

**Title: Preventing and responding to depression, self-harm, and suicide in older people living in long term care settings: A systematic review**

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**Abstract**

**Objective:** The well documented demographic shift to an aging population means that more people will in future be in need of long term residential care. Previous research has reported an increased risk of mental health issues and suicidal behaviour among older people living in residential care settings. However, there is little information on the actual prevalence of depression, self-harm, and suicidal ideation in this population, how it is measured and how care homes respond to these issues.

**Method:** This systematic review of international literature addressed three research questions relating to; the prevalence of mental health problems in this population; how they are identified and; how care homes try to prevent or respond to mental health issues.

**Results:** Findings showed higher reported rates of depression and suicidal ideation (but not self-harm) in care home residents compared to matched age groups in the community, variation in the use and appropriateness of standardised measures across studies and, interventions almost exclusively focused on increasing staff knowledge about mental health but with an absence of involvement of older people themselves in these programmes.

**Conclusion:** We discuss the implications of these findings in the context of addressing mental health difficulties experienced by older people in residential care and future research in this area.

**Keywords:** older people, care homes, mental health, depression, suicide, staff training

## Introduction

It is estimated that between now and 2050 the proportion of the world's population aged over 60 will almost double from 12% to 22% (World Health Organization [WHO], 2015). Many of these individuals will require social care of some form and a large proportion will eventually move to residential care. Moving into long term care can result from declining physical or cognitive functioning, loss of a partner or caregiver (Podgorski, Langford, Pearson & Conwell, 2010) and can be perceived as a last resort when other interventions have failed (Netten, Darton, Bebbington & Brown, 2001). While it is anticipated that increasing numbers of older people will need specialist dementia care within residential settings in future years, less consideration has been given to those older people with mental health needs unrelated to dementia (AGE UK, 2016; Grabowski, Aschbrenner, Rome & Bartels, 2010). For those with no diagnosis of dementia or cognitive decline, self-neglect or self-harm in older people has been shown to be a response to loss of autonomy, an attempt to maintain self-identity, feelings of social isolation (both real and self-imposed) or a sense of meaninglessness of one's life (Wand, Peisah, Draper & Brodaty, 2017).

Previous research suggests that older people living in care homes are at increased risk of depression, self-harm, and suicidal ideation compared to those in the community (e.g. Murphy, Bugeja, Pilgrim & Ibrahim, 2015; Wand, et al., 2017). Figures consistently suggest that around 20% of older people in the community experience depression, this rises to 40% for those living in care homes (Mental Health Foundation [MHF], 2011). Despite this it is estimated that in the UK up to 85% of older people with depression receive no support from health services (MHF, 2011). Depression and suicidal behavior may be further under reported within long term residential settings for older people which can be difficult to diagnose when cognitive decline is also a factor (see Azulai & Walsh, 2015 for a review). Similarly, under-identification of mental ill health by health-care professionals and older people themselves and the stigma surrounding mental illness makes people reluctant to seek help.

Prevention and appropriate responses to mental health difficulties in older people is an increasingly urgent public health issue. In order to better understand how to do this, it is important first to have a comprehensive picture of the scale of the problem, how it is identified and what can be learned from previous interventions. Most research on the mental health needs of older people in care homes to date has focused on dementia although it is beginning to be recognised that a greater proportion of care home residents now have mental health problems that are unrelated to dementia (Grabowski, et al., 2010). There is a need to maintain and review research and knowledge about depression, self-harm and suicidal behaviour impacting on older people living in care homes to better understand and predict risk (Nock & Kessler, 2006) and to understand mental health in the context of the institutional environment in which it occurs to develop appropriate prevention strategies (Murphy et al, 2015). This systematic review was conducted to assess the evidence on the rates of depression, self-harm, and suicidal behavior within care homes, how these are measured and what responses have been shown to be effective in addressing them.

Specifically, three research questions were addressed:

1. What is the prevalence of depression, self-harm and suicidal behavior in older people living in residential care settings/nursing homes?
2. What tools are used to measure, or assess the risk of, depression, self-harm or suicidal behavior in this population and how are they routinely used?
3. What interventions are used in older people's residential settings/nursing homes to prevent or address depression, self-harm and/or suicidal behavior and how effective are they?

## **Methods**

### *Search Strategy*

The first author conducted searches in seven databases (CINAHL, IBSS, MEDLINE, OVID, PsychINFO, PubMed and RCN Journals) using a combination of keywords, presented in Box 1. Terminology regarding the setting differed among countries so that some referred to residential care facilities, nursing homes or residential care homes with little evidence of distinction between them. We addressed this issue by including all terms in our search in order to ensure no literature was missed at this stage.

### *Inclusion/exclusion criteria*

Included papers were limited to;

- Peer reviewed research articles published between 1990 and 2016 using qualitative, quantitative, or mixed methods.
- Those set in care homes or long-term residential care for older people
- Describes the prevalence or measurement of depression, self-harm, or suicidal ideation/behavior in residents with no indication of dementia
- Describes interventions (including staff training) aimed at identifying, preventing, or responding to depression, self-harm, or suicidal behavior in residents, with no indication of dementia.
- Studies published in English

### *Data extraction and synthesis*

All identified papers were collated on Covidence (2017), an online program that allows teams to work simultaneously on systematic reviews. Titles were reviewed for relevance by one author (HG) and in the second phase relevant abstracts were reviewed by two authors (HG and DC). Where the abstract was considered relevant to one or more of the research questions the full paper was screened and assessed for inclusion by at least two of the paper authors, with disagreements being resolved through discussion between the full research team. The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA, Moher, Liberati, Tetzlaff & Altman, 2009).

