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Effects of interventions on depression and anxiety in older people with physical health problems in the criminal justice system: a systematic review

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The demand for health care in older people involved in the criminal justice system is high. The prevalence of mental and physical health conditions for people living in prison is greater than in community populations. After systematically searching 21 databases, we found no targeted interventions to support depression or anxiety for this group of people. 24 studies (including interventions of yoga, creative-arts-based programmes, positive psychology, or mindfulness-based interventions and psychotherapy) did contain people older than 50 years, but this only represented a minority (10%) of the overall study population. No single study reported outcomes of physical health. Future interventions need to consider the needs and views of this vulnerable group. Specific gendered and coproduced interventions are required to enhance the implementation, feasibility, and acceptability of interventions that are delivered in prisons.

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Introduction

As the general UK population of older adults increases,[1] so too do the numbers of older people living in prison. Since 2002, older adults (aged ≥50 years) who are incarcerated have represented the fastest growing age group within the UK prison population, with an increase of 159%. Similar findings in European countries show a steady increase (11·7% in 2013 to 15·3% in 2021)[2] and a large increase in the USA (280% increase reported between 1999 and 2016),[3] whereas the numbers of younger people who are incarcerated remain relatively stable.[4] By 2030, it is estimated that older people will make up a third of the entire prison population in the USA.[5]

The UK National Institute for Health and Care Excellence guidelines about the provision of appropriate evidenced-based health care to support people who are ageing and involved with the criminal justice system (CJS) recognise the growing demand. Up to 90% of people living in prison aged 50 years or older report at least one moderate or severe health condition, and more than half of all older prisoners present with a mental illness.[6] Up to a third of the people who are incarcerated have depression.[6] In addition, people with a mental health problem are up to 17% more likely to reoffend than their counterparts without a mental health diagnosis.[7,8] Studies reporting on the physical health of older people in custody are scarce. Some studies refer to prevalent physical health problems linked to poor diet, resulting in obesity and including complicating factors such as chronic obstructive pulmonary disease (COPD) and diabetes.[9] However, often both physical and mental health problems are confounded by problems of substance misuse.[10] There is some evidence to suggest that the presence of mental and physical health problems links to exacerbated misconduct while incarcerated and consequent reoffending behaviour.[11] For these reasons, it is important to consider both the mental and physical health problems of people in the CJS.

Delivery of health care in prisons is expensive and complex. In England, the total cost to the economy is estimated at £125 billion per annum, comprising £20 billion in health costs, £36 billion in lost output, and £69 billion in human costs (eg, loss of quality of life or loss of life).[12] The principal driver of this cost is the incarcerated ageing population. Internationally, cost estimates vary. For example, the US National Institute of Corrections estimated the annual cost of incarcerating people aged 55 years or older who have chronic and terminal illnesses at 2–3 times that for all other ages on average.[4]

Previous systematic review evidence identifies the prevalence of health[13] and social care needs.[14] These reviews showed the scarcity of focused psychological interventions to support this group[15] and evidence points to the absence of service user input.[16] One systematic review revealed only one randomised controlled trial (RCT)[17] that addressed the assessment and planning of health and social care needs for older prisoners[18] and another review included mixed populations of people who have been incarcerated with an armed forces background and younger prisoners (aged <50 years), finding that such interventions did not reduce stress, depression, anxiety, or somatisation in older prisoners compared with the control groups.[19] With scarce information, high-quality RCTs targeting ageing populations involved in the CJS are required as the recognised gold standard.[20] Calls for research in the UK have not gone unnoticed and the National Institute for Health and Care Research (Research for Patient Benefit Fund: NIHR203484) has commissioned an ongoing study, part of which involves systematically reviewing RCTs of interventions for older people engaged with the CJS. Given the scarcity of evidence, the aim of this systematic review was to identify and examine RCTs of interventions for older people (aged ≥50 years) involved in the CJS that focused on outcomes of depression or

anxiety (or both) in people with the physical health needs of either obesity, COPD, or diabetes (or a combination). This review also assessed the feasibility and acceptability of these interventions.

Methods

For more on the **review protocol** see https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42021281384

See Online for appendix

This systematic review protocol was registered with PROSPERO (ID CRD42021281384). This review complies with PRISMA guidelines (appendix pp 1–3).[21] Deviations from the original protocol, with reasons, are explained (appendix p 4). We used the Population, Intervention, Comparison, and Outcome framework to structure our review.[22]

Population and setting

We included RCTs (including pilot and cluster randomised studies) with male or female adult participants who were aged 50 years or older determined by using the age range, mean age, or the standard deviation of the sample. We contacted authors to identify how many people within each study fell within this age group. We did not exclude any study on the basis of the proportion of participants who were aged 50 years and older. Settings included prison, jail, secure hospitals, parole, probation, police custody, boot camps, or the general community for people with a previous offending history.

