Baseline 24 weeks 48 weeks	Interactive website	197	0.71 (0.20) 0.72 (0.19) ^e 0.72 (0.21) ^e	Usual access to information	193	0.72 (0.20) 0.72 (0.19) ^e 0.73 (0.22) ^e			
Mavandadi, 2015	12 weeks	PHQ-9	Baseline 12 weeks 24 weeks	MH Monitoring + care management by phone	509	8.83 (4.56) 5.70 (4.48) ^b 5.68 (4.57) ^b	MH Monitoring by phone	509	8.64(4.27) 6.04 (4.72) 6.82 (4.91)			
		GAD-7	Baseline 12 weeks 24 weeks			4.75 (4.41) 3.09 (3.72) ^b 2.79 (3.61) ^b			4.48 (4.21) 3.42(3.82) 3.90 (4.34)			
Silfvernagel, 2018	8 weeks	MADRS	Baseline 8 weeks	Individually tailored Internet CBT	33	20.27 (6.75) 11.75 (8.36) ^b	Email support from a clinician weekly	33	20.03 (7.73) 16.99 (8.84)			
		BAI	Baseline 8 weeks			18.4 (12.53) 10.11 (10.0) ^b			17.52 (8.09) 14.94 (9.26)			
		GAD-7	Baseline 8 weeks			8.88 (5.04) 4.68 (3.71) ^b			8.82 (3.80) 7.64 (5.12)			

		PHQ-9	Baseline 8 weeks			10.88 (5.57) 5.47 (3.99) ^b			10.06 (5.33) 8.66 (6.25)			
Stahl, 2020	12 weeks	PHQ-9	Baseline 12 weeks 24 weeks 36 weeks	Digital Monitoring + Health Coaching by phone	18	3.0 (2.5) ^{f ***}	Usual Care	9	3.0 (2.5) ^{f ***}	Digital Monitoring	18	3.0 (2.5) ^{f ***}
Titov, 2016	12 weeks	PHQ-9	Baseline 8 weeks 12 weeks	iCBT self and clinician-guided	153	10.74 (4.88) 4.39 (3.81) *** 4.30 (3.37)	iCBT self- guided +inical interview	140	10.43 (4.61) 4.44 (3.67) *** 4.71 (3.79)	iCBT self- guided only	140	10.43 (4.73) 4.78 (3.90) *** 4.75 (3.79)
		GAD-7	Baseline 8 weeks 12 weeks			9.86 (4.58) 4.17 (3.96) *** 3.73 (3.09) ***			10.45 (4.38) 4.74 (4.02) *** 4.36 (3.90) ***			10.44 (4.14) 5.19 (4.02) *** 4.50 (3.79) ***
References	Intervention Duration	Anxiety and/or Depression Outcome Measure	Timing of Outcome Measure	Intervention 1	Sample Size	Depression or Anxiety Symptoms Score Mean (SD)	Intervention 2 or control	Sample Size	Depression or Anxiety Symptoms Score (Mean SD)	Intervention 3	Sample Size	Depression or Anxiety Symptoms Score
		GDS	Baseline 8 weeks 12 weeks			8.07 (3.46) 4.83 (3.71) *** 4.41(3.59) ***			7.82 (3.79) 4.73 (3.43) *** 4.35 (3.55) ***			7.72 (3.59) 5.36 (3.43) *** 4.50 (3.67) ***
Tele Intervention Vs. Non Tele Intervention												
Bakas, 2018	4 weeks	PHQ-8	Baseline 5 weeks 9 weeks 13 weeks 17 weeks	Case management by telepresence robot	12	10.5(0.6) 9.6(0.5) 9.8(0.5) ^h 9.4(0.5) ^h 9.6(0.5) ^h	Waitlist	10	10.1(0.7) 9.8 (0.5) 11.30(.6) 10.5(0.5) 10.6(0.6)			
Bott, 2019	according to patient engagement	GDS	Baseline Pos Intervention	Bedside Digital Conversational Agent by Avatar	41	4.2 (3.20) 4.02 (2.99)	Face-to-face visit	54	4.19(3.50) 3.87 (2.99)			
Brenes, 2012	8 weeks	STAI-T	Baseline 8 weeks 24 weeks	CBT by phone + workbook	30	44.9 (SD 6.4) 42.3(SE0.9) * 43.6 (SE 0.9)	Written education	30	44.0 (SD 5.4) 45.7 (SE 0.9) 44.8 (SE 1.0)			