## *Quality Assessment*

The included studies were a mix of qualitative, quantitative, and mixed-methods research reports. In order to appraise the methodological quality of all 25 papers in a comprehensive and comparable manner an assessment tool designed for mixed systematic reviews was employed for this review. The Mixed Methods Appraisal Tool (MMAT; Pluye, et al., 2011) scores papers on a scale of one star to four stars based on an average score of four individual criteria per research design, for example, for qualitative studies question 1.2 asks 'Is the process for analysing qualitative data relevant to address the research question (objective)?' and for quantitative studies 4.3 asks 'Are measurements appropriate (clear origin, or validity known or standard instrument?)' Each paper was reviewed according to the questions relevant to that research design and assigned a star score; details of each paper included with the assigned quality assessment are given in Table 1.

## **Results**

### *Study Characteristics*

Twenty five studies were deemed to be relevant to at least one review question and were included in the literature synthesis (see Figure 1). Studies were based in multiple countries, with the majority from the USA ( $n = 7$ ), the UK ( $n = 5$ ) and the Netherlands ( $n = 4$ ), other countries included Australia ( $n = 2$ ), Iran, Greece, Spain, Austria, Canada, Italy, and China (all  $n = 1$ ). Study designs varied also with a mixture of randomised controlled trials ( $n = 8$ ), quasi-experimental studies ( $n = 8$ ), cross-sectional surveys ( $n = 6$ ) and three papers reporting on large scale secondary data analyses.

As can be seen from Table 1 the studies varied in quality, those scoring just one or two stars were assigned these quality assessments due to poor methodological reporting where insufficient information was given on aspects such as participant recruitment, randomization, or stratification. There was a mixture of settings included across studies with most focusing just on care homes and a small number comparing rates of depression etc., between community living older people and those in care homes. Most studies that reported on inclusion criteria specified participants older than 65 years although some ( $n = 3$ ) included those aged 50 years or older. As it was not possible to separate data by age within the reviewed papers all results are reviewed here.

### *Prevalence of depression, self-harm and suicidal behaviour*

Seven studies reported some measured prevalence rates, with the majority focusing on depression or suicidal ideation (Anstey, von Sanden, Sargent-Cox & Luszcz, 2007; Arvaniti, et al., 2005; Damian, Pastor-Barriuso & Valderrama-Gama, 2010; Levin, et al., 2007; Malfent, Wondrak, Kapusta & Sonneck, 2010) while two reported statistical analyses on rates of completed or attempted suicide (Mezuk, Lohman, Leslie & Powell, 2015; Scocco, et al., 2006). Collectively these studies suggest that rates of depression and suicidal ideation are higher within residential care settings compared to those not in residential care, but that older people living in the community are more likely to attempt or complete suicide.

Two of the studies reported rates of depression for those living in the community to be between 14.4% (Anstey, et al, 2007) and 22.5% (Arvaniti, et al., 2005) compared to between 32% (Anstey, et al., 2007) and 63.5% (Arvaniti, et al., 2005) in residential care homes. Other studies reported depression prevalence within care homes only finding rates between 32% (Damian, et al., 2010) and 48% (Levin, et al., 2007) when validated tools were used to detect mental health difficulties. Malfent et al. (2010) reported on levels of suicidal ideation among a sample of 129 residents of 15 care homes and found that 43% reported having death wishes, with 11% of these having active suicidal ideation in the previous year.

Completed suicides were measured as a proportion per 100,000 people rather than percentage. In the USA, Mezuk, et al. (2015) reported a rate of 15.66 per 100,000 in the community compared to 14.16 per 100,000 within care homes. While in Italy, Scocco, et al. (2006) compared attempted and completed suicides among a sample of 298 residential care homes. They report high levels of attempted suicide (29.7 per 100,000) and completed suicide (18.6 per 100,000) in this group.

### *Measuring depression*

In total 16 studies used at least one quantitative, standardized measure of depression or other mental health issue. The most commonly used measure was the Geriatric Depression Scale (GDS) with 10 of the studies including this measure in a variety of languages. Other common measures used included; the Center for Epidemiological Studies Depression Scale (CESD); the Hospital Anxiety and Depression Scale (HADS) and; the Geriatric Mental State – Depression Scale (GMS-DS).

The most commonly used scale was the GDS, but despite it being developed as a screening tool it tended to be used as an outcome measure (Cuijpers & van Lemmenen, 2001; Karimi, et al., 2010; McCurren, Dowe, Rattle & Looney, 1999; ) or as a diagnostic tool for mild to severe depression (Arvaniti, et al., 2005; Damian, et al., 2010; Konnert, Dobson & Stelmach, 2009; Malfent, et al., 2010). Just three of the papers included psychometric details for the scale (Cuijpers & van Lemmenen, 2001; Heiser, 2004; Yeung, Kwok & Chung, 2013), reporting reliability of between .48 and .87 for the scale, inter-rater reliability between .63 and .84 and specificity of 81 - 82.6%, sensitivity of 92-100%.

