

BMJ Open

Reducing social isolation in older people: a systematic review protocol

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2016-013778
Article Type:	Protocol
Date Submitted by the Author:	05-Aug-2016
Complete List of Authors:	Landeiro, Filipa; University of Oxford, Nuffield Department of Population Health Barrows, Paige; University of Oxford, Nuffield Department of Population Health Gray, Alastair; University of Oxford, Nuffield Department of Population Health Leal, Jose; University of Oxford, UK, Nuffield Department of Population Health
Primary Subject Heading:	Public health
Secondary Subject Heading:	Health policy
Keywords:	social isolation, loneliness, intervention, systematic review, older, elderly

SCHOLARONE™
Manuscripts

1
2
3 **Reducing social isolation in older people: a systematic review protocol**
4

5 Filipa Landeiro, Paige Barrows, Alastair M. Gray, José Leal
6
7
8

9 Filipa Landeiro, DPhil student in Public Health, Health Economics Research Centre, Nuffield
10

11 Department of Population Health, Old Road Campus, University of Oxford, Oxford, OX3 7LF, UK
12

13 Paige Barrows, Foundation Doctor, Health Economics Research Centre, Nuffield Department of
14

15 Population Health, Old Road Campus, University of Oxford, Oxford, OX3 7LF, UK
16

17 Alastair M Gray, Professor of Health Economics, Health Economics Research Centre, Nuffield
18

19 Department of Population Health, Old Road Campus, University of Oxford, Oxford, OX3 7LF, UK
20

21 José Leal, University Research Lecturer, Health Economics Research Centre, Nuffield Department of
22

23 Population Health, Old Road Campus, University of Oxford, Oxford, OX3 7LF, UK
24
25
26
27
28

29 Correspondence to: Filipa Landeiro filipa.landeiro@dph.ox.ac.uk
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Abstract

Introduction: Social isolation and loneliness affect approximately one third to half of the elderly population and have a negative impact on their physical and mental health. Group-based interventions where facilitators are well trained and the elderly are actively engaged in their development seem to be more effective but conclusions have been limited by weak study designs. We aim to conduct a systematic review to assess the effectiveness of health promotion interventions on social isolation or loneliness in older people.

Methods and analysis: A systematic review was conducted in Medline, Embase, PsycINFO, Cinahl, ASSIA, LILACS, OpenGrey and The Cochrane Library on peer-reviewed studies and doctoral theses published between 1995 and 2016 evaluating the impact of health promotion interventions on social isolation and/or loneliness for individuals aged 60 and over. Two reviewers will independently assess each study for inclusion and disagreements will be resolved by a third reviewer. Data will be extracted using a pre-defined pro-forma following best practice. Study quality will be assessed with the Effective Public Health Practice Project quality assessment tool. A narrative synthesis of all studies will be presented by type of outcome (social isolation or loneliness) and type of intervention. If feasible, the effectiveness data will be synthesised using appropriate statistical techniques.

Ethics and Dissemination: This systematic review is exempt from ethics approval because the work is carried out on published documents. The findings of the review will be disseminated in a related peer-reviewed journal and presented at conferences. They will also contribute to a DPhil thesis.

Trial registration number: CRD42016039650

Keywords: social isolation, loneliness, intervention, systematic review, older, elderly

Strengths of study

- This systematic review of interventions to alleviate social isolation or loneliness was based on a detailed search strategy including studies from any country published in any language.
- The review followed robust guidelines and the quality of the papers included was assessed using a validated tool.

Limitations of study

- The heterogeneity of the interventions and of the tools used to measure social isolation or loneliness may not allow for direct comparisons between studies.

Introduction

Worldwide, the population is ageing as a result of decreasing mortality and fertility (1). The global share of individuals aged 60 years or over represented 11.7% of the world population in 2013 and is expected to reach 21.1% by 2050 (2). Up to 50% of those aged over 60 are at risk of social isolation (3) and approximately one third of older people will experience some degree of loneliness later in life (4) (5).

Social isolation has detrimental effects on health (6) (7), having been identified as a risk factor for all-cause morbidity and mortality (8) with outcomes comparable to smoking, obesity, lack of exercise and high blood pressure (9). It has also been associated with decreased resistance to infection (10) (11), cognitive decline and mental health conditions such as depression and dementia (9) and with increased emergency admission to hospital (12), longer length of stay, and delayed discharges (13).

The literature identifies two main types of interventions aiming to reduce social isolation and loneliness: group based interventions (i.e. support groups (14) (15), reminiscence therapy (16) (17), video-conferencing (18), etc.), and one-to-one interventions (i.e. computer use training (19), animal companionship (20) (21), visitor volunteers (22), etc.). These types of interventions can be

1
2
3 implemented in the community (i.e. in a centralised location, such as centres for adult education, or
4
5 at the participant's home) or in a supported living facility (i.e. nursing or residential homes, warden
6
7 controlled flats, etc.). These interventions can focus on: social skills training (i.e. educational course
8
9 on friendship (23), strategies to develop social behaviours (24), etc.); enhanced social support (i.e.
10
11 befriending volunteer program (22), support groups following bereavement (15), etc.); increased
12
13 opportunity for social interaction (i.e. through the provision of services such as transport (25), home
14
15 delivered meals (26) and use of technology such as internet and interactive games or activities (27)
16
17 (28) (29) (30), etc.); and social cognitive training (i.e. self-management group sessions (31), etc.).
18
19 Furthermore, these interventions can either be technology assisted or not.
20
21

22 Previous reviews of health promotion interventions aimed at reducing social isolation in the elderly
23
24 suggest that interventions with group-based formats and where individuals are required to actively
25
26 participate were more effective than one-to-one interventions (32) (33). Also, involving the study
27
28 participants in the planning, implementation and evaluation of policies (34), high quality training of
29
30 facilitators (32) and interventions based on existing community resources seem to produce more
31
32 successful outcomes (4) (34). The individuality of the experience of loneliness is an important issue
33
34 which has also been highlighted in the literature, as this may cause difficulty in the delivery of
35
36 standardised interventions: it has been suggested that programmes which are tailored to meet
37
38 individual needs may be more appropriate and successful (4). But previous reviews were restricted
39
40 to studies published in English language (33) (34) (35) (36) (37) (38) and up to 2013. Furthermore,
41
42 statistical synthesis of effectiveness data has been largely lacking (33) (34) (36) (38) (39), as well as
43
44 the assessment of the quality of the studies included using a validated tool (34) (35) (36) (39).
45
46 Previous systematic reviews that assessed the quality of the studies suggest that the literature
47
48 investigating the effectiveness of interventions aiming to reduce social isolation or loneliness is of
49
50 poor methodological quality and, although conclusions have been drawn, further investigation is
51
52 required (32). The aim of this review is therefore to identify health promotion interventions aiming
53
54 to alleviate social isolation or loneliness in older people and to assess their effectiveness.
55
56
57
58
59
60

Methods and analysis

Protocol and registration

We followed the reporting guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis for Protocols 2015 (PRISMA-P) (40). The completed PRISMA-P checklist is provided in Additional file 1. The protocol is registered with the PROSPERO international prospective register of systematic reviews (registration number CRD42016039650). The final review will be reported following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) statement (41) (42) (43). Important amendments to this protocol will be reported and published with the results of the review.

