

REVIEW ARTICLE

Dog ownership and mental health among community-dwelling older adults: A systematic review

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Abstract

Background: The population is ageing, and psychiatric disorders are common in older people. Those are associated with worsened quality of life. Although the positive relationship between dog ownership and physical health has been documented, data on mental health are scarcer, especially in community-dwelling older adults.

Objective: We sought to establish whether owning a dog was associated with a lower number of symptoms of psychological disorders in community-dwelling older adults.

Methods: We conducted a systematic review of the literature published between January 2005 and December 2020. We analysed comparative studies of the level of insomnia and symptoms of depression and/or anxiety among community-dwelling dog owners aged 70 and over.

Results: The search identified 191 articles, of which 117 full texts were assessed for eligibility. Five cross-sectional studies and one before-after with control group study (assessing a total of 25,138 older adults) were included. The mean (range) NOS score (five studies) was 6.8/9 (5–9) and the EPOC score (one study) was 2/8. The association between the presence of a dog and depressive symptoms did not appear to be significant. Regular contact with a dog was associated with fewer symptoms of anxiety. None of the studies specifically examined sleep disorders.

Conclusions: Although the presence of a dog did not appear to be related to the level of depressive symptoms among community-dwelling older adults, there might be a beneficial relationship with anxiety. Further investigation is needed - especially with regard to the type of dog and the type of relationship with the dog.

KEYWORDS

community-dwelling, dog ownership, mental health, older adults

Clémence Maurice and Cynthia Engels have contributed equally to the work.

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Key points

- Very few studies of low level of evidence have explored the putative link between dog ownership and mental health in community-dwelling older adults.
- There is no compelling evidence of an association between dog ownership and mental health in community-dwelling older adults.
- There may be a beneficial association between dog ownership and anxiety in community-dwelling older adults.

1 | INTRODUCTION

In many countries of the world, the proportion of older adults is increasing.¹ In France, for example, people aged 60 and over are expected to account for more than a third of the population by 2050.² Ageing is associated with greater morbidity rates: more than half of older adults have several concomitant morbidities,³ including psychiatric disorders.⁴

The spectrum of geriatric psychiatric disorders ranges from depressive disorders (minor or major), dysthymia and bipolar disorders to anxiety disorders such as generalised anxiety disorder, panic disorder, and insomnia. Among community-dwelling older adults, the prevalence of major depression disorders ranges from 1% to 4%,⁵ and the prevalence of moderate depression ranges from 8% to 16%.⁶ Major depression is more prevalent (10%–12%) in medical settings and in nursing homes (12%–14%).⁶ Depressive symptoms are most frequent among the oldest adults. This higher frequency can be explained by factors associated with ageing, the higher proportion of women, greater physical disability, greater cognitive impairment, and lower socioeconomic status.^{6,7} The risks of chronicity and definitive cognitive impairment are specifically associated with geriatric forms of depression. With regard to anxiety, an Australian review found that the prevalence rate of generalised anxiety disorder in community-dwelling older adults ranged from 1% to 12%⁸—even though anxiety disorders in later life are often under-diagnosed.⁹ Furthermore, anxiety and sleep disorders in older adults place a burden on families and caregivers.^{7,10,11} Setting aside established psychiatric disorders, psychological symptoms (depression, anxiety and sleep disorders) in older adults are associated with worsened quality of life^{12,13} and elevated mortality.

Despite issues with implementation¹⁴ or efficacy evidence,¹⁴ the treatments for depressive/anxiety disorders in older adults are similar to those in younger age groups. The social environment, the presence of family support, and early management have major impacts on the prognosis for older adults with depression disorders.