Interventions

We included psychological interventions that explicitly focused on improving depression or anxiety (or both). These interventions included (but were not limited to) psychosocial, spiritual, and educational training opportunities; support; post-release support; advocacy training; peer support; life skills training; community programmes; physical and mental health promotion and awareness; vocational training; activities relating to daily living; nutrition education; coordinated post-release support; transition programmes; employment; socialising; resettlement; adapted regimens (eg, extended activities within the prison environment); and family support. Since the primary focus of this review was to identify interventions for depression or anxiety, RCTs not containing physical health needs were included if the intervention explicitly provided the focus on mental health.

Comparators

We included comparators of placebo, treatment as usual (defined as routine clinical services that the prisoners would receive had they not been included in the trial) with or without active control elements, and no intervention or waiting list.

Outcomes (primary and secondary)

Our primary outcomes were symptoms of depression and anxiety measured by standard rating scales such as the Hamilton Anxiety Scale, Beck Anxiety Inventory, or Generalised Anxiety Disorder questionnaire. Secondary outcomes included reporting on the physical conditions of obesity, COPD, or diabetes, as some of the most prevalent physical health problems reported in the CJS.

Exclusion criteria

We excluded any trials that focused on participants whose primary diagnosis was post-traumatic stress disorder, obsessive-compulsive disorder, schizophrenia, dementia, or any mental health problem other than anxiety and depression. Additionally, we excluded trials that focused on physical health problems other than obesity, diabetes, or COPD, as well as trials that focused on prisoners of war, abuse of older people, or fear of crime. Interventions that focused on medication management or prescribing, health-care service access, drug withdrawal, prison-based needle and syringe programmes, alcohol-only or drug-only focused programmes, programmes targeting sexual offending behaviour, pharmacological interventions, and end of life interventions were also excluded.

Search strategy and selection criteria

An Information Specialist (MH) developed search strategies with Ovid MEDLINE and Ovid PsycINFO. The search strategy consisted of terms for people in the care of the CJS; mental and physical health conditions; and randomised controlled trials. Retrieval was limited to studies published from 1990 onwards. The MEDLINE strategy was peer reviewed by a second Information Specialist with the Peer Review of Electronic Search Strategies checklist and was then translated to run on the other databases and resources.[23] We did not apply any language restrictions.

21 databases and resources were searched on Nov 26, 2021, covering literature from the fields of health, medicine, psychology, criminology, nursing, allied health, and social science. The databases included MEDLINE ALL (Ovid), Embase (Ovid), PsycINFO (Ovid), CINAHL Plus (Ebsco), Criminal Justice Abstracts (Ebsco), ASSIA (ProQuest), Social Science Citation Index (Clarivate analytics and Web of Science), Social Policy and Practice (Ovid), Cochrane Central Register of Controlled Trials (Wiley), and ProQuest Dissertations and Theses A&I (ProQuest). Previous and ongoing reviews were identified via the Cochrane Database of Systematic Reviews (Wiley), Database of Abstracts of Effects (DARE), Epistemonikos, and PROSPERO. Economic evaluations and Health Technology Assessments were sought from the UK National Health Service Economic Evaluations Databases and the Health Technology Assessment database. The search strategies for these databases included population terms only.

We searched the Campbell Collaboration website for any ongoing or completed systematic reviews beyond health; the National Institute of Health Research Journals Library for any published reports or ongoing studies; and ClinicalTrials.gov, WHO International Clinical Trials

Registry Platform, and International Standard Randomised Controlled Trial Number for any unpublished or ongoing trials. With the use of predetermined criteria (appendix p 5), duplicate studies were removed before title and abstract searching by two reviewers (AEP and DM). After screening, we did forward (via the Web of Science) and backward citation checking of included studies and previous systematic reviews. All search strategies are reported in the appendix (pp 6–8).

Data analysis

We used a piloted data extraction form to extract the following data: study design; study participants (ie, focusing specifically on people aged ≥50 years and their sex); interventions (ie, population, sample size, intervention or comparator details, intensity, and duration); and measures of effectiveness including depression, anxiety, physical health, and the feasibility and acceptability of the specific intervention components.