Study selection criteria

Type of participants

Studies will be included if the full or part of the study population is older persons. The agreed United Nations cut-off age of 60 years will define the older population (1).

Type of studies

This systematic review will include studies published in a peer-reviewed journal or doctoral thesis using a randomised control trial (RCT), non-randomised controlled trial (NRCT), controlled before-and-after (CBA) or uncontrolled before-and-after (BA) study design.

Type of outcome measure

The outcome of interest is social isolation or loneliness measured using appropriate instruments. Both validated (e.g. Lubben Social Network Scale (44) and Duke Social Support Index (45) (46) to measure social isolation and De Jong Gierveld Scale (47) and UCLA loneliness scale (48) to measure loneliness) and non-validated outcome instruments of social isolation or loneliness will be considered. To be included, studies must report a quantitative measure of the effect of the health promotion intervention on social isolation or loneliness.

Type of intervention

1
2
3 Studies will only be included if the health promotion intervention under analysis was designed
4
5 specifically to alleviate or prevent social isolation or loneliness.
6

7 Search strategy

8 *Electronic databases*

9
10 The selection of electronic databases and the search strategy were developed in conjunction with an
11
12 information specialist and were based on previous literature reviews' search strategies (33, 39, 49).
13
14 The following electronic databases were searched from 1995 until the end of 2015: Medline,
15
16 Embase, PsycINFO, Cinahl, ASSIA, LILACS, OpenGrey and The Cochrane Library. No language or
17
18 geography restrictions were applied to the search. The exact search terms used in all databases are
19
20 described in Additional file 2.
21
22
23

24 *Manual searches*

25
26 The reference list of the studies included in this review, as well as those of previous literature
27
28 reviews on health promotion interventions to reduce social isolation or loneliness, will be searched
29
30 in order to identify additional potentially relevant studies.
31
32

33 *Study selection*

34
35 ENDNOTE X7, Thomson Reuters, will be used to manage the references. Duplicates will be removed
36
37 by one reviewer (FL). Two reviewers (FL and PB) will then independently assess each abstract to
38
39 determine whether full text review is needed. Any disagreement between the two reviewers will be
40
41 resolved by a third reviewer (JL). Full text of potentially eligible studies will be retrieved and
42
43 reviewed and assessed for final inclusion by two reviewers (FL and PB) again with a third reviewer
44
45 (JL) being consulted if necessary. Following PRISMA guidelines (41) a flow diagram will be created to
46
47 illustrate the selection process.
48
49

50 *Data extraction*

51
52 Data extraction will be conducted independently by two authors (FL and PB) and disagreements will
53
54 be solved as described above. The following information will be extracted using a data extraction
55
56
57
58
59
60

1
2
3 form based on “The Cochrane Group Data collection form for intervention reviews” (50). Data
4
5 extracted will cover the following points (see Additional file 3):
6

- 7 ➤ Study details: title, author, publication details, location, language (if not English);
- 8
- 9 ➤ Study design: type of study, duration, outcomes measured;
- 10
- 11 ➤ Participant demographics: setting, inclusion and exclusion criteria, population size and
- 12 demographics;
- 13
- 14 ➤ Intervention Characteristics: duration, type and mode of intervention;
- 15
- 16 ➤ Outcomes: Measure of outcome used, any other outcomes analysed;
- 17
- 18 ➤ Results: Raw data and effect size for social isolation or loneliness as main outcome as well as
- 19 secondary outcomes;
- 20
- 21 ➤ Conclusions: Author and reviewer conclusions.
22
23
24
25

26 *Risk of bias (quality) assessment*

27
28 Two reviewers (FL and PB) will perform a quality appraisal of each study independently using the
29 Effective Public Health Practice Project “Quality assessment tool for quantitative studies” (51)
30 recommended by the Cochrane Public Health Group as it is applicable to both experimental and
31 quasi-experimental study designs (52).
32
33
34
35
36

37 *Description of studies and measurements of effect size*

38
39 We expect to find a diverse range of study designs and heterogeneous interventions aimed at social
40 isolation or loneliness. Hence, data will be divided by type of outcome: impact of interventions on
41 social isolation and impact of interventions on loneliness. Social isolation and loneliness are
42 intricately related but distinct concepts which are frequently used interchangeably (4). Social
43 isolation is defined as a scarcity of contacts or social encounters of adequate quality or quantity, and
44 is regarded as an objective measure of social interaction (6) (53) (54) (39) whereas loneliness is
45 described as the subjective counterpart of social isolation, where an individual’s perceived level of
46 interaction with others does not fulfil their expectations, often resulting in an unpleasant emotional
47 experience (6) (4) (55) (56). Given that these two concepts have been used interchangeably and
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 inconsistently in the literature, we will consider both collectively for search purposes but separately
4
5 in terms of analysis. Similarities and differences found in the literature will be compared and
6
7 discussed.
8

9
10 We will further divide the studies by type of study design (e.g. RCT, NRCT, CBA and BA) and sub-
11
12 divide them by type of intervention (e.g. group, one-to-one and other designs). A narrative synthesis
13
14 of all relevant studies will be provided by type outcome, divided in terms of study design and sub-
15
16 divided by type of intervention, describing study and participants' characteristics, interventions,
17
18 outcomes, results and author's conclusions.
19

20
21 The effectiveness of the health promotion interventions on alleviation or prevention of social
22
23 isolation or loneliness, will be presented in terms of mean effect size (e.g. standardised mean
24
25 difference) and respective confidence interval. The rationale for these summary statistics is the
26
27 expected variation in the instruments used to assess the same outcome. The effect size will be
28
29 calculated using Hedges' (adjusted) g , as it provides a superior estimate of the standardised mean
30
31 difference (SMD) in studies with small samples(57).
32

33
34 The primary effect size for each study will be calculated from the first available post-intervention
35
36 measurement time point. If a study has more than one intervention, the primary effect size will be
37
38 calculated for the main intervention group targeting social isolation or loneliness, or the group with
39
40 the most robust design (e.g. the intervention which yields the largest difference from the control
41
42 group) (35). If a study has more than one control group, the primary effect size will be calculated
43
44 using the group which theoretically is expected to generate the greatest difference from the
45
46 intervention group (35). In cases where there are more than two groups, we will firstly conduct
47
48 pairwise comparisons and also explore more complex analysis, if appropriate, as suggested by
49
50 Cochrane (58).
51

52
53 The authors of the studies included in this review will be contacted with the aim to retrieve any
54
55 missing data necessary for our analysis. We will attempt to calculate any missing SMDs for
56
57
58
59
60

1
2
3 continuous measures from the reported statistics (e.g. confidence intervals and standard errors) in
4
5 the relevant paper.