As with the GDS, the CES-D tended to be used as an outcome measure (Anstey, et al., 2007; Bosmans, et al., 2013) of depression and usually as just one of multiple measurements of mental health and quality of life among older people (Konnert, et al., 2009). Two studies by the same authors also used the scale as an indicator of anxiety in this population (Dozeman, et al., 2012; Dozeman, et al., 2011). None of the studies that included the CES-D reported any psychometric properties for this scale.

The GMS-DS was used as an outcome measure for intervention studies by Lyne, et al. (2006) assessing a care planning intervention, by Moxon et al. (2001) to assess the effects of a staff training intervention aimed at reducing depression in care home residents, and by Mozley, et al. (2007) to assess an occupational therapy intervention in care homes. None of the studies reported on the psychometric properties of the measurement. Likewise, the HADS was used as a clinical outcome measure by three studies in the review (Bosman, et al., 2014; Dozeman, et al., 2012; Dozeman, et al., 2011)

as one of multiple measures of mental health/illness indicators. No paper reported on the psychometric properties of the scale for their study.

### *Measuring self-harm and suicidal behavior*

Just three of the studies used a standardised measure to assess risk of self-harm or suicidal behavior directly (Arvanti, et al., 2005; Bosmans, et al., 2013; Dozeman, et al., 2012). Arvaniti et al. (2005) used a Greek version of a short diagnostic tool, the Mini International Neuropsychiatric Interview (MINI; Sheehan, et al., 1998) to assess the existence of suicidality based on DSM-IV and ICD-10 criteria as part of their prevalence study comparing community dwelling and residential care home older people. The Dutch version of this measure was used by Bosmans, et al. (2013) and Dozeman, et al. (2012), to assess the levels of depression in community and residential care dwelling older people. Further details on the use of this measure were not given.

Malfent, et al. (2010) created three direct questions to measure passive death wishes ('Have you ever wished to die?') and active suicidal thoughts ('Have you ever thought of taking your own life?') but these were not psychometrically tested so their validity or reliability is not known. The aim of this paper was to assess the potential risk and protective factors associated with suicidal ideation in care home residents, therefore, the questions were used as an outcome measure rather than a means of identifying those likely to need interventions.

### *Interventions to identify or prevent depression, self-harm, and suicidal behavior*

In all 16 papers focused on intervention or prevention measures in long term residential care settings. Papers tended to report either staff training interventions or targeted mental health intervention/prevention programs. For this reason, the results of the synthesis from these papers are presented under two separate headings below.

#### *Staff training and knowledge acquisition*

Eight studies focused on staff training and knowledge development to improve understanding and identification of depression or mental illness (Blair Irvine, et al., 2012; Cuijpers & van Lammeren, 2001; Furniaux & Mitchell, 2004; Lyne et al., 2006; McCabe, et al., 2013; Meeks & Burton, 2004; Moxon, et al., 2001; Walker & Osgood, 2001). Training was delivered as an online course (Blair Irvine, et al., 2012), or group instruction (Cuijpers & van Lammeren, 2001; Furniaux & Mitchell, 2004; Lyne, et al., 2006; McCabe, et al., 2013; Meeks & Burton, 2004). One study used staff mentoring as a means of improving staff understanding and knowledge of mental illness and found increases in sensitivity of identification and mentors noted higher levels of empathy and rapport between staff and residents (Moxon, et al., 2001).

Training was welcomed by staff and showed significant increases in levels of knowledge in the short term and greater confidence in identifying symptoms of depression (Blair Irvine, et al., 2012; Cuijpers & van Lammeren, 2001; Furniaux & Mitchell, 2004; Lyne, et al., 2006), with those that included follow up assessments showing these were maintained over time (McCabe, et al., 2013). In one study, this was mediated by existing staff knowledge prior to training (Meeks & Burton, 2004), other studies did not include reference to potentially mediating variables. Cuijpers and van Lammeren (2001) also

reported that training interventions can be successful when administered to non-mental health professionals within care homes. None of these studies, however, included measurement of the impacts of this training on the mental health status of care home residents so it is unclear if staff training has a real effect on depression, self-harm, or suicidal behavior.

### *Prevention and intervention*

The remaining eight studies reported on intervention or prevention programs within residential care settings (Bosmans, et al., 2013; Dozeman, et al., 2011, 2012; Karimi, et al., 2010; Konnert, et al., 2008; McCurren, et al., 1999; Mozley, et al., 2007; Underwood, et al., 2013). Three of these studies were reporting on the same intervention (Bosmans, et al., 2013; Dozeman, et al., 2011, 2012) in care homes in the Netherlands that involved a stepped-care program to address anxiety and depression. The program involved four levels of intervention depending on assessed need from watchful waiting for one month up to clinical treatment from a GP. While the findings suggest that there were significant improvements in depression amongst the residents involved, reported anxiety levels increased after the intervention and Bosmans et al. (2013) found that the intervention was not cost effective.