Dear, 2015	8 weeks	BDI	Baseline 8 weeks 24 weeks	iCBT	33	16.9 (SD 8.2) 11.4 (SE 1.1) 10.7 (SE 1.6)	Waitlist	37	17.9 (SD 7.7) 14.1 (SE 1.1) 13.3 (SE 1.6)				
		HAM-A	Baseline 8 weeks 24 weeks			20.4 (SD 5.5) 11.4 (SE 1.2) * 11.1 (SE 0.5)			19.9 (SD 7.8) 16.3 (SE 1.1) 14.4 (SE 1.5)				
		GAD-7	Baseline 8 weeks 12 weeks 48 weeks			11.67 (5.34) 3.90 (2.94) * 4.57 (3.79) * 4.03 (3.27) *			10.35 (4.41) 9.75 (4.91) - -				
		PHQ-9	Baseline 8 weeks 12 weeks 48 weeks			10.76 (4.79) 3.63 (2.68) * 3.93 (3.81) * 3.93 (3.44) *			10.78 (4.37) 10.47 (4.62) - -				
References	Intervention Duration	Anxiety and/or Depression Outcome Measure	Timing of Outcome Measure	Intervention 1	Sample Size	Depression or Anxiety Symptoms Score Mean (SD)	Intervention 2 or control	Sample Size	Depression or Anxiety Symptoms Score (Mean SD)	Intervention 3	Sample Size	Depression or Anxiety Symptoms Score	
Gellis, 2012	12 weeks	CES-D	Baseline 12 weeks	Education + PST by phone + Digital Monitoring	57	19.9 (5.1) 10.4(5.8) *	Usual care + Education	58	20.5 (8.8) 18.7 (9.4)				
		PHQ-9	Baseline 12 weeks			14.9(6.4) 7.4(5.7) *			15.2(5.8) 13.6(5.6)				
Gellis, 2014	12 weeks	PHQ-9	Baseline 12 weeks 24 weeks	PST by phone + Digital Monitoring	57	14.9 (6.4) 7.4 (5.7) * 7.9 (5.3) **	Home visits for education	58	15.2 (5.8) 13.6 (5.6) 14.1 (5.9)				

Kornblith, 2006	24 weeks	HAD	Baseline 24 weeks	Monitoring by phone	69	Anxiety: 3.84 (3.79) 2.81 (2.65) * Depression: 3.65 (3.41) 3.20 (2.92) *	Written education	61	Anxiety: 3.46 (3.40) 3.25 (3.39) Depression: 2.95 (2.65) 4.08 (2.85)			
		GDS-15	Baseline 24 weeks		68	3.35 (3.74) 2.98 (3.19)		60	2.83 (3.08) 3.15 (3.18)			
Read, 2020	8 weeks	PHQ-9	Baseline 8 weeks 24 weeks	iCBT	150	3.55 (3.63) 2.34 (2.95) ^b 3.43 (3.81)	Usual Care	152	3.32 (3.01) 3.61 (3.65) 3.70 (3.49)			
		GDS-15	Baseline 8 weeks 24 weeks			2.81 (2.39) 2.41 (2.36) ^b 2.90 (2.81)			2.45 (2.25) 2.68 (2.6) 2.49 (2.08)			
		GAI	Baseline 8 weeks 24 weeks			2.75 (3.94) 2.20 (3.57) 2.76 (4.34)			2.70 (3.96) 2.50 (3.83) 2.51 (3.7)			
References	Intervention Duration	Anxiety and/or Depression Outcome Measure	Timing of Outcome Measure	Intervention 1	Sample Size	Depression or Anxiety Score Symptoms Mean (SD)	Intervention 2 or control	Sample Size	Depression or Anxiety Symptoms Score (Mean SD)	Intervention 3	Sample Size	Depression or Anxiety Symptoms Score
		GAD-7	Baseline 8 weeks 24 weeks			2.21 (2.62) 1.77 (2.35)			2.32 (2.77) 2.16 (2.61)			
Riegel, 2006	24 weeks	PHQ-9	Baseline 12 weeks 24 weeks	Case management by phone	69	8.8 (5.8) 1.9 (2.1) *** 1.5 (2.0) ***	Usual care	65	8.6 (5.4) 2.3 (2.3) *** 2.0 (2.1) ***			