6
7 If sufficient data are available, subgroup analysis (i.e. type of intervention) will be conducted to
8
9 account for heterogeneity. If there are sufficient numbers of comparisons for the same outcome and
10
11 intervention across studies, the between-study heterogeneity will be quantified by calculating the χ^2
12
13 test for heterogeneity (significance level $p < 0.1$) and the I^2 statistic. We will report the sum of the
14
15 studies using both a fixed-effect and random-effects meta-analysis by type of study design and
16
17 intervention.
18
19

20 Ethics and dissemination

21
22 This systematic review is exempt from ethics approval because the work is carried out on published
23
24 documents. The systematic review will be disseminated in a related peer-reviewed journal. The
25
26 findings of the review will be presented at conferences and will contribute to a DPhil thesis.
27
28
29

30 **Discussion**

31
32 This systematic review will be performed to compare the effectiveness of health promotion
33
34 interventions in alleviating social isolation or loneliness in older persons. By grouping interventions
35
36 we will be able to determine which type of intervention is more likely to be effective and we will also
37
38 assess the role technology plays in promoting social contacts. We will use a validated tool to assess
39
40 the quality of evidence since previous reviews refer they were limited by the weak methodology of
41
42 studies analysed and we will synthesise the data using appropriate statistical methods, if feasible.
43
44 Furthermore, we will include studies conducted in the last 20 years without any languages or any
45
46 geographic restrictions. Previous reviews were restricted to studies published in English language
47
48 and up to 2013.
49
50

51
52 Our review aims to address an increasingly relevant problem not only in terms of the impact it has
53
54 on older people's health but also on health and social care systems worldwide. This review will
55
56 therefore provide policy makers with a better insight on how to tackle social isolation and loneliness
57
58
59
60

1
2
3 by identifying the type of interventions that alleviate or prevent social isolation or loneliness and
4
5 under which circumstances.
6
7

8 9 **Funding**

10
11 Filipa Landeiro is sponsored by Fundação para a Ciência e Tecnologia, I.P. (SFRH/BD/90910/2012,
12
13 financed by POPH-QREN) and by Fundação Calouste Gulbenkian via Instituto do Envelhecimento –
14
15 Universidade de Lisboa.
16
17

18 19 **Competing interests**

20
21 The authors declare that they have no competing interests.
22
23
24
25

26 27 **Contributors**

28
29 FL conceived the initial idea for the study and is the guarantor of the review. FL and PB wrote the
30
31 protocol. AMG and JL critically appraised the protocol and also contributed to its development by
32
33 revising different version. All authors read and approved the final version of the manuscript.
34
35
36

37 38 **Acknowledgments**

39
40 The publication of this article was funded by the Open Access fund of the Nuffield Department of
41
42 Population Health, University of Oxford. We would also like to thank our information specialists Eli
43
44 Harriss and Nia Roberts for their help in developing the search strategy and selecting databases.
45
46
47

48 49 **References**

- 50
51 1. The World Health Organization. Active ageing: a policy framework. 2002.
52 2. United Nations Department of Economic and Social Affairs Population Division. World
53 Population Aging. 2013.
54 3. Ibrahim R, Abolfathi Momtaz Y, Hamid TA. Social isolation in older Malaysians: prevalence
55 and risk factors. *Psychogeriatrics*. 2013;13(2):71-9.
56 4. Grenade L, Boldy D. Social isolation and loneliness among older people: issues and future
57 challenges in community and residential settings. *Australian Health Review*. 2008;32(3):468-78.
58
59
60

- 1
- 2
- 3 5. Victor CR, Scambler SJ, Bowling A, Bond J. The prevalence of, and risk factors for, loneliness
- 4 in later life: a survey of older people in Great Britain. *Ageing & Society*. 2005;25(06):357-75.
- 5 6. British Columbia Ministry of Health. *Social Isolation Among Seniors: An Emerging Issue*.
- 6 2004.
- 7 7. Nicholson NR. A Review of Social Isolation: An Important but Underassessed Condition in
- 8 Older Adults. *The Journal of Primary Prevention*. 2012;33(2):137-52.
- 9 8. Tomaka J, Thompson S, Palacios R. The Relation of Social Isolation, Loneliness, and Social
- 10 Support to Disease Outcomes Among the Elderly. *Journal of Aging and Health*. 2006;18(3):359-84.
- 11 9. Cacioppo JT, Hawkley LC, Norman GJ, Berntson GG. Social isolation. *Annals of the New York*
- 12 *Academy of Sciences*. 2011;1231(1):17-22.
- 13 10. Cohen S, Doyle WJ, Skoner DP, Rabin BS, Gwaltney JM, Jr. Social ties and susceptibility to the
- 14 common cold. *JAMA*. 1997;277(24):1940-4.
- 15 11. Cornwell EY, Waite LJ. Social Disconnectedness, Perceived Isolation, and Health among Older
- 16 Adults. *Journal of Health and Social Behavior*. 2009;50(1):31-48.
- 17 12. Hastings SN, George LK, Fillenbaum GG, Park RS, Burchett BM, Schmader KE. Does lack of
- 18 social support lead to more ED visits for older adults? *The American Journal of Emergency Medicine*.
- 19 2008;26(4):454-61.
- 20 13. Landeiro F, Leal J, Gray AM. The impact of social isolation on delayed hospital discharges of
- 21 older hip fracture patients and associated costs. *Osteoporosis International*. 2015;27(2):737-45.
- 22 14. Mendieta M, Martin MAG. Effects of the social support groups on loneliness, social support
- 23 and quality of life in the elderly. *Revista de Psicologia Social Aplicada*. 2003;13(1):55-72.
- 24 15. Stewart M, Craig D, MacPherson K, Alexander S. Promoting positive affect and diminishing
- 25 loneliness of widowed seniors through a support intervention. *Public Health Nurs*. 2001;18(1):54-63.
- 26 16. Dammeyer MM. Does social isolation among facility-dwelling elderly decrease using a
- 27 reminiscence group intervention? *Dissertation Abstracts International: Section B: The Sciences and*
- 28 *Engineering*. 2004;65(5-B):2618.
- 29 17. Liu SJ, Lin CJ, Chen YM, Huang XY. The effects of reminiscence group therapy on self-esteem,
- 30 depression, loneliness and life satisfaction of elderly people living alone. *Mid-Taiwan Journal of*
- 31 *Medicine*. 2007;12(3):133-42.
- 32 18. Tsai H-H, Tsai Y-F, Wang H-H, Chang Y-C, Chu HH. Videoconference program enhances social
- 33 support, loneliness, and depressive status of elderly nursing home residents. *Ageing & Mental Health*.
- 34 2010;14(8):947-54.
- 35 19. Fokkema T, Knipscheer K. Escape loneliness by going digital: a quantitative and qualitative
- 36 evaluation of a Dutch experiment in using ECT to overcome loneliness among older adults. *Ageing &*
- 37 *Mental Health*. 2007;11(5):496-504.
- 38 20. Banks MR, Willoughby LM, Banks WA. Animal-Assisted Therapy and Loneliness in Nursing
- 39 Homes: Use of Robotic versus Living Dogs. *Journal of the American Medical Directors*
- 40 *Association*. 9(3):173-7.
- 41 21. Essen JJ, Cardiello F, Baun MM. Avian companionship in alleviation of depression, loneliness
- 42 and low morale of older adults in skilled rehabilitation units. *Psychological Reports*. 1996;78(1):339-
- 43 48.
- 44 22. MacIntyre I, Corradetti P, Roberts J, Browne G, Watt S, Lane A. Short papers. Pilot study of a
- 45 visitor volunteer programme for community elderly people receiving home health care. *Health &*
- 46 *Social Care in the Community*. 1999;7(3):225-8 4p.
- 47 23. Stevens N, van Tilburg T. Stimulating friendship in later life: A strategy for reducing
- 48 loneliness among older women. *Educational Gerontology*. 2000;26(1):15-35.
- 49 24. Alaviani M, Khosravan S, Alami A, Moshki M. The Effect of a Multi-Strategy Program on
- 50 Developing Social Behaviors Based on Pender's Health Promotion Model to Prevent Loneliness of
- 51 Old Women Referred to Gonabad Urban Health Centers. *Int*. 2015;3(2):132-40.
- 52 25. Robertson R. J. Indirect measurement of results in a project for improving socialization
- 53 among the elderly. *Journal of Gerontology*. 1970;25(3):265-7.
- 54
- 55
- 56
- 57
- 58
- 59
- 60