We used the Template for Intervention Description and Replication (TIDieR) checklist, which provided a framework to identify feasibility and acceptability through key elements of the intervention delivery, content, and intervention tailoring.[24] This framework focuses on the rationale of the study; materials that were used; procedures; how, where, when, and how much training was provided; how the intervention was tailored and modified; and how well planned the intervention was. We added items relating to use of the intervention in the CJS environment; these included why the intervention was chosen (focusing specifically on reporting any rationale of the adaptation of interventions for older people involved in the CJS) and the general acceptability (and specifically acceptability relating to older people in the CJS) and feasibility (benefits and barriers). We did not include item 1 (brief name to describe the intervention) of the TIDieR checklist. Study quality was independently assessed by two reviewers (DM and TM-B) with the Cochrane Collaboration Risk of Bias Tool.[25] The tool assessed several sources of bias, including selection, performance, detection, attrition, and reporting of other potential sources of bias such as funding rated as either low, high, or unclear risk on each item. We did not rate studies on performance bias as the nature of intervention delivery did not allow for masking of participants.

Due to the paucity of evidence, we were unable to explore heterogeneity with statistical methods (eg, Q and T^2 statistics), nor could we conduct any meta-analysis to estimate the effect size (eg, Hedges' g).[26] Instead, we used a narrative approach to summarise the overall result. Studies were grouped together into themed areas to represent similar activities (eg, yoga or positive psychology). We did represent differences between trial arms at $p<0{\cdot}05$ as indicators of effect on relevant outcome measures of depression, anxiety, and physical outcomes and counted the frequency of reporting across each item on the TIDieR checklist.

Role of the funding source

The study was funded by the National Institute for Health Research's Research for Patient Benefit grant (ID NIHR203484).

Results

We identified 22 105 search results (figure 1), including 1116 records identified from reference lists of systematic reviews, forward citation searches of protocols, and trial registries. After removal of the duplicated records, 11 700 were screened at title and abstract level. A total of 213 records were identified for a full-text review.

We found no RCTs of interventions specifically providing dedicated support for improving depression or anxiety for older people with physical health needs involved in the CJS. Through contact with authors and examination of the mean age range or standard deviation of each study sample, 24 studies (from

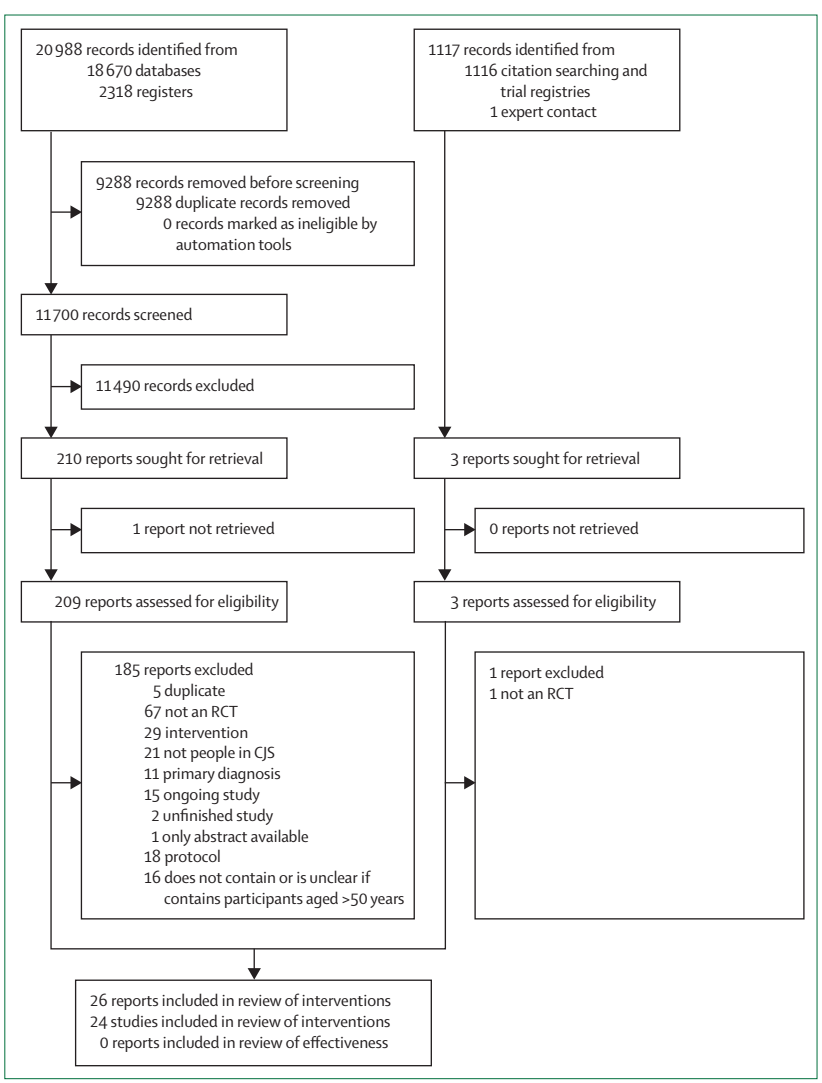

Figure 1: **Flowchart of study search and selection**
CJS=criminal justice system. RCT=randomised controlled trial.