Previous research has shown that the presence of a dog has a number of positive impacts on people's physical health.¹⁵ For example, it has been reported that owning a dog leads to a 24% reduction in the risk of all-cause mortality at all ages,¹⁶ a 31% reduction in the risk of cardiovascular disease,^{16–18} greater physical activity,¹⁹ and greater ability to embrace a healthy lifestyle.^{20,21} Just as in younger individuals, older dog owners benefit from the effects of walking a dog.^{22–27} The benefit of dog ownership might also be combined with a perceived good physical health and may facilitates

the development of new social relationships. Recent reviews suggest that dog ownership could benefit children's and adult's mental health.^{24–26}

In contrast, there is far less data on the putative association between dog ownership and the mental health of community-dwelling older adults. Most of the data come from other settings; for example, systematic reviews and meta-analyses have emphasised the impact of "therapy techniques", such as interventions by trained dogs in nursing homes. The reported effects were either small and positive (for apathy, anxiety, and prosocial conduct) or null (for cognition and depression).^{28–32} A study of 2551 community-based adults aged 60–64 in Australia even found some negative results with regard to mental and physical health.³³

In the light of these literature findings, we sought to determine whether dog ownership was associated with a lower level of symptoms of anxiety or depression and sleep disorders (rather than effects on physical health alone) among community-dwelling older adults.

2 | METHODS

2.1 | Study design

We performed a systematic review of the literature on the association between dog ownership and mental health in older adults living at home. The eligibility criteria and search strategy are described below. We reported our results in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines³⁴ (supplementary file). The systematic review's protocol was registered prospectively in the PROSPERO (reference: CRD42020216464). We searched the PROSPERO and clinicaltrials.gov databases for similar studies; none were found.

2.2 | Eligibility

Studies were eligible for inclusion if they met the criteria established by the following PICOS framework.

2.2.1 | Participants

We included studies of community-dwelling adults in which the participants' mean age was 70 or over. Studies of institutionalised

adults were excluded. The presence of cognitive disorders among the study participants was not an exclusion criterion.

2.2.2 | Interventions

The presence of a dog at home was the main exposure factor, although assistance interventions by a trained dog were not excluded.

2.2.3 | Comparison

The dog owners were variously compared with people who did not own a pet or who owned a pet other than a dog. We also included studies of groups in which dog owners accounted for the majority of animal owners.

2.2.4 | Outcomes

The primary outcome was an intergroup difference (i.e. dog owners vs. another group) in the indices or scores for depression, anxiety and/or insomnia used in the selected studies. All types of index or score were included.

2.2.5 | Study type

With the exception of case reports, popular science articles, and qualitative studies, all types of study were included.

2.3 | Search strategy

We searched the PubMed, EMBASE, Cochrane Library, Google Scholar, PsycInfo, Web of Science, OpenGrey and Grey Literature databases, together with a list of French MD theses. The search period ran from January 2005 and December 2020. A four-step strategy was applied. Firstly, we searched PubMed using the keywords "dog", "dog owner", "pet", "pet owner", "depress*", "anxiety", "anxious", "insomnia", "sleep", "elderly", and "aged". Secondly, we used the results of this preliminary search to expand our list of relevant keywords. Thirdly, we searched all the databases using the expanded list of keywords. Lastly, we screened the reference lists of the selected articles, reviews and meta-analysis. The search was limited to full-text articles published in English or French. Data were extracted from the selected publications and summarised in a table.

2.4 | Study selection

The selected publications were reviewed by two investigators (CF and EP), with the help of a university librarian, during the year 2021.

Firstly, the two investigators independently reviewed the search results (i.e. the list of publications). The initial selection was based on the titles and abstracts by considering the PICOS criteria defined above. Next, the reviewers examined full-text versions of the candidate publications. Disagreements about selection were resolved by consensus.

2.5 | Data extraction and analysis

The risk of bias was assessed by scoring the Newcastle Ottawa Scale (NOS, for observational epidemiological studies)³⁵ or the Effective Practice and Organisation of Care scale (EPOC, for clinical trials).³⁶ The EPOC scales includes 8 risks, each classified as high risk and low risk. For the review, we rated the low risk 1, the high risk 0 and this on a scale ranging from 0 to 8. The NOS scale was scored from 0 to 9 with quality considered good for a score greater than or equal to 6.