A further study reported on an intervention that trained older (60 -91 years) volunteers from the community to provide social support to residents in care homes (McCurren, et al., 1999). This study found that the social bond provided by volunteers was an effective means of reducing the incidence of depression in the care home group and that it helped to alleviate the factors associated with depression such as loss of independence, significant others, and self-esteem. Karimi et al. (2010) reported on a reminiscence therapy intervention delivered through group sessions with nursing home residents which found significant decreases in levels of depression for the intervention group. A cognitive behavioral therapy (CBT) intervention was reported by Konnert, et al. (2008) where significant improvements in reported depressive symptoms were found in the intervention group.

Overall, success of these interventions varied. Mozley, et al. (2007) for example found that their occupational therapist led activity intervention had little effect on longer term residents of care homes but was much more effective at engaging new residents suggesting a need for different approaches to motivate residents in such interventions and to consider these effects in interpreting study outcomes. There were also high levels of attrition across all studies and none investigated differences between participants who left the intervention early and those who remained for the full term. In addition, no study included any follow-up measures of mental health beyond the immediate completion of intervention so longer term impacts are not clear.

## **Discussion**

The purpose of this systematic review was to investigate the prevalence of depression, self-harm and, suicidal behavior amongst older people living in nursing homes and how these are assessed and responded to. Our search returned 25 papers relevant to one or more review question spanning 11 countries with the majority focusing exclusively on depression and notably less emphasis on self-harm or suicidal behavior. None of the studies reviewed offered a theoretical explanation of mental health decline in this

population despite more than half reporting on interventions to improve or support mental health, a criticism noted by other authors in this area (Van Orden & Conwell, 2016). However, some of the studies indicated that transitioning from independent living to a residential setting is likely to be a significant risk factor for poor mental health in this population (e.g. Anstey, et al., 2007). Comparisons across settings and countries are difficult to make however as there was considerable variation in the sample sizes, measures used and means of reporting prevalence. Nonetheless, our findings add to the existing literature that shows older people living in care homes are at higher risk of experiencing mental ill health and suicidal ideation and behavior when compared to the same age groups living independently.

An important methodological issue highlighted by this review is the absence of the voice of residents themselves. They were not active participants in any of the studies reviewed and their perspectives on what would help them improve their mental health in residential/care homes were not accounted for. An understanding of how the interventions introduced affected them on a qualitative level is also missing from the current body of literature in this area. A recent qualitative review investigating the reasons for suicidal behavior and self-harm in older people reported that self-neglect is often used as an attempt to regain control and self-identity while suicidal behavior can be a response to alienation and meaninglessness of life (Wand, et al., 2017). Studies included in this review however, did not address issues of identity, control or meaningfulness in care home populations tending instead to focus on more generic measures of mental ill health.

Similarly given that personal relationships are the key to residents having positive experiences of, and being able to make a valuable contribution to, life within a care home which may promote older people's sense of wellbeing and mental health, there was a noted absence of inclusion of family members or the wider community. For example, Brown-Wilson et al. (Brown-Wilson, Davies & Nolans, 2009) have explored the contribution of family members to interventions that promote person-centred relationships through sharing photographs, personal belongings or stories which could be used by staff as conversation triggers during personal care. This suggests the need for a re-evaluation of interventions which are co-produced.

In line with previous research (e.g. Murphy, et al., 2015) reviewed studies show higher rates of depression and suicidal ideation in older people living in care homes compared to those in the community with one study reporting considerably higher rates of depression in care home residents than has previously been reported at 63.5% (Arvaniti, et al. 2005). While direct links between depression and suicidal behavior are by no means inevitable, findings from Malfent et al. (2010) where almost half of their participants reported death wishes suggest there is a need for further investigation of the correlations between depression and suicidal behaviour in this population. A European study including 16 countries found weak correlations between reported suicidal ideation and completed suicide in community populations suggesting a relatively high proportion of older people experience suicidal thoughts without making attempts to end their lives and that other factors need to be considered in fully understanding suicide risk in older people (Lukaschek, Engelhardt, Baumert and Ladwig, 2015). What differentiates between those who do attempt suicide and those who do not is unclear meaning interventions to prevent suicide or suicidal behaviour in

older people either in the community or in care homes are difficult to design and implement.

From our review of research, completed suicide appears slightly lower in residential settings (Mezuk, et al., 2015) compared to the community which may be no more than a reflection of the practical difficulties of accessing means of suicide in care homes. It was not reported in these studies whether other forms of self-harm that lead to death were recorded as attempted or completed suicide or as some other cause of death. For example, Wand et al. (2017) and XXX (under review: authors anonymised for peer review) highlight the need to consider passive acts of self-harm, such as refusing to eat or take medication, isolating oneself from social interaction and self-neglect, as a form of suicidal behaviour that may be significantly under-recorded and largely ignored by both professionals and researchers.

Measurement of depression, suicidal ideation and suicidal behavior was primarily through the GDS and CES-D with 15 papers using one or both of these tools. Across studies reviewed there was little discussion of the psychometric properties of any of the measurement tools used and in many cases they appear to have been used as diagnostic, rather than screening, tools. As reported elsewhere (Van Orden & Conwell, 2016), there may be a need to distinguish between those older people who are actively suicidal and those who, due to declining independence and physical capabilities, may see little purpose to their lives anymore but would not consider taking their own lives. The measures in current use as highlighted by this review do not take account of these potential differences and therefore proposed interventions to support mental health do not make this distinction either.