26 records) included some participants who were aged 50 years and older. Of the 24 studies, 140 (10%) of 1349 participants represented responses from 13 of 24 study authors who provided us with an exact number of participants aged 50 years and older.[27–39] The 24 studies were done in the USA (12 studies; two studies in one paper),[27,30–32,36,40–45] Europe (six studies: four in the UK,[28,29,39,46] one in Norway,[34] and one in Sweden[37]), and Asia (six studies: four from China,[33,35,47,48] one from Australia,[49] and one from India[38]). All studies except one[27] involved people incarcerated in jail or prison. Most studies (n=17) were parallel group randomised controlled trials, two of which were three-arm trials[47,48] and the remainder were two-armed trials. There were five pilot randomised controlled trials,[28,29,34,41] one cluster randomised controlled trial,[48] and a crossover study.[36] When reported, study sample sizes ranged from 20 to 226 (mean of 93) and the mean age of the participants ranged from 29 to 41 years. Of 24 studies, six studies included only female participants[31,36,40,43,44,46] and 13 studies included only male participants.[28,29,32–35,38,41,45,47–49] The remainder included both males and females.[27,30,37,39,42] The rate of dropout varied across the trials from 0% to 61%.

Across the 24 studies, we extracted data on 26 interventions. 21 studies described a single intervention, two studies described two different interventions, and two studies within the same paper described a single intervention across both studies (table). The interventions formed five themed areas: yoga-based interventions (n=5);[36–40] creative-arts-based interventions, such as art and music therapy (n=4);[34,35,41,42] positive-psychology-based or mindfulness-based interventions (n=4);[32,33,47,48] psychotherapy interventions (n=5);[29–31,46] and other treatments (eg, health education, Beyond Violence peer therapy, and cognitive bibliotherapy).[27,28,43–45]

TIDieR checklist

The rationale

Reporting on rationale was provided for all interventions except for one.[29] Seven studies[30,31,39,45,47,49] drew upon evidence from the general population as opposed to the prison population for their rationale. Other rationales were based on the widespread use of the intervention in prisons,[40] the effectiveness of the intervention in diverse populations,[32] and an intervention that was specifically developed for use with prisoners.[28] None of the studies provided any rationale or potential benefit for the use of these interventions with older people involved in the CJS (figure 2).

Materials used

All but five studies[28,34,38–40] reported some level of detail on the materials (physical or informational) used for the intervention. 11 studies reported standardised guidelines for the interventionist to follow.[27,29–31,33,36,37,44,46,47,49] Procedures for the interventions were well described across the studies, although there was a distinction across intervention categories in the detail provided. Three yoga-based interventions gave descriptions insufficient to enable recreation.[38–40]

Delivery of the intervention

All studies but one[38] contained details of the interventionists. Brief background details were reported in 13 studies, nine studies[27,29–31,37,39,44,46,49] included trained interventionists as part of the study, five studies[31,33–35,41] trained the interventionist before study commencement, and ten studies reported supervision requirements for the interventionist.[27,29–31,44,46,48,49]

All except two studies[29,39] were administered partly with face-to-face delivery; five interventions contained elements of self-administration.[45,47,48,49] Of the 20 interventions that were exclusively face to face, 14 were delivered in a group setting,[27,32,33,35–37,39–44,49] three used a combination of group and individual settings,[29,30,33] and four used exclusively individual formats.[27–30,46] One study[38] did not specify the format.

All studies reported on the setting in which the intervention took place, although the extent of detail varied across intervention types. Eight studies provided minimal detail.[28,30,31,33,37–39,43]

The duration and intensity of the interventions

There was considerable variation across interventions on the duration and intensity of delivery. Intervention durations were provided for all except one intervention[27] and ranged from 5 days to 9 months. Regarding intensity, most interventions were delivered weekly,[28,32,37,39,41–43,46] seven interventions[29–31,34,35,44,49] were delivered two to three times a week, and six interventions from four studies[36,38,47,48] were delivered daily. No details were provided on intensity for four of the interventions.[27,33,40,45] The length of individual sessions ranged from 50 min to 2·5 h.