The studies' outcomes were examined in order to determine whether a meta-analysis of a common outcome was feasible. We included original publications grade I to IV of Sackett's level of evidence.³⁷

3 | RESULTS

3.1 | Literature search and selection

The search generated a list of 319 publications, of which 202 were excluded because they were duplicates ($n = 128$), published in a language other than French or English ($n = 19$), or unavailable in our university library ($n = 16$) or with methodological weakness ($n = 39$). Hence, 117 studies were selected for full-text evaluation. Of these, 111 were excluded because the study included institutionalised participants ($n = 20$) or participants whose mean age was under 70 ($n = 47$) or because the study lacked a comparator or control group ($n = 21$) or had excluded outcomes ($n = 23$). Hence, six studies³⁸⁻⁴³ were included in the final review (Figure 1).⁴³

3.2 | Characteristics of included studies and sample participants

We reviewed five cross-sectional studies and one before-after with control group study, conducted variously in Europe ($n = 2$), Asia ($n = 2$) and Australia ($n = 2$) (Table 1). None of the studies had a randomised design. The sample sizes differed markedly, with fewer than 100 participants in two studies,^{38,39} between 300 and 3000 participants in two other studies,^{41,42} and over 10,000 participants in the last two studies.^{40,43} The participants' mean age was over 70 years in all studies. All participants were independent, community-dwelling older adults. Dog owners were included in all six studies. Dog owners accounted for all the pet owners assessed in one