- 1
- 2
- 3 26. Wright L, Vance L, Sudduth C, Epps JB. The Impact of a Home-Delivered Meal Program on
- 4 Nutritional Risk, Dietary Intake, Food Security, Loneliness, and Social Well-Being. *J Nutr Gerontol*
- 5 *Geriatr.* 2015;34(2):218-27.
- 6 27. Brennan PF, Moore SM, Smyth KA. The effects of a special computer network on caregivers
- 7 of persons with Alzheimer's disease. *Nurs Res.* 1995;44(3):166-72.
- 8 28. White H, McConnell E, Clipp E, Bynum L, Teague C, Navas L, et al. Surfing the net in later life:
- 9 A review of the literature and pilot study of computer use and quality of life. *Journal of Applied*
- 10 *Gerontology.* 1999;18(3):358-78.
- 11 29. Kahlbaugh PE, Sperandio AJ, Carlson AL, Hauselt J. Effects of Playing Wii on Well-Being in the
- 12 Elderly: Physical Activity, Loneliness, and Mood. *Activities, Adaptation & Aging.* 2011;35(4):331-44.
- 13 30. Tse MM. Therapeutic effects of an indoor gardening programme for older people living in
- 14 nursing homes. *J Clin Nurs.* 2010;19(7-8):949-58.
- 15 31. Kremers IP, Steverink N, Albersnagel FA, Slaets JPJ. Improved self-management ability and
- 16 well-being in older women after a short group intervention. *Aging and Mental Health.*
- 17 2006;10(5):476-84.
- 18 32. Franck L, Molyneux N, Parkinson L. Systematic review of interventions addressing social
- 19 isolation and depression in aged care clients. *Qual Life Res.* 2015.
- 20 33. Dickens AP, Richards SH, Greaves CJ, Campbell JL. Interventions targeting social isolation in
- 21 older people: a systematic review. *BMC Public Health.* 2011;11(1):1-22.
- 22 34. Findlay RA. Interventions to reduce social isolation amongst older people: where is the
- 23 evidence? *Ageing & Society.* 2003;23(05):647-58.
- 24 35. Masi CM, Chen H-Y, Hawkey LC, Cacioppo JT. A Meta-Analysis of Interventions to Reduce
- 25 Loneliness. *Personality and Social Psychology Review.* 2011;15(3):219-66.
- 26 36. Hagan R, Manktelow R, Taylor BJ, Mallett J. Reducing loneliness amongst older people: a
- 27 systematic search and narrative review. *Aging & Mental Health.* 2014;18(6):683-93.
- 28 37. Choi M, Kong S, Jung D. Computer and Internet Interventions for Loneliness and Depression
- 29 in Older Adults: A Meta-Analysis. *Healthc Inform Res.* 2012;18(3):191-8.
- 30 38. Medical Advisory Secretariat. Social isolation in community-dwelling seniors: an evidence-
- 31 based analysis. Ontario health technology assessment series. 2008;8(5):1-49.
- 32 39. CATTAN M, WHITE M, BOND J, LEARMOUTH A. Preventing social isolation and loneliness
- 33 among older people: a systematic review of health promotion interventions. *Ageing & Society.*
- 34 2005;25(01):41-67.
- 35 40. Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, et al. Preferred reporting
- 36 items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and
- 37 explanation. *BMJ.* 2015;349.
- 38 41. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews
- 39 and meta-analyses: the PRISMA statement. *BMJ.* 2009;339.
- 40 42. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gotzsche PC, Ioannidis JP, et al. The PRISMA
- 41 statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare
- 42 interventions: explanation and elaboration. *Bmj.* 2009;339:b2700.
- 43 43. Welch V, Petticrew M, Tugwell P, Moher D, O'Neill J, Waters E, et al. PRISMA-Equity 2012
- 44 Extension: Reporting Guidelines for Systematic Reviews with a Focus on Health Equity. *PLoS Med.*
- 45 2012;9(10):e1001333.
- 46 44. Lubben JE. Assessing social networks among elderly populations. *Family & Community*
- 47 *Health.* 1988;11(3):42-52.
- 48 45. Bernard S. Loneliness and Social Isolation Among Older People in North Yorkshire, Working
- 49 Paper (WP2565). Social Policy Research Unit, University of York. 2013.
- 50 46. Powers JR, Goodger B, Byles JE. Assessment of the abbreviated Duke Social Support Index in
- 51 a cohort of older Australian women. *Australasian Journal on Ageing.* 2004;23(2):71-6.
- 52 47. De Jong-Gierveld J, Kamphuis F. The development of a Rasch-type loneliness scale. *Applied*
- 53 *Psychological Assessment.* 1985;9(3):289-99.
- 54
- 55
- 56
- 57
- 58
- 59
- 60