Tailoring and modification of interventions to suit the CJS

Tailoring of and modifications to the interventions were poorly reported. Eight studies[28,29,33,34,36,37,46,49] made any mention of tailoring beyond what would be expected as part of standard practice and four of the eight[29,33,36,46] reported minor modifications.[29,33,36,46]

Planning of the intervention

In most cases integrity was reported, with only three studies[40,41,43] not providing any details. Measures of integrity included standardised manuals or protocols,[29–33,35–39,44–47] use of standardised training, and supervised training.[27,29–31,35,42,44,46,48,49] Other techniques, such as use of a single therapist across participants or keeping logs of the intervention, were used in 12 interventions.[27–32,34,36,42,46,48] Psychotherapy-based interventions were the most consistent in their use of techniques to ensure the integrity of the intervention and

monitor fidelity. Approximately a third of studies reported details on actual adherence to treatment for the participants.[27–31,34,35,48] This adherence was usually monitored through the number of sessions completed or the rate of dropout from the intervention.

Acceptability and feasibility

Approximately a third of the studies reported on the acceptability of their respective interventions in their discussion,[28,30,31,35,37,42,47,49] of which only one[37] reported on acceptability in relation to older people involved in the CJS. Feasibility of interventions was reported in 13 studies.[27,28,29,30,31,32,34,42,44,45,46,47,49]

Intervention outcomes for mental and physical health

Outcomes of anxiety were reported in nine studies.[29,30,32–35,38,40,44] Of those nine studies, five reported a significant difference, with interventions reducing symptoms of anxiety in studies on yoga,[38] creative arts,[35] positive psychology,[32,33] and psychoeducation.[44] Outcomes of depression were reported in 15 studies (two studies within the same paper).[29–36,40–42,44–46] Of those 15 studies, 11 reported a significant difference, with interventions reducing symptoms of depression in studies on yoga,[36,40] creative arts,[35,41,42] positive psychology,[32,33,] psychotherapy,[30] and other interventions such as psychoeducation[44] and bibliotherapy.[45] No single study reported any outcomes

	Country	Participants aged ≥50 years	Total sample size	Study design (intervention *vs* control)	Setting	Mean age, years (SD; range)	% male; % female	Intervention(s) details			Control details		
								N	Intensity	Duration	N	Intensity	Duration
Yoga-based interventions (n=4)													
Ambhore and Joshi (2009)[38]	India	4 (4%)	90	RCT (yoga *vs* no intervention)	Central jail and prison	36·86 (3·88; 19–61)	100%; 0%	45	6 sessions, 1 h each	9 months	45	NR	9 months
Bilderbeck et al (2013)[39]	UK	23 (14%)	167	RCT (yoga *vs* TAU)	West Midlands prison	36·08 (12·14; 21–68)	NR	87	1 class per week, 2 h each	10 weeks	80	NR	10 weeks
Danielly and Silverthorne (2017)[40]	USA	NR	63	RCT (trauma-focused yoga therapy *vs* waiting list control)	Prison	37·92 (10·19; 23–70)	0%; 100%	NR*	NR	10 weeks	NR*	NR	10 weeks
Kerekes et al (2017)[37]	Sweden	24 (44%)	226	RCT (yoga *vs* waiting list control)	9 prison facilities	NR	89%; 11%	134	90 min per week	10 weeks	92	90 min per week	10 weeks
Lundstrom et al (2021)[36]	USA	6 (18%)	34	Crossover RCT (yoga *vs* waiting list control)	County jail	37·32 (11·67; NR)	0%; 100%	21	Daily 75 min classes for 5 days per week	2 weeks	13	NR	2 weeks
Creative arts-based interventions (n=4)													
Chen et al (2016)[35]	China	21 (11%)	200	RCT (music therapy *vs* standard care)	Beijing prison	35·5 (9·95; 18–54)	100%; 0%	100	20 sessions twice per week for 90 min	NR	10	NR	NR
Gold et al (2014)[34]	Norway	7 (6%)	113	Pilot RCT (music therapy *vs* standard care)	Bjørgvin prison	31·38 (10·72; NR)	100%; 0%	56	No restrictions	4 weeks	57	None	4 weeks
Gussak (2006)[41]	USA	NR	44	Pilot RCT (art therapy *vs* TAU)	Rural Florida prison	NR (NR; 21–59)	100%; 0%	27	2 days a week, 2 sessions a day	8 weeks	17	None	8 weeks
Gussak (2009)[42]	USA	NR	NR*	RCT (art therapy *vs* TAU)	Rural Florida prison	NR (NR; 21–51)	39%; 61%	NR	Once a week	15 weeks	NR	None	15 weeks
Positive psychology or mindfulness-based interventions n=5													
An et al (2019)[33]	China	9 (17%)	54	RCT (mindfulness training *vs* waiting list control)	Prison in Beijing	41·2 (10·4; 22–57)	100%; 0%	25	Did not mention time limit per week	6 weeks	29	None	6 weeks
Deng et al (2019)[47]	China	NR	104	RCT (counting blessings and sharing gratitude *vs* TAU [reading a short story])	Prison in China	35·49 (9·65; 21–53)	100%; 0%	37	Daily	5 weeks	34	Daily	5 weeks
Yang et al (2018)[48]	China	NR	144	Cluster RCT (kindness *vs* gratitude *vs* TAU)	Local prison	34·8 (9·76; 19–61)	100%; 0%	48	Daily and weekly	6 weeks	48	NR	6 months
Yu et al (2021)[32]	USA	4 (17%)	24	RCT (forgiveness therapy *vs* Carey Guides)	Maximum-security prison	NR (NR; 21–60)	100%; 0%	12	Once a week for 1 h	6 months	12	NR	6 months