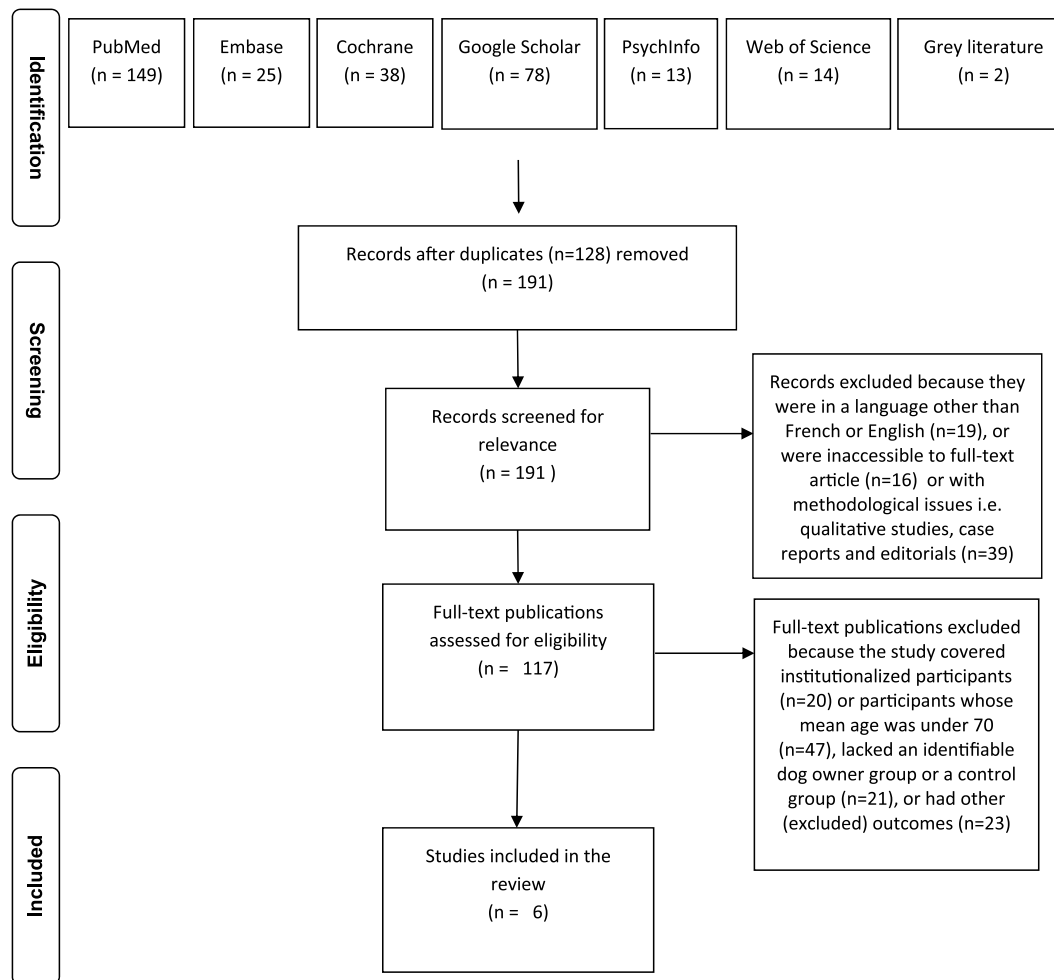


FIGURE 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram. From: Moher D, (2009)⁴⁴

study³⁹ and the majority of pet owners assessed in four studies.^{38,40–42} In one study, dogs were not the most frequently depicted pet. The presence of direct comparisons between dog owners and participants without pets made it possible to retain it⁴³ in the final selection. All the studies had a comparative design, and the comparator groups comprised people who did not own a pet.

3.3 | Outcomes

The mental health outcomes and the measurement tools varied markedly from one study to another (Table 1). Four studies measured the participants' level of depression on the Geriatric Depression Scale (GDS) ($n = 2$),^{38,39} the Hospital Anxiety and Depression Scale (HADS-D) ($n = 1$)⁴³ or the Depression Anxiety Stress Scale (DASC) ($n = 1$).⁴⁰ The last two studies^{41,42} gathered data on mental health by administering the SF-36 Health Survey and the 12-item General Health Questionnaire (GHQ-12). One study analysed the level of symptoms of anxiety⁴⁰ but none specifically studied anxiety disorders or insomnia. The lack of a common outcome in the six studies prevented us from performing a meta-analysis.

3.4 | The relationship between dog ownership and symptoms of depression, anxiety or insomnia

In unadjusted analyses, two studies^{38,39} (one of which had a high level of evidence³⁹—before-after with control group study) found that the level of depression was significantly lower among dog owners than among control participants. However, these differences were not significant after adjustment for sociodemographic factors. The same two studies also found a positive relationship between the presence of a dog and light-to-moderate physical activity. One study found that the frequency of a dog's presence (measured by completing a checklist six times a day for a week) was strongly and negatively associated with depression and moderately and negatively associated with anxiety or loneliness.⁴⁰ Another study found a positive association between the feeling of happiness and the presence of a dog.⁴² It is noteworthy that most of the dog owners in the two studies were regular walkers.^{40,42}

In contrast, the study performed in The Netherlands found an association between having a dog at home and an increase in the frequency of seeking outpatient mental care.⁴¹ The last study⁴³ found that symptoms of depression were more prevalent in dog owners than in the comparator group.