Schoene, 2015	16 weeks	PHQ-9	Baseline 16 weeks	Exercise and cognitive videogame	47	2.50 (4.20) 3.00 (4.90)	Brochure on fall prevention.	43	2.12 (3.05) 3.83 (4.10)			
Schwarz, 2008	12 weeks	CES-D	Baseline 12 weeks	Telemonitoring + Education	44	8.7 (8.9) 8.2 (11.2)	Usual Care	40	6.8 (8.9) 6.6 (6.7)			
Shapira, 2021	3,5 weeks	PHQ-9	Baseline 3,5 weeks	Online guided CBT in groups	64	6.6 (5.2) 5.2 (4.7)	Waitlist	18	6.3 (4.9) 7.1 (6.1)			
Titov, 2015	8 weeks	PHQ-9	Baseline 8 weeks 12 weeks 52 weeks	iCBT	27	11.04 (5.62) 3.96(2.48)* 4.90 (4.05) 4.68 (4.47)	Waitlist	25	12.04 (5.42) 12.68 (5.48) - -			
		GAD-7	Baseline 8 weeks 12 weeks 52 weeks			7.44 (5.15) 2.96 (2.87) * 3.05 (3.44) 2.84 (2.63)			8.28 (4.90) 7.64 (4.68)			
Tomasino, 2017	8 weeks	PHQ-9	Baseline 8 weeks	iCBT	12	10.6 (3.2) 5.1 (2.8) *	Waitlist	12	9.3 (3.7) 8.2 (5.7)	iCBT + Peer Support	23	11.2 (5.4) 6.4 (4.2) *
		GAD-7	Baseline 8 weeks			6.1 (2.1) 2.3 (1.9) *			5.8 (4) 7.2 (4.7)			6.7 (4.8) 4.7 (3.5) *
Villani, 2014	48 weeks	PHQ-9	Baseline 48 weeks	Monitoring by software	40	26.8 (3.3) 24.0 (2.6) *	Usual Care	40	25.03 (3.3) 29.1 (3.3)			
			STAI	Baseline 48 weeks					42.2 (8.2) 35.1 (6.3) *	41.5 (6.6) 41.6 (6.0)		

Abbreviations: SE (standard error), Geriatric Anxiety Scale (GAS), Patient Health Questionnaire (PHQ-9, PHQ-8), Montgomery Åsberg Depression Rating Scale (MADRS), or Geriatric Depression Scale (GDS), Centre for Epidemiology Studies Depression Scale (CES-D), Beck Depression Inventory (BDI), Cognitive Behavioral therapy (CBT), Internet-delivered CBT (iCBT), Hamilton Anxiety Rating Scale (HAM-A), Hamilton Depression Rating Scale (HAM-D), Interpersonal Psychotherapy (IPT), Behavioral Activation (BA), Problem-Solving Therapy (PST), Mental Health (MH), Progressive Muscle Relaxation (PMR), Digital Video Disc (DVD).

a: Reported as Mean Change

b: Reported as significant for the group by time interaction only

c: Reported as significant for the group interaction and the group by time interaction

e: Reported as covariate-adjusted estimates of scores on depression (Higher mean values = worse depression, range 1–4).

f: Average of Delta PHQ-9 (postintervention – baseline).

g: Reported as significant by the group interaction

h: Partial η^2 medium effect size

*p-value < 0.05, compared to control or intervention 2.

** p-value at 0.05, compared to control.

*** p-value < 0,05, compared to baseline.

Figure 2. Forest Plot for Effective of Internet-Delivered CBT for depression in older people