(Table continues on next page)

	Country	Participants aged ≥50 years	Total sample size	Study design (intervention *vs* control)	Setting	Mean age, years (SD; range)	% male; % female	Intervention(s) details			Control details		
								N	Intensity	Duration	N	Intensity	Duration
(Continued from previous page)													
Psychotherapy interventions n=4													
Johnson and Zlotnick (2012)[31]	USA	3 (8%)	38	Pilot RCT (interpersonal psychotherapy plus TAU *vs* psychoeducation plus TAU)	Rhode Island state prison	35 (9·2; 20–54)	0%; 100%	19	60–75 min group sessions 3 times a week, 3 individual sessions, and 6 weeks of individual sessions after release	8 weeks	19	3 times per week and 6 weeks session after release	8 weeks
Johnson et al (2019)[30]	USA	12 (17%)	181	RCT (interpersonal psychotherapy *vs* TAU)	Two prisons in north-eastern USA	39 (10·4; 20–61)	0%; 100%	91	90 min 2 times per week and 4 individual sessions	10 weeks	90	NR	10 weeks
Pratt et al (2015)[29]	UK	8 (13%)	62	Pilot RCT (CBSP plus TAU *vs* TAU)	Northwest England prison	35·2 (11·1; 21–60)	100%; 0%	31	Up to 20 sessions 2 times per week, reducing to once per week for up to 1 h	4 months	31	NR	4 months
Walker et al (2017)[46]	UK	NR	113	RCT (psychodynamic interpersonal therapy *vs* conversation with non-prison staff)	Prison	29·9 (NR; 18–52)	0%; 100%	56	50 min per week	4–8 weeks	57	50 min per week	4–8 weeks
Other treatments n=7													
Cashin et al (2008)[49]	Australia	NR	20	RCT (health education and exercise programme *vs* waiting list)	Prison	51 (NR; NR)	100%; 0%	10	2 sessions per week	12 weeks	10	Exercise as usual	12 weeks
Jasperson (2013)[43]	USA	NR	81	RCT (animal assisted therapy *vs* psychoeducational therapy)	Prison in Utah	36 (NR; 19–58)	0%; 100%	NR*	1 h per week	8 weeks	NR*	1 h per week	8 weeks
Lennox et al (2017)[28]	UK	3 (5%)	60	Pilot RCT (ENGAGER plus TAU *vs* standard care)	Prison in the northwest and southwest of England	33·3 (NR; 19–57)	100%; 0%	40	Variable, depending on need	12 weeks	20	NR	12 weeks
Messina and Calhoun (2022)[44]	USA	NR	145	RCT (psychoeducational violence prevention programme *vs* waiting list control)	Prison	38·6 (14; NR)	0%; 100%	78	2·5 h session 2 times per week	10 weeks	67	NA	10 weeks
Pardini et al; study 1 (2014)[45]	USA	NR	37	RCT (cognitive bibliotherapy *vs* waiting list control)	Jail and prison	29·37 (9·22; 19–52)	100%; 0%	20	Self-managed	4 weeks	17	NA	4 weeks
Pardini et al; study 2 (2014)[45]	USA	NR	42	RCT (cognitive bibliotherapy *vs* waiting list control)	Jail and prison	32·7 (8·27; 20–53)	100%; 0%	19	Self-managed	4 weeks	23	NA	4 weeks
Van Deinse et al (2022)[27]	USA	16 (16%)	100	RCT (SMHP *vs* standard probation)	Probation	35·95 (12·53; NR)	54%; 46%	47	NR	NR	53	NR	NR

RCT=randomised controlled trial. NR=not reported. TAU=treatment as usual. CBSP=cognitive behavioural suicide prevention. SMHP=specialised mental health probation. *Only completed numbers were reported.