Staff training in recognising symptoms of depression in residents tended to show increases in detection that were not sensitive to validated measures, i.e. that staff were inclined to over identify depression in residents after training (Moxon, et al., 2001). Whether this is merely an effect of greater awareness from staff or if the measures in current use to assess mental health (e.g. GDS-15) are poor indicators of milder forms of depression or the specific ways it may be displayed in those living in residential care was not determined. Challenges to increasing staff roles in responding to depression or other mental health issues in residents were noted across many of the reviewed papers. Insufficient resources and time means that care staff tend to focus solely on practical and physical duties and pragmatic relationships that primarily focus on the instrumental aspects of care, such as feeding, washing and dressing of residents, and more subtle needs can be neglected. There is a need for future research to assess the correlations between staff confidence in identifying depression in care home residents and impacts on the mental health of residents. This suggests a need to involve residents in designing and implementing interventions in order to gauge the most acceptable means of discussing mental health with residents and means of addressing aspects of loss of control and independence that appear to be major factors.

High levels of attrition were seen throughout the primary research studies we reviewed. The possible reasons for this were not addressed in these studies but it can be assumed that in some part it was due to declining health in some residents, death of participants and high turnover of staff within care homes (Bosmans, et al., 2013). Motivation of care home residents is also a challenge for intervention studies. Mozley et al. (2007) found those with longer residency were less inclined to engage with their intervention

compared to newer residents, however they did not assess the reasons for this and no comparisons in mental health status or other motivation factors were made. This study does suggest that universal interventions to improve mental health in older people in care homes may fail to show real impacts if there are different levels of involvement and interest from participants depending on their length of residency. It also shows the need to consider what factors should be in place in order to ensure that those who are in need of mental health support are able to receive it.

In addition, those entering the nursing home may experience feelings of loss and social isolation (Podgorski et al., 2010), and the anticipation of loss of independence may be a risk factor for self-harm and suicidal behavior (Osgood & Brant, 1990; Murphy et al, 2015). None of the studies we reviewed were aimed at preventing mental health difficulties in care home residents although some of the staff training programs could be interpreted as possible future prevention attempts. However, few studies reviewed included follow-up measures of impacts of interventions and many reported only on the effects of training on staff confidence and did not extend their research into measuring impacts on resident mental health. Without measurement of the impact of training on residential mental health it cannot be said that any of these interventions are effective at preventing depression or suicidal behavior amongst care home residents.

### **Limitations**

For the purposes of this review we concentrated on older people living in residential or nursing home settings only as our population of interest. It is likely that by limiting our search in this way we have missed some important research that describes the etiology and influencing factors on poor mental health in older people more generally. There are recognised inequalities in support for older people with mental health issues which coincide with an ageist response to depression as a normal part of ageing particularly in care homes making it difficult to fully understand potential causes of mental ill health in this population (Age UK, 2016; WHO, 2015). However, the closed environment of long term care settings also lend themselves to some form of structured intervention to improve mental health. This could be more useful to inform future research aimed at targeting poor mental health in community based older populations.

Variations in the methodologies used across studies reviewed means that comparison either between community dwelling and residential care home older people, or between countries, could not be made with any confidence.

### **Conclusion**

Older people living in care are among the most vulnerable in our community because of their physical frailty, cognitive impairments, and dependency on others. This review has highlighted challenges in fully understanding the prevalence of depression, self-harm and suicidal behavior and effective ways of preventing or intervening in mental health for older people living in care homes. There is a strong suggestion that the psychological and social impacts involved in the transition between independent living and residential care creates a risk period for developing mental health problems.

The absence of older people themselves in designing ways to prevent mental ill health is a particular limitation of the current research literature despite increasing moves to

more co-productive research across the social sciences. Future research should assess the correlations between staff confidence in identifying depression in care home residents and impacts on the mental health of residents. Again, this highlights the need to involve residents in designing and implementing interventions in order to gauge the most acceptable means of discussing mental health with residents and means of addressing aspects of loss of control and independence that appear to be major factors.

Further, consideration of socio-economic and political factors impacting on the mental health experiences of older people living in a care home in a wider context lacks adequate examination. Only one study completed over 20 years ago, examined organizational factors of the nursing home in relation to suicide in particular (Osgood & Brant, 1990). Osgood and Brant (1990) and more recently, Murphy et al (2015) have stressed the significance of organizational factors associated with increased risk of suicide among nursing home residents in relation to high staff turnover and size of the care facility. These require more research alongside greater engagement with older people to facilitate their participation in making decisions about their health and mental wellbeing particularly where depression or self-harm has been identified.