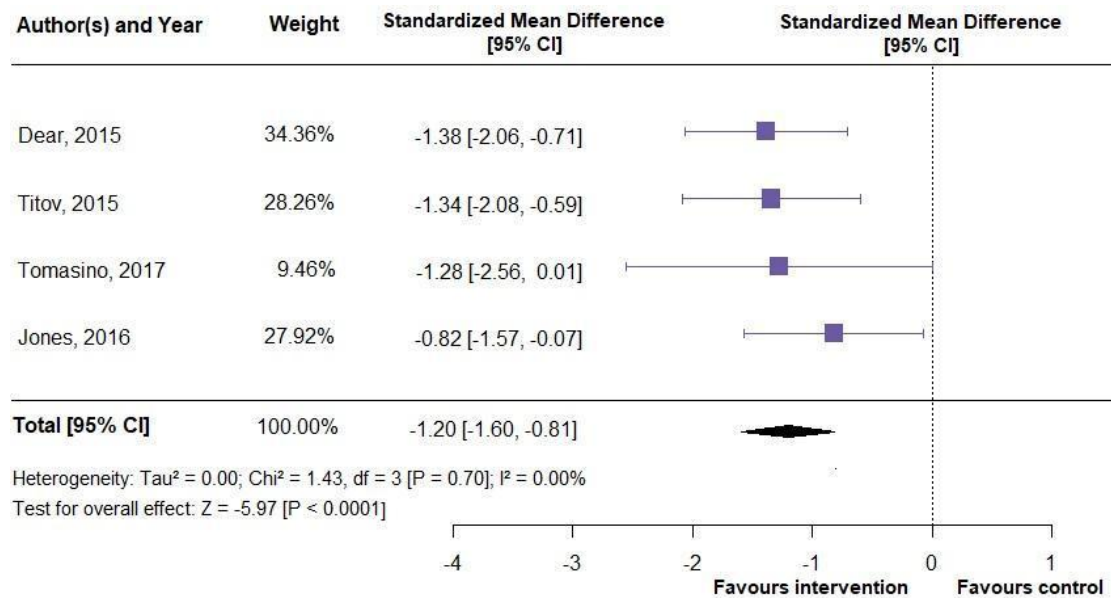


Figure 3. Forest Plot for Effective of Internet-Delivered CBT for anxiety in older people