- 1
2
3 48. Russell D, Peplau LA, Cutrona CE. The revised UCLA Loneliness Scale: concurrent and
4 discriminant validity evidence. *Journal of personality and social psychology*. 1980;39(3):472-80.
- 5 49. Masi CM, Chen H-Y, Hawkley LC, Cacioppo JT. A Meta-Analysis of Interventions to Reduce
6 Loneliness. *Personality and social psychology review : an official journal of the Society for Personality
7 and Social Psychology, Inc.* 2011;15(3):10.1177/1088868310377394.
- 8 50. The Cochrane Collaboration. Data collection forms for intervention reviews: RCTs and non-
9 RCTs. Version 3. 2014 [cited 2016 27th April]. Available from:
10 <http://training.cochrane.org/resource/data-collection-forms-intervention-reviews>.
- 11 51. McMaster University Faculty of Health Sciences. Quality assessment tool for quantitative
12 studies. In: *Effective public health practice project*. 2009 [cited 2016 27th April]. Available from:
13 <http://www.ehphp.ca/tools.html>.
- 14 52. Armijo-Olivo S, Stiles CR, Hagen NA, Biondo PD, Cummings GG. Assessment of study quality
15 for systematic reviews: a comparison of the Cochrane Collaboration Risk of Bias Tool and the
16 Effective Public Health Practice Project Quality Assessment Tool: methodological research. *Journal of
17 Evaluation in Clinical Practice*. 2012;18(1):12-8.
- 18 53. Nicholson NR. Social isolation in older adults: an evolutionary concept analysis. *J Adv Nurs*.
19 2009;65(6):1342-52.
- 20 54. Delisle M-A. What does Solitude Mean to the Aged? *Canadian Journal on Aging/La Revue
21 canadienne du vieillissement*. 1988;7(04):358-71.
- 22 55. Peplau LA, & Perlman, D. . *Perspectives on loneliness. Loneliness; A Sourcebook of current
23 theory, research and therapy*. UCLA: Los Angeles: Wiley-Interscience; 1982. p. 1-18.
- 24 56. Victor C, Scambler S, Bond J, Bowling A. Being alone in later life: loneliness, social isolation
25 and living alone. *Reviews in Clinical Gerontology*. 2000;10(04):407-17.
- 26 57. Lipsey M. W., Wilson D. B. *Practical Meta-Analysis*. Thousand Oaks, CA: Sage; 2001.
- 27 58. The Cochrane Collaboration. *Cochrane Handbook for Systematic Reviews of Interventions*
28 2011 [cited 2016 26th May]. Version 5.1.0:[Available from:
29 http://handbook.cochrane.org/front_page.htm.
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Reducing social isolation in older people: a systematic review protocol

Additional files

Additional file 1: PRISMA-P checklist 2

Additional file 2: Search strategy 4

Additional file 3: Pro-forma for Data Extraction 9

For peer review only

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Additional file 1: PRISMA-P checklist

Table A.1: PRISMA-P 2015 checklist

Section and topic	Item No.	Checklist Item	Reported on page #
A) Administrative Information			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	Identify protocol as an update of a previous systematic review if applicable	n/a
Registration	2	Name of registry and registration number	2
B) Authors			
Contact		Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions		Describe contributions of protocol authors and identify the guarantor of the review	1 + 6 + 7
Amendments		If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	n/a
Support			
- Sources	5a	Indicate Sources of financial or other support for the review	10
- Sponsor	5b	Provide name for the review funder and/or sponsor	9
- Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s) and/or institution(s), if any, in developing the protocol	n/a
C) Introduction			
Rationale	6	Describe the rationale for the review in the context of what is already known	3 + 4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	3 + 4
D) Methods			
Eligibility Criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	5
Information Sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	5 + 6
Search Strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	5 + Additional file 2
E) Study Records			
Data Management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	6
Selection Process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	5 - 7
Data Collection Process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	6 + 8 + Additional file 3
Data Items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	6
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	6
Risk of bias in	14	Describe anticipated methods for assessing risk of bias of individual	7

individual studies		studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	
Data Synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	7 + 8
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency	7 + 8
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	7 + 8
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	7 + 8
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	7
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed	7

For peer review only

Additional file 2: Search strategy

Table A.2.1: Ovid MEDLINE and Embase- search date 15/01/16

Searches	Search Terms
1	exp "Aged, 80 and over"/ or exp Aged/
2	older*.ti,ab.
3	elder*.ti,ab.
4	senior*.ti,ab.
5	geriatric.ti,ab.
6	aged.ti,ab.
7	OR/1-6
8	Social Isolation/
9	Loneliness/
10	isolation.ti,ab.
11	loneliness.ti,ab.
12	(social* adj3 isolat*).ti,ab.
13	(emotional* adj3 isolat*).ti,ab.
14	OR/ 8-13
15	exp Social Support/
16	"social support*".ti,ab.
17	loss.ti,ab.
18	access.ti,ab.
19	(social* adj3 activ*).ti,ab.
20	"social network*".ti,ab.
21	"social intervention*".ti,ab.
22	(promot* or prevent* or support* or self-help or "self help" or educat*).ti,ab.
23	Self Care/
24	exp Policy/
25	policy.ti,ab.
26	program*.ti,ab
27	OR/ 15-26
28	7 AND 14 AND 27
29	limit 28 to yr="1995 -Current"

ti: title; ab: abstract

Table A.2.2: PsycINFO - search date 15/01/16

Searches	Search Terms
1	exp "Aged, 80 and over"/ or exp Aged/
2	older*.ti,ab.
3	elder*.ti,ab.
4	senior*.ti,ab.
5	geriatric.ti,ab.
6	aged.ti,ab.
7	OR/1-6
8	Social Isolation/
9	Loneliness/
10	isolation.ti,ab.
11	loneliness.ti,ab.
12	(social* adj3 isolat*).ti,ab.
13	(emotional* adj3 isolat*).ti,ab.
14	OR/ 8-13
15	exp Social Support/
16	"social support*".ti,ab.
17	loss.ti,ab.
18	access.ti,ab.
19	(social* adj3 activ*).ti,ab.
20	"social network*".ti,ab.
21	"social intervention*".ti,ab.
22	(promot* or prevent* or support* or self-help or "self help" or educat*).ti,ab.
23	Self Care/
24	exp Policy Making/ or exp Health Care Policy/ or exp Government Policy Making/
25	policy.ti,ab.
26	program*.ti,ab
27	OR/ 15-26
28	7 AND 14 AND 27
29	limit 28 to yr="1995 -Current"