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Box 1. *Primary search terms*

In order to address our three review questions on the prevalence, measurement and responses to depression, self-harm and suicidal behaviour in older people in residential care/nursing homes, the following search terms were used;

(older people OR age\* OR elderly OR older adults) AND (care home OR nursing home OR residential care OR long term care\*)

AND

(self-harm OR mental health OR mental ill\* OR depress\*) OR (suicide\* OR attempted suicide OR substance misuse OR overdose)

AND

(intervention OR evidence-based practice review OR measurement tools OR risk assessment OR systems review OR staff training OR predictive tools OR suicide prevention OR workforce development OR educat\*)

AND

(mental health outcomes OR system outcomes OR awareness OR identifi\* OR prevention OR knowledge building OR effectiveness OR patient safety OR service user safety OR educat\* OR care pathway)

Figure 1: PRISMA Flowchart

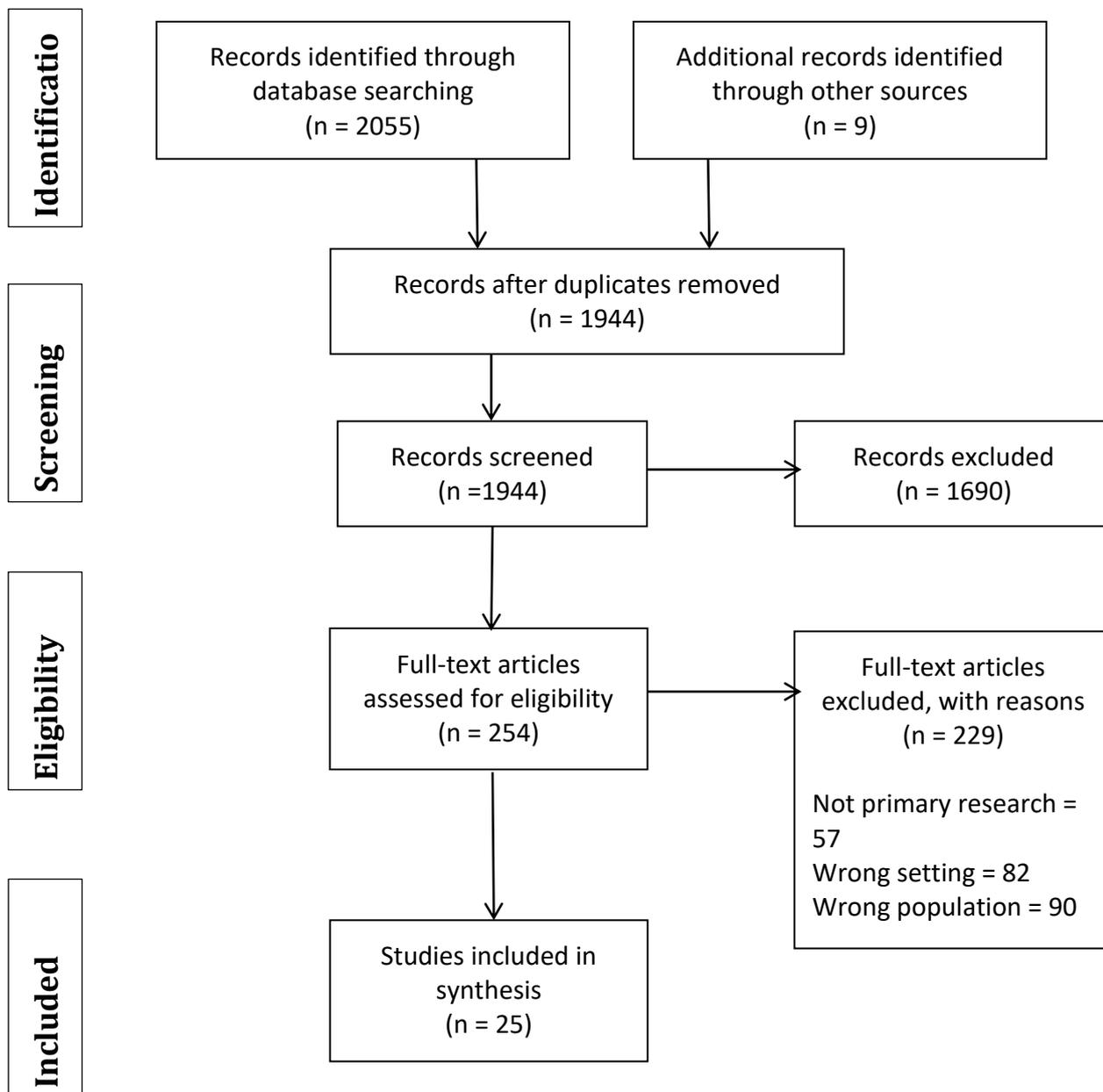


Table 1: Summary of included studies

Author	QA	RQ	Aims & Objectives	Sample & Inclusion	Setting & Methods	Main Findings
1. Anstey, et al (2007), Australia	****	1,2	To identify if transition to residential care predicted depressive symptoms	1,116 (from Australian Longitudinal Study of Ageing, Wave 6), 65 + No cognitive decline	Community and residential care. Secondary data analysis (CES-D)	Depression is linked with increased dependency and transition to residential care.
2. Arvaniti, et al (2004), Greece	**	1,2	To examine mental health problems in older adults living in residential care in Greek rural area	80 (40 residential, 40 community), 71 +, 50% female. No severe physical/cognitive decline	Community and residential care. Cross sectional survey (MINI; GDS; MMSE)	Suggest that, especially in rural areas, admission to a residential institution is a traumatic event precipitating suicidality.
3. Blair Irvine, et al (2012), USA	**	3	To evaluate 'Caring Skills: Working with Mental Illness' internet based training programme	172 (84 intervention group), licensed health professionals in nursing homes	Nursing home and assisted living. RCT	Delivery of training online is effective for nursing and long term care staff
4. Bosmans, et al (2013), Netherlands	*	2,3	To evaluate the cost-effectiveness of stepped care programme for prevention of depression and anxiety	185 (M age = 84, 73% female), Dutch speaking, no cognitive impairment, no DSM-IV depression/anxiety.	Residential care homes (N = 14). Pragmatic RCT (MINI; MMSE; CES-D; HADS)	The stepped care programme is not considered cost effective in comparison with usual care.
5. Cuijpers, et al.	**	2,3	To examine the effects of a multifaceted	424 (213 intervention, 211 control), 71+, 78.5%	Residential care homes (N = 10 plus 5 control).	General approaches within care homes can

(2001), Netherlands			secondary prevention intervention	female. No cognitive impairment, Dutch speaking.	Quasi-experiment (GDS; MMSE; MOS-SF-20)	be effective in reducing negative symptoms.
6. Damian, et al. (2010), Spain	*	1,2	To measure prevalence of undetected depression in institutionalised older people	579 residents (74% female, 65 + years). Longer than 60 days in residence, no cognitive impairment.	Public and private care homes (N = 186). Cross sectional survey (GDS)	Medication and self- rated health predicted undetected depression.
7. Dozeman, et al. (2011), Netherlands	**	2,3	To evaluate a guided self-help prevention intervention for depression and anxiety	129 residents (67 intervention, 62 control group). Dutch speaking.	Residential care homes (N = 14). Stratified cluster sampling. RCT (CES-D; HADS)	Only 21% completed the intervention. Lack of guidance may have contributed to low completion and satisfaction.