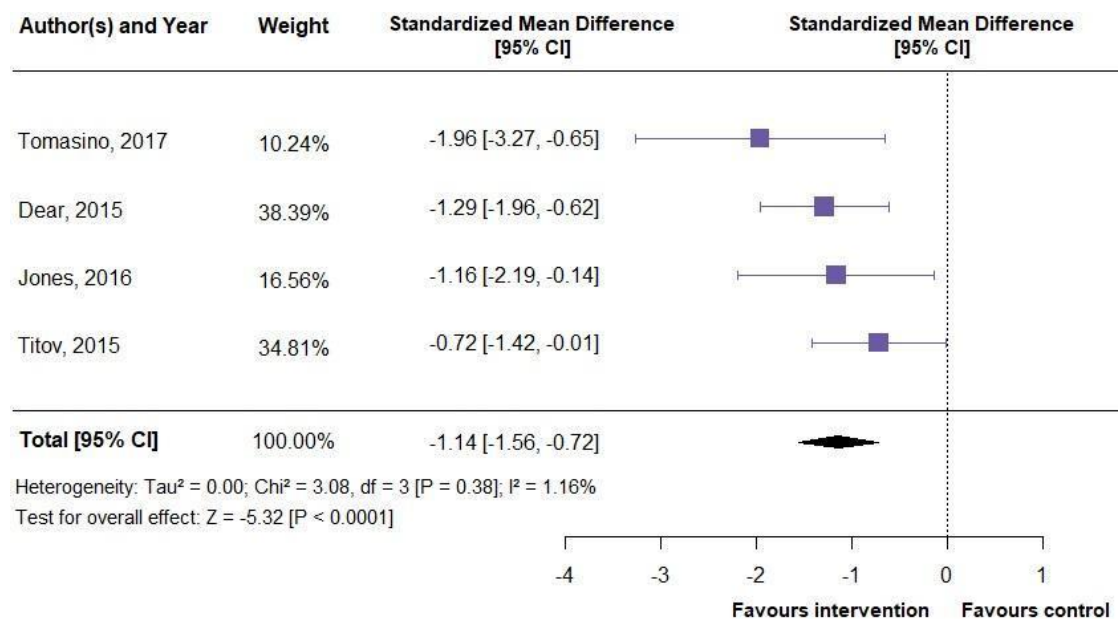


Figure 4. Risk of Bias in eligible studies

	Risk of bias domains					Overall
	D1	D2	D3	D4	D5	
Aburizik, 2013	+	+	+	-	-	-
Bakas, 2018	+	+	+	+	-	-
Bott, 2019	X	+	+	-	+	X
Brenes, 2012	+	-	+	+	+	-
Brenes 2015/ 2017	+	+	+	+	+	+
Choi, 2020	+	+	+	X	+	X
Choi, 2020 _1	-	+	+	+	+	-
Dear, 2015	+	+	+	-	+	-
DiNapoli, 2017	X	-	+	-	+	X
Gellis, 2012	+	+	+	+	+	+
Gellis, 2014	+	+	+	+	+	+
Gould, 2019	+	+	+	-	-	-
Gustafson, 2021	+	+	+	+	X	X
Hartke and King, 2003	-	-	-	-	-	-
Jones, 2016	+	+	+	-	+	-
Kenealy, 2015	-	+	+	+	+	-
Kornblith, 2006	-	X	+	-	-	X
Mavandadi, 2015	-	+	+	X	+	X
Read, 2020	+	-	+	+	+	-
Riegel, 2006	+	+	+	+	-	-
Schoene, 2015	+	+	+	+	+	+
Schwarz, 2008	+	+	+	-	-	-
Shapira, 2021	+	+	+	-	-	-
Silfvernagel, 2018	+	+	+	+	-	-
Stahl, 2020	+	+	+	-	+	-
Titov, 2016	+	+	+	-	+	-
Titov, 2015	+	+	+	-	+	-
Tomasino, 2017	X	-	+	-	+	X
Villani, 2014	+	-	+	-	-	-

Study

Domains:
D1: Bias arising from the randomization process.
D2: Bias due to deviations from intended intervention.
D3: Bias due to missing outcome data.
D4: Bias in measurement of the outcome.
D5: Bias in selection of the reported result.

Judgement
X High
- Some concerns
+ Low

Supplement Material:

Search Strategy used for PubMed database

#1 "Depression"[Mesh] OR "Depressions" OR "Depressive Symptoms" OR "Depressive Symptom" OR "Symptom, Depressive" OR "Symptoms, Depressive" OR "Emotional Depression" OR "Depression, Emotional"

OR

#2 "Depressive Disorder"[Mesh] OR "Depressive Disorders" OR "Disorder, Depressive" OR "Disorders, Depressive" OR "Neurosis, Depressive" OR "Depressive Neuroses" OR "Depressive Neurosis" OR "Neuroses, Depressive" OR "Depression, Endogenous" OR "Depressions, Endogenous" OR "Endogenous Depression" OR "Endogenous Depressions" OR "Depressive Syndrome" OR "Depressive Syndromes" OR "Syndrome, Depressive" OR "Syndromes, Depressive" OR "Depression, Neurotic" OR "Neurotic Depression" OR "Neurotic Depressions" OR "Melancholia" OR "Melancholias" OR "Unipolar Depression" OR "Depression, Unipolar" OR "Depressions, Unipolar" OR "Unipolar Depressions"

OR

#3 "Anxiety"[Mesh] OR "Angst" OR "Nervousness" OR "Hypervigilance" OR "Anxiousness" OR "Social Anxiety" OR "Anxiety, Social" OR "Social Anxieties"

OR

#4 "Anxiety Disorders"[Mesh] OR "Anxiety Disorder" OR "Disorder, Anxiety" OR "Disorders, Anxiety" OR "Neuroses, Anxiety" OR "Anxiety Neuroses" OR "Anxiety States, Neurotic" OR "Neurotic Anxiety States"

AND

#5 "Aged"[Mesh] OR "Elderly" OR "Aged, 80 and over"[Mesh] OR "Oldest Old" OR "Nonagenarians" OR "Nonagenarian" OR "Octogenarians" OR "Octogenarian" OR "Centenarians" OR "Centenarian"

AND

#6 "Telemedicine"[Mesh] OR "Mobile Health" OR "mHealth" OR "Telehealth" OR "eHealth" OR "mobile applications" OR "Mobile App" OR "Portable Electronic Apps" OR "cell phone" OR "Smartphone"

7. CONCLUSÃO

As intervenções por telemedicina podem ser uma alternativa para o tratamento de sintomas depressivos e ansiosos em idosos, não só para aqueles com dificuldades de mobilidade ou moradores de áreas rurais, mas também para a população em geral, como forma de ampliar o acesso ao tratamento especializado, minimizar a distância entre os idosos e os serviços de saúde, além de trazer mais equidade ao cuidado em saúde mental no mundo. Estudos futuros devem avaliar a eficácia das intervenções de telemedicina em geral para facilitar sua implementação nos centros de saúde. Além disso, devem ser desenvolvidas diretrizes para facilitar a replicação das intervenções em telemedicina em diferentes centros, bem como auxiliar, individualmente, os profissionais de saúde a aplicarem a intervenção de forma adequada aos idosos. As questões de segurança e de custos dessas intervenções também devem ser objetivo de investigações futuras.