TABLE 1 Characteristics of the included studies

Authors	Country (year)	Design	Population	Exposure group	Comparative group	Outcome of interest for the review	Other outcomes	Results	NOS (9) / (8)	Title	Journal
Taniguchi et al.	Japan (2018)	Cross-sectional	Community-dwelling; N = 11,223, age = 75[1]	Dog owners (n = 963)	No pet owner (and cats owner)	GDS-5 (depression, range 0-5)	Dem, charact, social, health, psycho	GDS-5 score (mean (SD): Current dog own = 1.2 (1.2) versus never 1.3 (1.3) p = 0.018	9	Physical, social, and psychological characteristics of community-dwelling elderly Japanese dog and cat owners	Plos one
Kil et al.	Korea (2019)	Quasi-experimental	Alone older adults, N = 20, aged 70+	Group integrated interventions (animal assisted therapy (AAT) (dogs) + IEPT (games)) n = 10	No pet owner (n = 10)	GDS-5 short form-Korea (depression, range 0-15)	TMT-A, MMSE-K	Decreased level of depression with AAT	2	Effect of group integrated intervention program combined animal-assisted therapy and integrated elderly play therapy on live alone elderly	Journal of animal science and technology
Bennett et al	Australia (2015)	Cross-sectional	Healthy older adults n = 68, average age = 71.6	Pet owner (n = 41) dog (n = 33), cat (n = 17) and other animal (n = 8)	No pet owner (n = 27)	DASS (21 items, general mental health, anxiety > 7, depression > 9), self reported	PWI-A, SPS, ULS-R and MIDORS	No statistically significant differences for depression or anxiety were observed when comparing ...dog owners with non-dog owners... Frequency of dog presence was strongly negatively related to depression and moderately negatively related to anxiety and loneliness	5	An experience sampling approach to investigating Associations between pet presence and indicators of psychological wellbeing and mood in older australians	Anthrozoos

(Continues)

TABLE 1 (Continued)

Authors	Country (year)	Design	Population	Exposure group	Comparative group	Outcome of interest for the review	Other outcomes	Results	NOS (9)	EPOC (8)	Title	Journal
Rijken et al. van Beek	Netherlands (2011)	Cross-sectional	National random-sample of community-dwelling elderly suffering of chronic illness or disability. n = 1410, median age 74	Dogs (n = 108), cats (n = 27), others (n = 98) and others (n = 48)	No pet owners (n = 1116)	GHQ-12 (general mental health, range 0-12, psy disorder >2), 1 question on perceived health	Social items, medical purchase/sociodem, pathology/disability	Pet ownership (PO) associated with a greater chance to use ambulatory mental healthcare. No link between PO and self-reported general or mental health care. Having a dog increased the likelihood of being healthy-active, having a cat showed the opposite.	6		About cats and dogs ... Reconsidering the relationship between pet ownership and health related outcomes in community-dwelling elderly	Social indicators research
Winefield et al.	Australia (2008)	Cross-sectional	n = 314, average age = 71.35	Pet owners (n = 179) and dog owners (n = 99)	No pet owners (n = 135)	SF-36 (general health perception, with questions on mental health but no distinction between anxiety and depression, range 0-100)	-	After controlling for other variables, neither pet ownership nor pet attachment added significantly to explained variance in health and well-being	7		Health effects of ownership of and attachment to companion animals in an older population	International journal of Behavioural medicine
Enmarker et al.	Norway (2014)	Cross-sectional	Rural older adults, average age = 74.8, n = 12,093	Dog owners (n = 814), cat owners (n = 1083)	No pet owners (n = 10,196)	HADS-D (D = depression range 0-21), self reported	Questions about pets and loneliness	The main results showed higher mean values on the HADS-D for cat owners than for both dog and non-pet owners. The latter group rated their depression symptoms the lowest. The follow-up t-tests revealed significant differences between non-pet owners (M2.98) as well as between participants who had dogs (M 3.71) p < 0.001	7		Depression in older cat and dog owners: The nord-trendelag health study (HUNT)-3	Aging and Mental Health

3.5 | Risk-of-bias

The mean (range) NOS score was 6.8 out of 9 (5–9). The EPOC scale score (calculated for the Korean study alone³⁹) was two out of 8. This study had the only longitudinal design but the sample size was very small ($n = 20$).

4 | DISCUSSION

After reviewing studies of community-dwelling older adults, we did not find any compelling evidence of an association between the presence of a dog at home and mental health. However, the frequency of contact with a dog might be associated with a lower level of anxiety.