Table: **Summary of interventions**

Study	Brief name	Why		What		Who	How		Where	When and how much?		Tailored	Modified	How well		Acceptability		Feasibility
		Theory	Rationale	Materials	Procedure		Mode	Individual or group		Duration	Intensity			Plan	Actual	General	Older	
Yoga-based interventions																		
Ambhore and Joshi 2009[38]	Yoga practice	●	●	○	●	○	●	○	●	●	●	○	○	●	○	○	○	○
Bilderbeck et al 2013[39]	Yoga	●	●	○	●	●	●	●	●	●	●	○	○	●	○	○	○	○
Danielly and Silverthorne 2017[40]	Yoga therapy	●	●	○	○	●	●	●	●	●	○	○	○	○	○	○	○	○
Kerekes et al 2017[37]	Yoga	●	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	○
Lundstrom et al 2021[36]	Yoga	○	●	●	●	●	●	●	●	●	●	○	●	●	○	○	○	○
Creative-arts-based interventions																		
Chen et al 2016[35]	Music therapy	●	●	●	●	●	●	●	●	●	●	○	○	●	●	●	○	○
Gold et al 2014[34]	Music therapy	●	●	○	●	●	●	●	●	●	●	●	○	●	●	○	○	●
Gussak 2006[41]	Art therapy	●	●	●	●	●	●	●	●	●	●	○	○	○	○	●	○	○
Gussak 2009[42]	Art therapy	○	●	●	●	●	●	●	●	●	●	○	○	●	○	●	○	●
Positive-psychology-based or mindfulness-based interventions																		
An et al 2019[33]	Mindfulness training	○	●	●	●	●	●	●	●	●	○	○	●	●	○	○	○	○
Deng et al 2019[47]	Counting blessings	●	●	●	●	●	●	●	●	●	●	○	○	●	○	○	○	●
	Sharing gratitude	●	●	●	●	●	●	●	●	●	●	○	○	●	○	●	○	○
Yu et al 2021[32]	Forgiveness therapy	●	●	●	●	●	●	●	●	●	●	○	○	●	○	○	○	●
Yang et al 2018[48]	Kindness	●	●	●	●	●	●	●	●	●	●	○	○	●	●	○	○	○
	Gratitude	●	●	●	●	●	●	●	●	●	●	○	○	●	●	○	○	○
Psychotherapy interventions																		
Pratt et al 2015[29]	Cognitive behavioural	○	○	●	●	●	●	●	●	●	●	○	●	●	●	○	○	●
Johnson and Zlotnick 2012[31]	Interpersonal	●	●	●	●	●	●	●	●	●	●	○	○	●	●	●	○	●
Johnson et al 2019[30]	Interpersonal	●	●	●	●	●	●	●	●	●	●	○	○	●	●	●	○	●
Walker et al 2017[46]	Psychodynamic interpersonal	●	●	●	●	●	●	●	●	●	●	○	●	●	○	○	○	●
Other treatments																		
Jasperson 2013[43]	Animal-assisted therapy	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○
Lennox et al 2017[28]	Complex collaborative care	●	●	○	●	●	●	●	●	●	●	●	○	●	●	●	○	●
Messina and Calhoun 2022[44]	Psychoeducational violence prevention	●	●	●	●	●	●	●	●	●	●	○	○	●	○	○	○	●
Pardini et al 2014[45] (two studies)	Cognitive bibliotherapy	●	●	●	●	●	●	●	●	●	○	○	○	●	○	○	○	●
Van Deinse et al 2022[27]	Specialised mental health probation	●	●	●	●	●	●	●	●	○	○	○	○	●	●	○	○	●
Cashin et al 2008[49]	Exercise	●	●	●	●	●	●	●	●	●	●	●	○	●	○	●	○	●

● Reported ○ Not reported

Figure 2: **Template for Intervention Description and Replication checklist**

of physical health relating to either COPD, diabetes, or obesity (appendix pp 9–10, 11–12). However, these findings did not apply exclusively to people aged 50 years and older, but rather to interventions across different age groups.