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9. ANEXOS

9.1 ANEXO A - PARECER DE APROVAÇÃO DO COMITÊ DE ÉTICA DA UFCSPA

Declaro que a presente tese é uma revisão sistemática e meta-análise, razão pela qual é dispensado o parecer de aprovação do Comitê de Ética da UFCSPA.

9.2 ANEXO B – NORMAS DE SUBMISSÃO AO PERIÓDICO INTERNATIONAL JOURNAL OF GERIATRIC PSYCHIATRY

Author Guidelines - *International Journal of Geriatric Psychiatry*

1. SUBMISSION

New submissions should be made via the Research Exchange submission portal <https://submission.wiley.com/journal/gps>.

Before you submit, you will need:

- Your manuscript: this should be an editable file including text, figures, and tables, or separate files – whichever you prefer. All required sections should be contained in your manuscript, including abstract, introduction, methods, results, and conclusions. Figures and tables should have legends. Figures should be uploaded in the highest resolution possible. References may be submitted in any style or format, as long as it is consistent throughout the manuscript. Supporting information should be submitted in separate files. If the manuscript, figures or tables are difficult for you to read, they will also be difficult for the editors and reviewers, and the editorial office will send it back to you

for revision. Your manuscript may also be sent back to you for revision if the quality of English language is poor.

- An ORCID ID
- The title page of the manuscript, including:
 - Your co-author details, including affiliation and email address.
(*Why is this important? We need to keep all co-authors informed of the outcome of the peer review process.*)

Data Protection

By submitting a manuscript to, or reviewing for, this publication, your name, email address, institutional affiliation, and other contact details the publication might require, will be used for the regular operations of the publication, including, when necessary, sharing with the publisher (Wiley) and partners for production and publication. The publication and the publisher recognize the importance of protecting the personal information collected from users in the operation of these services, and have practices in place to ensure that steps are taken to maintain the security, integrity, and privacy of the personal data collected and processed. You can learn more at <https://authorservices.wiley.com/statements/data-protection-policy.html>.

Preprint Policy

The *International Journal of Geriatric Psychiatry* will consider for review articles previously available as preprints. Authors may also post the submitted version of a manuscript to a preprint server at any time. Authors are requested to update any pre-publication versions with a link to the final published article.

For help with submissions, please contact: GPSeditorialoffice@wiley.com

2. AIMS AND SCOPE

The rapidly increasing world population of aged people has led to a growing need to focus attention on the problems of mental disorder in late life. The aim of the *International Journal of Geriatric Psychiatry* is to communicate the results of original research in the causes, treatment and care of all forms of mental disorder which affect the elderly. The Journal is of interest to psychiatrists, psychologists, social scientists, nurses and others engaged in therapeutic professions, together with general neurobiological researchers.

The Journal provides an international perspective on the important issue of geriatric psychiatry, and contributions are published from countries throughout the world. Topics covered include epidemiology of mental disorders in old age, clinical aetiological

research, post-mortem pathological and neurochemical studies, treatment trials and evaluation of geriatric psychiatry services.

Further information about the Journal, including links to the online sample copy and contents pages, can be found on the Journal homepage.

3. MANUSCRIPT CATEGORIES AND REQUIREMENTS

All tables, figures, supporting information and bibliographic entries must have a reference in the text. Tables and figures should be numbered (Figure 1, Table 1, Supplementary Figure 1). The journal prefers tables to be included in the main document after the reference list, each on an individual page alongside their legend. The journal prefers figures to be uploaded as individual files rather than included in the main document. However authors should indicate clearly where figures/tables should be inserted in the main document. All figures and tables must be accompanied by a legend. Word limits below include the main text and exclude tables, figure/table legends and references.

Review Article

The review articles published by the journal are characterised by the following: (i) high quality methodology; (ii) novelty in terms of the scope and content compared with other published reviews; (iii) coverage of an area of particular clinical and/or scientific importance; (iv) there being sufficient papers in the literature to make the review informative; and (v) the ability to make well supported conclusions of clinical and/or scientific importance. All reviews are subject to the same process of editorial and peer review as research articles.