ti: title; ab: abstract

Table A.2.3: Cinahl - search date 15/01/16

Searches	Search Terms
1	exp "Aged, 80 and over"/ or exp Aged/
2	older*.ti,ab.
3	elder*.ti,ab.
4	senior*.ti,ab.
5	geriatric.ti,ab.
6	aged.ti,ab.
7	OR/1-6
8	Social Isolation/
9	Loneliness/
10	isolation.ti,ab.
11	loneliness.ti,ab.
12	(social* adj3 isolat*).ti,ab.
13	(emotional* adj3 isolat*).ti,ab.
14	OR/ 8-13
15	exp "Support, Psychosocial+"/
16	"social support*".ti,ab.
17	loss.ti,ab.
18	access.ti,ab.
19	(social* adj3 activ*).ti,ab.
20	"social network*".ti,ab.
21	"social intervention*".ti,ab.
22	(promot* or prevent* or support* or self-help or "self help" or educat*).ti,ab.
23	Self Care/
24	(MH "Public Policy+") OR (MH "Policy Making") OR (MH "Policy Studies+") OR (MH "Health Policy Studies") OR (MH "Health Policy+") OR (MH "Policy and Procedure Manuals") OR (MH "Organizational Policies+") OR (MH "Hospital Policies+")
25	policy.ti,ab.
26	program*.ti,ab
27	OR/ 15-27
28	7 AND 14 AND 27
29	limit 28 to yr="1995 -Current"

ti: title; ab: abstract

Table A.2.4: ASSIA - search date 20/01/16**Search Terms**

((SU.EXACT.EXPLODE("Terminally ill elderly people") OR SU.EXACT.EXPLODE("Disabled elderly women") OR SU.EXACT.EXPLODE("Low income elderly people") OR SU.EXACT.EXPLODE("Visually impaired elderly women") OR SU.EXACT.EXPLODE("Visually impaired elderly people") OR SU.EXACT.EXPLODE("Terminally ill elderly women") OR SU.EXACT.EXPLODE("Widowed elderly men") OR SU.EXACT.EXPLODE("Married elderly men") OR SU.EXACT.EXPLODE("Terminally ill elderly men") OR SU.EXACT.EXPLODE("Language disordered elderly people") OR SU.EXACT.EXPLODE("Elderly widows") OR SU.EXACT.EXPLODE("Mentally ill elderly women") OR SU.EXACT.EXPLODE("Elderly husbands") OR SU.EXACT.EXPLODE("Remarried elderly people") OR SU.EXACT.EXPLODE("Elderly fathers") OR SU.EXACT.EXPLODE("Sick elderly people") OR SU.EXACT.EXPLODE("Learning disabled elderly people") OR SU.EXACT.EXPLODE("Mentally ill elderly men") OR SU.EXACT.EXPLODE("Divorced elderly people") OR SU.EXACT.EXPLODE("Sick elderly women") OR SU.EXACT.EXPLODE("Emotionally disturbed elderly people") OR SU.EXACT.EXPLODE("Disabled elderly people") OR SU.EXACT.EXPLODE("Elderly married couples") OR SU.EXACT.EXPLODE("Elderly mothers") OR SU.EXACT.EXPLODE("Mentally ill elderly people") OR SU.EXACT.EXPLODE("Disabled elderly men" OR "Elderly men" OR "Married elderly men" OR "Mentally ill elderly men" OR "Terminally ill elderly men" OR "Widowed elderly men") OR SU.EXACT.EXPLODE("Single elderly people") OR SU.EXACT.EXPLODE("Elderly relatives") OR SU.EXACT.EXPLODE("Disabled elderly men") OR SU.EXACT.EXPLODE("Brain damaged elderly people" OR "Centenarians" OR "Disabled elderly people" OR "Divorced elderly people" OR "Elderly people" OR "Emotionally disturbed elderly people" OR "Gifted elderly people" OR "Hearing impaired elderly people" OR "Homeless elderly people" OR "Housebound elderly people" OR "Language disordered elderly people" OR "Learning disabled elderly people" OR "Low income elderly people" OR "Mentally ill elderly people" OR "Remarried elderly people" OR "Retired people" OR "Sick elderly people" OR "Single elderly people" OR "Terminally ill elderly people" OR "Visually impaired elderly people") OR SU.EXACT.EXPLODE("Blind-Deaf elderly women" OR "Disabled elderly women" OR "Elderly women" OR "Married elderly women" OR "Mentally ill elderly women" OR "Sick elderly women" OR "Single elderly women" OR "Terminally ill elderly women" OR "Visually impaired elderly women") OR SU.EXACT.EXPLODE("Homeless elderly people") OR SU.EXACT.EXPLODE("Married elderly women") OR SU.EXACT.EXPLODE("Hearing impaired elderly people") OR SU.EXACT.EXPLODE("Housebound elderly people") OR SU.EXACT.EXPLODE("Elderly housing assistance programmes") OR SU.EXACT.EXPLODE("Elderly parents")) OR (ab(older* OR elder* OR senior* OR geriatric OR aged) OR ti(older* OR elder* OR senior* OR geriatric OR aged))) AND (SU.EXACT.EXPLODE("Isolation" OR "Purdah" OR "Seclusion") OR SU.EXACT.EXPLODE("Loneliness") OR (ti(isolation OR loneliness OR (social* NEAR/3 isolat*) OR (emotion* NEAR/3 isolat*)) OR ab(isolation OR loneliness OR (social* NEAR/3 isolat*) OR (emotion* NEAR/3 isolat*)))) AND ((SU.EXACT.EXPLODE("Computer based social support" OR "Perceived social support" OR "Social support") OR SU.EXACT.EXPLODE("Perceived social support")) OR SU.EXACT.EXPLODE("Selfcare") OR SU.EXACT.EXPLODE("Agricultural policy" OR "Colonial policy" OR "Constitutional policy" OR "Criminal justice policy" OR "Criminal policy" OR "Economic policy" OR "Energy policy" OR "Environmental policy" OR "Fiscal equalization" OR "Fiscal policy" OR "Foreign policy" OR "Health policy" OR "Housing policy" OR "Incomes policy" OR "Industrial policy" OR "Mental health policy" OR "Monetary policy" OR "Organizational policy" OR "Penal policy" OR "Policy" OR "Public health policy" OR "Public policy" OR "Regional policy" OR "Science policy" OR "Social housing policy" OR "Social policy" OR "Technological policy" OR "Transport policy" OR "Urban policy" OR "Welfare policy") OR (ab("social support*") OR ti("social support*")) OR (ab(loss) OR ti(loss)) OR (ab(access) OR ti(access)) OR (ab((social* NEAR/3 activ*) OR "social network*" OR "social intervention*") OR ti((social* NEAR/3 activ*) OR "social network*" OR "social intervention*")) OR (ab(promot* OR prevent* OR support* OR self-help OR "self help" OR educat*) OR ti(promot* OR prevent* OR support* OR self-help OR "self help" OR educat*)) OR (ab(policy OR program*) OR ti(policy OR program*))