Risk of bias

Three of 24 studies[22,33,44] were rated as having a high risk of bias due to no reporting of the randomisation process and allocation concealment (figure 3). Over two-thirds of the studies were considered to be of unclear or high risk

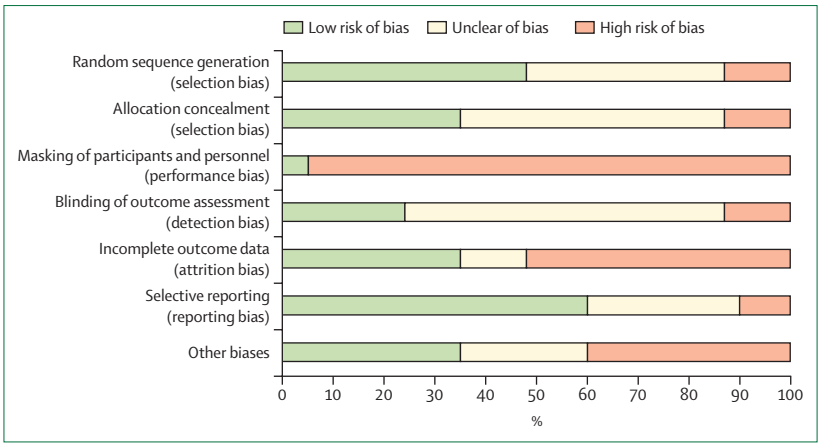

Figure 3: **Risk of bias graph**

on masking of the outcome assessors, as no details were provided on who administered the outcome measures.[27,32–44,46–49] Half of the studies were rated high risk for the incomplete outcome data assessment, and the common reason for studies being judged to have a high risk of bias was high dropout rate and missing outcome data.[28,29,33,34,36,37,39–42,46,49] Nearly half of the studies were considered to be of high or unclear risk in selective reporting, mainly due to absence of protocol registration.[27,37,38,40,41,43–45,47,48] About two-thirds of the studies were rated as having an unclear or high risk of bias in other biases, due to small sample size or self-reported outcomes (or both; appendix p 13).[29,32–38,40–42,45,47–49]

Discussion

Despite calls from the scientific community, the evidence to support effective treatment of older people involved in the CJS is sparse. Our systematic review identified no study that evaluated interventions specifically targeting or tailored towards supporting depression or anxiety of older people involved in the CJS with physical health needs. Although 24 studies included some people aged 50 years or older, they also included people across age groups. The overall number of participants aged 50 years or older was negligible (representing only 10% of the study sample), providing little evidence to guide either service or research decision making. We did not synthesise the effectiveness of these studies nor report on any economic findings for this reason. The exclusion of older people taking part in research or intervention activities could represent an element of social bias and others have drawn similar conclusions.[18] The low proportion of older people in this study could also be exacerbated by the well established age–crime curve, which sees offending peak in late adolescence,[50] meaning that older people in custody are not often offered the opportunity to engage. In addition, use of UK and USA policy initiatives to introduce harsher sentences have increased the length of sentences, meaning that people are more likely to be incarcerated into old age,[51,52] increasing the challenges for dealing with and the likelihood of complex mental and physical health conditions.[53] The TIDieR checklist revealed that most studies had some transparency of reporting, with little evidence on tailoring interventions, modification, intervention fidelity, acceptability, and feasibility. Dropout rates varied greatly (ranging from 0% to 61%), indicating concerns about the acceptability of interventions for this population.

In conclusion, there is very little known about the needs of older people with mental and physical health conditions in the CJS or how to improve these health outcomes. Evidence from systematic reviews for depression in older adults in primary care shows cognitive behavioural therapy as an effective form of treatment.[45] Other studies indicate that use of bibliotherapy, life review, and problem-solving therapy were effective at short-term follow-up.[45] Reviews of relaxation interventions (eg, progressive muscle relaxation or yoga) show greater reductions for depression and anxiety in treatment groups than controls in most studies.[46] Examination of the effect of virtual reality versus exercise games showed how commercial virtual reality games had statistically significantly larger effects on depressive outcomes than exercise games,[47] but these are unlikely to be acceptable within the prison environment.

Left unresolved, the scarcity of evidence is likely to result in an endlessly revolving cycle of exacerbated mental and physical health problems in older people involved in the CJS. Continued policy interest and a dedicated programme of research are urgently required. Future interventions need to take into consideration the needs and views of this vulnerable group. Ensuring that coproduction, tailored to sex, and use of existing public health frameworks form a central part in the development of interventions is essential. Use of coproduction and public health frameworks will improve knowledge and understanding of what makes interventions acceptable, promoting successful implementation with stakeholder engagement throughout the criminal justice pathway.[50, 51]

Contributors

AEP, SK, MH, and RC were responsible for the overall design of the study. AEP, DM, and TM-B oversaw the day-to-day conduct of the study. MH was responsible for the development of search strategies. AEP, DM, and TM-B conducted the prescreening, secondary screening, and data extraction of study information. All authors made substantial contributions to the interpretation of the data and drafting of the article. All authors had full access to all data and had final responsibility for the decision to submit for publication.

Declaration of interests

We declare no competing interests.

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