Manuscript structure: Abstract (250 words max); Introduction; Content-appropriate headings; Acknowledgements; References; Tables; List of figure captions; List of supporting information legends. Overall combined limit of 6 figures/tables and 150 references. Word limit: 4500 words.

Cover Letters and Conflict of Interest statements may be provided as separate files, included in the manuscript, or provided as free text in the submission system. A

statement of funding (including grant numbers, if applicable) should be included in the “Acknowledgements” section of your manuscript.

4. PREPARING YOUR SUBMISSION

Cover Letters

Cover letters are not mandatory; however, they may be supplied at the author’s discretion.

Main Text Format

Recommended format for optimal review:

- i. A short informative title containing the major key words. The title should not contain abbreviations (see Wiley's [best practice SEO tips](#));
- ii. A short running title of less than 50 characters;
- iii. The full names of the authors;
- iv. The author's institutional affiliations where the work was conducted, with a footnote for the author’s present address if different from where the work was conducted;
- v. The corresponding author details;
- vi. The word count of the body text;
- vii. Acknowledgments;
- viii. The name(s) of any sponsor(s) of the research contained in the paper, along with grant number(s);
- ix. Abstract, keywords and key-points;
- x. Main text;
- xi. References;
- xii. Tables (each table complete with title and footnotes);
- xiii. Figure legends;
- xiv. Appendices (if relevant).

Figures and supporting information should be supplied as separate files.

Authorship

Please refer to the journal’s Authorship policy in the Editorial Policies and Ethical Considerations section for details on author listing eligibility. On initial submission, the

submitting author will be prompted to provide the email address and country for all contributing authors.

Acknowledgments

Contributions from anyone who does not meet the criteria for authorship should be listed, with permission from the contributor, in an Acknowledgments section. Financial and material support should also be mentioned. Thanks to anonymous reviewers are not appropriate.

Conflict of Interest Statement

Authors will be asked to provide a conflict of interest statement during the submission process. For details on what to include in this section, see the 'Conflict of Interest' section in the Editorial Policies and Ethical Considerations section below. Submitting authors should ensure they liaise with all co-authors to confirm agreement with the final statement.

Abstract

Abstracts are required for research and review articles. They must not exceed 250 words and should be divided into the following sections: 'Objectives', 'Methods'/'Design', 'Results', and 'Conclusions'.

Keywords

Please provide 3-10 keywords – the 'Keywords' section should be listed after the abstract in the main document and also entered into the submission system.

Key points

Please provide up to 4 key points – there should be listed after the keywords in the main document.

Main Text

Authors may submit using English UK or English US as spelling of accepted papers is converted during the production process, however this should be consistent throughout. See section 3 for information on manuscript types, word limits and other

requirements. See Section 3: Manuscript categories and requirements for information on manuscript types, structure, word limit and other requirements.

References

All references should be numbered consecutively in order of appearance and should be as complete as possible. In text citations should cite references in consecutive order using Arabic superscript numerals.

For more information about this reference style, please see the AMA Manual of Style. Reference examples follow:

Journal article

1. King VM, Armstrong DM, Apps R, Trott JR. Numerical aspects of pontine, lateral reticular, and inferior olivary projections to two paravermal cortical zones of the cat cerebellum. *J Comp Neurol* 1998;390:537-551.

Book

2. Voet D, Voet JG. *Biochemistry*. New York: John Wiley & Sons; 1990. 1223 p.

Please note that journal title abbreviations should conform to the practices of Chemical Abstracts.

Internet Document

1. American Cancer Society. *Cancer Facts & Figures* 2003. <http://www.cancer.org/downloads/STT/CAFF2003PWSecured.pdf>. Accessed March 3, 2003.

Tables

Tables should be self-contained and complement, not duplicate, information contained in the text. They should be supplied as editable files, not pasted as images. Legends should be concise but comprehensive – the table, legend, and footnotes must be understandable without reference to the text. All abbreviations must be defined in footnotes. Footnote symbols: †, ‡, §, ¶, should be used (in that order) and *, **, ***

should be reserved for P-values. Statistical measures such as SD or SEM should be identified in the headings.

Figure Legends

Legends should be concise but comprehensive – the figure and its legend must be understandable without reference to the text. Include definitions of any symbols used and define/explain all abbreviations and units of measurement.

Figures

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