Table A.2.5: LILACS - search date 21/01/16**Search Terms**

(aged OR older* OR elder* OR senior* OR geriatric) AND (isolat* OR loneliness) AND ("social support*" OR loss OR access OR "social* activ*" OR "social network*" OR "social intervention*" OR promot* OR prevent* OR support* OR self-help OR "self help" OR educat* OR policy OR program*))

Table A.2.6: OpenGrey - search date 21/01/16**Search Terms**

(aged OR older* OR elder* OR senior* OR geriatric) AND (isolat* OR loneliness) AND ("social support*" OR loss OR access OR "social* activ*" OR "social network*" OR "social intervention*" OR promot* OR prevent* OR support* OR self-help OR "self help" OR educat* OR policy OR program*))

Table A.2.7: The Cochrane Library – search date 21/01/16**Searches****Search Terms**

1	MeSH descriptor: [Aged] explode all trees
2	older* or aged or elder* or senior* or geriatric.ti,ab.
3	#1 or #2
4	MeSH descriptor: [Social Isolation] explode all trees
5	isolation.ti,ab.
6	loneliness.ti,ab.
7	(social* near/3 isolat*) .ti,ab.
8	(emotional* near/3 isolat*) .ti,ab.
9	#4 or #5 or #6 or #7 or #8
10	MeSH descriptor: [Social Support] explode all trees
11	"social support*" .ti,ab.
12	loss.ti,ab.
13	access.ti,ab.
14	(social* near/3 activ*) .ti,ab.
15	"social network*" .ti,ab.
16	"social intervention*" .ti,ab.
17	(promot* or prevent* or support* or self-help or "self help" or educat*) .ti,ab.
18	MeSH descriptor: [Self Care] explode all trees
19	MeSH descriptor: [Policy] explode all trees
20	policy.ti,ab.
21	program*.ti,ab.
22	#10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21
23	#3 and #9 and #22
	Limit by date: 1995 to present

ti: title; ab: abstract

Additional file 3: Pro-forma for Data Extraction

Reviewer	
Date form completed	

Study Details

Title	
Author	
Year Published	
Journal	
Location (country/city)	
Language (if not English)	

		Location in text (page/figure/table/other)
Type of study	Randomised controlled trial <input type="checkbox"/> Non-randomised controlled trial <input type="checkbox"/> Controlled before and after study <input type="checkbox"/> Uncontrolled before and after study <input type="checkbox"/>	
A. Start Date B. End Date	A. B.	
Outcomes Measured (aims)		

Participants

		Location in text (page/figure/table/other)
Setting	Large population in unspecified setting <input type="checkbox"/> Community: <input type="checkbox"/> Supported living <input type="checkbox"/> Other:	
Type of Participants		
Enrolment Eligibility A. Inclusion Criteria B. Exclusion Criteria	A. B.	
Recruitment process (e.g. phone, mail, clinic)		
Total number randomised (or total population for non-RCT)		
Age range (mean age)		
Gender (% female)		
Ethnicity		
Sample size		
Any other relevant sociodemographic information		
Any subgroups		

established		
Notes		

Intervention

		Location in text (page/figure/table/other)
Intervention	Description	
	Duration of each intervention episode	
	Duration of intervention studied (total study duration)	
	Frequency (daily/weekly etc.)	
	Provider (i.e. no., profession, training)	
	Economic information (cost, resource requirements)	
Type of intervention	Group Intervention	Community based: At home <input type="checkbox"/> Centralised location <input type="checkbox"/> Supported Living* <input type="checkbox"/>
	One-to-one Intervention	Community based: At home <input type="checkbox"/> Centralised location <input type="checkbox"/> Supported Living* <input type="checkbox"/>
	Focus of intervention	Social skills training <input type="checkbox"/> Enhanced social support <input type="checkbox"/> Increased opportunity for social interaction <input type="checkbox"/> Social cognitive training <input type="checkbox"/> Provision of services** Other.....
Intervention Mode	Technology assisted <input type="checkbox"/> Non-technology assisted <input type="checkbox"/>	
Compliance		
Notes		

Outcomes

	Description as stated in paper/report	Location in text (page/figure/table/other)
Measure of social isolation/loneliness		
Outcome tool validated	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	

Any outcomes other than social isolation/loneliness measured?	Yes <input type="checkbox"/> Details No <input type="checkbox"/>	
---	--	--

Results: effect of the intervention on social isolation or loneliness

		Location in text (page/figure/table/other)					
Comparison							
Outcome							
Subgroup							
Time point (from start or end of intervention)							
Results	Intervention	Comparison					
	Mean	SD (or other variance, specify)	No participants	Mean	SD (or other variance, specify)	No participants	
Effect size	Effect size: _____ Standard error: _____ Inverse variance: _____ 95% confidence interval: _____						
Any other results reported (e.g. Odds ratio)							
Statistical method used							
Notes							

Results: effects of the intervention on other outcome continuous variables

		Location in text (page/figure/table/other)					
Comparison							
Outcome							
Subgroup							
Time point (from start or end of intervention)							
Results	Intervention	Comparison					
	Mean	SD (or other variance, specify)	No participants	Mean	SD (or other variance, specify)	No participants	
Effect size	Effect size: _____ Standard error: _____ Inverse variance: _____						

	95% confidence interval: _____	
Any other results reported (e.g. Odds ratio)		
Statistical Method used		
Notes		

Results: effect of the intervention on other outcome categorical variables

					Location in text (page/figure/table/other)
Comparison					
Outcome					
Subgroup					
Time point (from start or end of intervention)					
Results	Intervention		Comparison		
	No. with event	No. in group	No. with event	No. in group	
Effect size (95% CI)					
Any other results reported (e.g. Odds ratio)					
Statistical method used					
Notes					

Other Information

		Location in text (page/figure/table/other)
Author's conclusions		
References to other relevant studies		
Reviewer's conclusions		
Notes		

*Residential or nursing care

**Provision of services such as transport, medical services, etc.

PRISMA-P checklist

Table A.1: PRISMA-P 2015 checklist

Section and topic	Item No.	Checklist Item	Reported on page #
A) Administrative Information			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	Identify protocol as an update of a previous systematic review if applicable	n/a
Registration	2	Name of registry and registration number	2
B) Authors			
Contact		Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions		Describe contributions of protocol authors and identify the guarantor of the review	1 + 6 + 7
Amendments		If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	n/a
Support			
- Sources	5a	Indicate Sources of financial or other support for the review	10
- Sponsor	5b	Provide name for the review funder and/or sponsor	9
- Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s) and/or institution(s), if any, in developing the protocol	n/a
C) Introduction			
Rationale	6	Describe the rationale for the review in the context of what is already known	3 + 4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	3 + 4
D) Methods			
Eligibility Criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	5
Information Sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	5 + 6
Search Strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	5 + Additional file 2
E) Study Records			
Data Management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	6
Selection Process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	5 - 7
Data Collection Process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	6 + 8 + Additional file 3
Data Items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	6
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	6
Risk of bias in	14	Describe anticipated methods for assessing risk of bias of individual	7

individual studies		studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	
Data Synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	7 + 8
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency	7 + 8
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	7 + 8
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	7 + 8
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	7
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed	7