8. Dozeman, et al. (2012), Netherlands	**	2,3	To evaluate effectiveness of stepped- care programme for prevention of depression and anxiety	185 residents (93 intervention, 92 control). Dutch speaking.	Residential care homes (N= 14). Stratified cluster sampling. RCT (CES-D; MINI; HADS)	Intervention is effective in reducing incidence of depression but not in preventing onset of anxiety.
9. Furniaux, et al. (2004), UK	*	3	To identify educational needs of staff, design and deliver training to increase knowledge and confidence.	Total 78 staff in pre-test and training, 20 post- test respondents. Senior carers and nurses only.	Community mental health nursing staff from care homes (N = 25). Action research. Pre/post questionnaire.	Tailored educational package had positive impact overall, indicates feasibility of this approach.

10. Heiser, D. (2004), USA	*	2	To compare depression identification rates and validity of Minimum Data Set (MDS) and Geriatric Depression Scale Short Form-15 (GDS)	348 residents. Inclusion/exclusion criteria not specified.	Single urban residential home. Cross sectional survey (GDS; MDS)	Current measures used to identify depression may be inadequate – the addition of GDS is effective and efficient to identify depression
11. Karimi, et al. (2010), Iran	****	2,3	To examine the therapeutic effectiveness of integrative and instrumental types of reminiscence for the treatment of depression in institutionalized older adults living in nursing homes.	29 total (10 reminiscence group; 9 instrumental reminiscence; 10 social discussion) (17 female, 60 + years). Resident for >6 months, not receiving anti-depression medication, Persian speaking, screened at risk for depression, no significant cognitive or physical impairment	Single care home. RCT (GDS; MMSE)	Provides support for effectiveness of integrative reminiscence therapy as intervention for depressed older adults in residential care settings.
12. Konnert, et al. (2008), Canada	***	2,3	To evaluate group based CBT in prevention of depression in care home residents	64 total at T1 (41 intervention, 23 control), at T2 – 20 intervention, 23 control.  At risk (not DSM criteria) of depression, > 60 years, English speaking, physically able	Non-profit residential care homes (N = 7). RCT (GDS; CES-D; MMSE)	Brief group-based CBT can have significant benefit for residents at risk of depression.

				to attend, no cognitive impairment.		
13. Levin, et al. (2007), USA	****	1	To examine the prevalence and treatment of diagnosed depression among elderly nursing home residents and determine the resident and facility characteristics associated with diagnosis and treatment.	79,735 care home residents. Over 65, resident > 3 months, not hospital based home.	921 nursing homes included. Secondary data analysis	Significant disparities exist in both diagnosis and treatment of depression. Disadvantaged groups least likely to be diagnosed and treated, majority (74%) treated with anti-depressants
14. Lyne, et al. (2006), UK	****	2,3	To assess staff training to detect and intervene to reduce depression in residents	282 residents (114 intervention, 168 control). Over 65 years, no psychotic or serious physical illness.	Residential care homes (N = 14), local authority, private and dual registered. Quasi-experiment (GMS-DS; MMSE)	Clinically significant improvements in depression were associated with the intervention.
15. Malfent, et al. (2010), Austria	**	1,2	To assess prevalence and correlates of suicidal ideation in care home residents	129 residents. Over 60 years, German speaking, no sensorial limitations or cognitive impairment.	15 residential care homes. Cross sectional survey (GDS; SWLS)	Suicidal ideation is prevalent in Viennese residential care homes (up to 54%). Research and prevention targets shouldn't only target risk but also look at protective factors.
16. McCabe, et al.	**	3	To evaluate a staff training initiative for	107 professional carers (34 intervention; 38	8 care facilities. RCT.	Trained staff not better at detecting depression