Very few studies have explored the putative link between dog ownership and mental health in community-dwelling adults. Most of the studies reviewed here had a cross-sectional design. However, our contrasting results for the over-70s appear to be corroborated by studies of the 60–70 age group^{42,43,45} and a study published before 2005.⁴⁵ A study of a large cohort in England did not find that dog owners were in better mental health or an improvement in mental health after having a dog, although the results concerned a younger population (men and women aged 50 and over).⁴⁶ In our review, the studies that found a better state of mental health in dog owners either involved unadjusted analyses and weak associations³⁸ or a small sample size and a non-blinded design.³⁹ One of the six studies even found an association between the presence of a dog and worse mental health.

In other populations, two studies^{47,48} of people with HIV and one study²¹ of people on dialysis found that cohabitation with a dog was associated with a lower number of depression symptoms. The same finding emerged from a study of adolescents in Japan.⁴⁹ Although none of the studies reviewed here looked at insomnia, some literature data suggest that younger dog owners tend to sleep better.^{50,51}

In the studies reviewed here, retrospective measurement of human-animal interactions was measured as a binary variable (e.g. dog ownership or not). This prevents one from looking at whether some characteristics of the dog-owner relationship might be associated with better mental health. For example, an observed association between dog ownership and depression may depend on other criteria, such as the time spent with the animal. Indeed, Bennett et al.⁴⁰ analysed human-animal interactions in greater depth and found that owners who exercised their dogs sufficiently had lower levels of depressive symptoms.⁴⁰ Moreover, the weak link found between the frequency of contact with the dog and less anxiety might be due to the positive effect of dog-walking.⁵² In other words the anxiety decrease may be mediated by the physical activity as already demonstrated.⁵³ In this way, dog-ownership may be a facilitator of physical activity but not a causal determinant.⁵⁴

We are now conducting a prospective, comparative study (NCT04032340) of adults aged 75 and over, in France, in which the dog-owner relationship is characterised in detail. We shall then

assess the association between having a dog as a companion on one hand and the feeling of loneliness and other mental health variables on the other.

Lastly, it is possible that some breeds of dog are less suitable as pets for older adults. Dog breeders and sellers might require specific training on the best breeds in this context. Furthermore, the documented, positive impact of dog-mediated interventions³⁹ may suggest that specific training for dogs and for people who buy or adopt a dog might help to improve the owner's mental health. Greater access to canine services (e.g. pet sitters) might facilitate the acquisition of a pet dog by older adults.

Even when the presence of a dog is associated with a mental health benefit, the association's underlying nature remains to be determined: do study participants buy or adopt a dog in order to overcome depression or to fill an emotional gap, or does the subsequent change in the owner's life create psychological problems? Therefore, longitudinal follow-up cohort studies and/or clinical trials are needed to determine whether or not the observed associations are causal.

Our study had several strengths. This is the first systematic review to have considered the mental health of community-dwelling dog owners aged 70 and over. One review⁵⁴ explored the impact of animal-mediated interventions on overall health (with no lower age limit), and two other reviews covered people with dementia and institutionalised people, respectively.^{31,32}

The study also had some limitations. We excluded publications not written in French or English, which limited the scope of our study. We included one study about animal-assisted intervention which effects (positive or negative) can be influenced by the presence of the trainer/therapist or the absence of responsibility toward the animal.³⁹ Furthermore, the selected studies were predominantly cross-sectional in nature preventing us for causal analysis. From our clinical experience, some older people appear to be reluctant to acquire a dog because they are worried that they will die before their canine companion; this might create selection bias in studies of dog ownership. Lastly, the disparate study outcomes prevented us from performing a quantitative analysis.

5 | CONCLUSION

The studies reviewed here did not find a positive association between dog ownership and depression in community-dwelling older adults. There may be a beneficial association with anxiety. Given the small number of studies, the low levels of evidence, and epidemiological issues with regard to older adults and psychological disorders, longitudinal cohort studies of the strength and putative causal nature of the association between dog ownership and psychological health in older people are warranted.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

All data generated or analysed during this study are included in this article. Further enquiries can be directed to the corresponding author.

ETHICS STATEMENT

An ethics statement is not applicable because this study was based exclusively on a review of the literature.

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