(2013), Australia			recognising depression in residents	control group). 216 residents (99 intervention; 51 training plus screening; 66 control group). Inclusion criteria not stated		than non-trained staff. Training Plus group more likely to diagnose non-depressed residents
17. McCurren, et al. (1999), USA	*	2,3	To test effects of intervention by psychiatric nurses in conjunction with older adult volunteers.	85 residents (44 treatment, 41 control). Over 65 years, > 12 months residency, no diagnosis of dementia, terminal illness.	Nursing home facilities (N = 3). Quasi- experiment (GDS; MMSE; MDS; LSES)	Medication alone had little impact on symptoms. Use of volunteers helped to create social bond, friendship which had significant impact on residents. Factors associated with loss of independence predictive of depression
18. Meeks & Burton (2004), USA	*	3	To describe outcomes from a didactic workshop to recognise and respond to depression	Staff (N = 58, pre and post data), nursing (16), social work (9), activity therapists (21) and 'other' (13). No inclusion/exclusion criteria applied	Nursing home facilities (N = 6). Quasi- experiment	Preliminary support for didactic approach, need to consider differences in staff experience in training
19. Mezuk, et al. (2015), USA	***	1	To investigate the epidemiology of suicide in over 50s, if transition	N = 3682 (recorded suicide and undetermined). Over 50 years.	Nursing homes (N = 285) and assisted living facilities (N = 548). Secondary data analysis	Transition into long term care may be an important point of

			to long term care is a risk factor			engagement in suicide prevention
20. Moxon, et al. (2001), UK	**	2,3	To assess training for staff in detecting depression and implementing care-planning intervention	Care home staff (N = 22). All staff invited to attend (total N = 26).	Care homes (N = 2) in one local authority. Quasi-experiment	Training is both necessary (almost half of residents deemed to be significantly depressed) and welcomed. Increased detection rates and some reductions in depressive symptoms after care plan intervention.
21. Mozley, et al. (2007), UK	**	2,3	To test hypothesis that depression severity can be reduced through occupational therapy programme	143 residents. Care home inclusion criteria; minimum 25 residents; owned by LA; non-specialist; residential not nursing home.	Residential care homes (N = 8) from two local authorities. Quasi-experiment (GMS-DS; MANQOL-R; Barthel Index)	Provides no evidence that occupational therapy impacts on depression, dependency or quality of life
22. Scocco, et al. (2006), Italy	*	1	To assess suicide and attempted suicide rates and their characteristics among older residents in nursing homes in North-East Italy	26,875 residents total. Homes with < 50% under 65 years. Open verdicts, self-starvation and 'suicidal erosion' were not considered as suicide/suicide attempts in this study	Nursing homes (N = 298). Managers or designated staff member surveyed. Cross sectional survey	The suicide rate in this study was higher than the national average for over 65s. Behavioural control, lack of access to methods of suicide and medical supervision appear to have failed to prevent suicide and attempted suicide.

23. Underwood, et al. (2013), UK	****	3	To compare depression levels between intervention and control homes up to 12 months after the introduction of a 'whole-home' exercise programme.	Baseline data for 765 residents; follow up 484.  Homes with > 6 potential participants; no severe cognitive impairment; English speaking; physically well enough to participate	Nursing homes (N = 78). Cluster RCT	Intervention was highly regarded by participants and staff but failed to show impact on depression symptoms
24. Walker & Osgood, (2001), USA	*	3	To measure what staff already know about suicide prevention  To develop a curriculum of staff training in recognising and preventing suicide  To test a pilot programme of training for effects on staff knowledge and attitudes	Care home staff (N = 57 baseline; 43 with pre and post data)	Care homes (N = 2). Quasi-experiment	That training can be beneficial to raise awareness.
25. Yeung, et al. (2013) China	**	2	To test the mediating effect of institutional peer support on the relationship between physical decline and depressive symptoms in nursing home residents	Residents (N = 187; 133 female)	Care homes (N = 2). Cross sectional survey (GDS)	Peer support has a positive contribution to make in reducing incidence of depressive symptoms

QA = Quality assurance rating, more \* indicates a higher quality paper as defined by MMAT (Pluye, et al., 2011)

RQ – refers to the research question addressed by this specific paper, as indicated in the text many papers were relevant to more than one research question.

CES-D = Center for Epidemiological Studies – Depression Scale; GDS = Geriatric Depression Scale; GMS-DS = Geriatric Mental State – Depression Scale; HADS = Hospital Anxiety and Depression Scale; LSES = Salamon-Conte Life Satisfaction in the Elderly Scale; MANQOL – R = Manchester Quality of Life Profile – Residential; MDS = Minimum Data Set; MINI = Mini International Neuropsychiatric Interview; MMSE = Mini Mental State Examination; MOS-SF-20 = Measures of Quality of Life – Short Form; SWLS = Satisfaction With Life Scale