BMJ Open

Reducing social isolation and loneliness in older people: a systematic review protocol

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2016-013778.R1
Article Type:	Protocol
Date Submitted by the Author:	24-Oct-2016
Complete List of Authors:	Landeiro, Filipa; University of Oxford, Nuffield Department of Population Health Barrows, Paige; University of Oxford, Nuffield Department of Population Health Nuttall Musson, Ellen; University of Oxford, Nuffield Department of Population Health Gray, Alastair; University of Oxford, Nuffield Department of Population Health Leal, Jose; University of Oxford, UK, Nuffield Department of Population Health
Primary Subject Heading:	Public health
Secondary Subject Heading:	Health policy
Keywords:	social isolation, loneliness, intervention, systematic review, older, elderly

SCHOLARONE™
Manuscripts

Only

Reducing social isolation and loneliness in older people: a systematic review protocol

Filipa Landeiro, Paige Barrows, Alastair M. Gray, José Leal

Filipa Landeiro, DPhil student in Public Health, Health Economics Research Centre, Nuffield

Department of Population Health, Old Road Campus, University of Oxford, Oxford, OX3 7LF, UK

Paige Barrows, Foundation Doctor, Health Economics Research Centre, Nuffield Department of

Population Health, Old Road Campus, University of Oxford, Oxford, OX3 7LF, UK

Ellen Nuttall Musson, Foundation Doctor, Health Economics Research Centre, Nuffield Department

of Population Health, Old Road Campus, University of Oxford, Oxford, OX3 7LF, UK

Alastair M Gray, Professor of Health Economics, Health Economics Research Centre, Nuffield

Department of Population Health, Old Road Campus, University of Oxford, Oxford, OX3 7LF, UK

José Leal, University Research Lecturer, Health Economics Research Centre, Nuffield Department of

Population Health, Old Road Campus, University of Oxford, Oxford, OX3 7LF, UK

Correspondence to: Filipa Landeiro filipa.landeiro@dph.ox.ac.uk

Abstract

Introduction: Social isolation and loneliness affect approximately one third to half of the elderly population and have a negative impact on their physical and mental health. Group-based interventions where facilitators are well trained and the elderly are actively engaged in their development seem to be more effective but conclusions have been limited by weak study designs. We aim to conduct a systematic review to assess the effectiveness of health promotion interventions on social isolation or loneliness in older people.

Methods and analysis: A systematic review was conducted in Medline, Embase, PsycINFO, Cinahl, ASSIA, LILACS, OpenGrey and The Cochrane Library on peer-reviewed studies and doctoral theses published between 1995 and 2016 evaluating the impact of health promotion interventions on social isolation and/or loneliness for individuals aged 60 and over. Two reviewers will independently assess each study for inclusion and disagreements will be resolved by a third reviewer. Data will be extracted using a pre-defined pro-forma following best practice. Study quality will be assessed with the Effective Public Health Practice Project quality assessment tool. A narrative synthesis of all studies will be presented by type of outcome (social isolation or loneliness) and type of intervention. If feasible, the effectiveness data will be synthesised using appropriate statistical techniques.

Ethics and Dissemination: This systematic review is exempt from ethics approval because the work is carried out on published documents. The findings of the review will be disseminated in a related peer-reviewed journal and presented at conferences. They will also contribute to a DPhil thesis.

Trial registration number: CRD42016039650

Keywords: social isolation, loneliness, intervention, systematic review, older, elderly

Strengths of study

- This systematic review of interventions to alleviate social isolation or loneliness was based on a detailed search strategy including studies from any country published in any language.
- The review followed robust guidelines and the quality of the papers included was assessed using a validated tool.

Limitations of study

- The heterogeneity of the interventions and of the tools used to measure social isolation or loneliness may not allow for direct comparisons between studies.

Introduction

Worldwide, the population is ageing as a result of decreasing mortality and fertility (1). The global share of individuals aged 60 years or over represented 11.7% of the world population in 2013 and is expected to reach 21.1% by 2050 (2). Up to 50% of those aged over 60 are at risk of social isolation (3) and approximately one third of older people will experience some degree of loneliness later in life (4) (5).

Social isolation has detrimental effects on health (6) (7), having been identified as a risk factor for all-cause morbidity and mortality (8) with outcomes comparable to smoking, obesity, lack of exercise and high blood pressure (9). It has also been associated with decreased resistance to infection (10) (11), cognitive decline and mental health conditions such as depression and dementia (9) and with increased emergency admission to hospital (12), longer length of stay, and delayed discharges (13).

The literature identifies two main types of interventions aiming to reduce social isolation and loneliness: group based interventions (i.e. support groups (14) (15), reminiscence therapy (16) (17), video-conferencing (18), etc.), and one-to-one interventions (i.e. computer use training (19), animal companionship (20) (21), visitor volunteers (22), etc.). These types of interventions can be

1
2
3 implemented in the community (i.e. in a centralised location, such as centres for adult education, or
4
5 at the participant's home) or in a supported living facility (i.e. nursing or residential homes, warden
6
7 controlled flats, etc.). These interventions can focus on: social skills training (i.e. educational course
8
9 on friendship (23), strategies to develop social behaviours (24), etc.); enhanced social support (i.e.
10
11 befriending volunteer program (22), support groups following bereavement (15), etc.); increased
12
13 opportunity for social interaction (i.e. through the provision of services such as transport (25), home
14
15 delivered meals (26) and use of technology such as internet and interactive games or activities (27)
16
17 (28) (29) (30), etc.); and social cognitive training (i.e. self-management group sessions (31), etc.).
18
19 Furthermore, these interventions can either be technology assisted or not.
20
21

22 Previous reviews of health promotion interventions aimed at reducing social isolation in the elderly
23
24 suggest that interventions with group-based formats and where individuals are required to actively
25
26 participate were more effective than one-to-one interventions (32) (33). Also, involving the study
27
28 participants in the planning, implementation and evaluation of policies (34), high quality training of
29
30 facilitators (32) and interventions based on existing community resources seem to produce more
31
32 successful outcomes (4) (34). The individuality of the experience of loneliness is an important issue
33
34 which has also been highlighted in the literature, as this may cause difficulty in the delivery of
35
36 standardised interventions: it has been suggested that programmes which are tailored to meet
37
38 individual needs may be more appropriate and successful (4). But previous reviews were restricted
39
40 to studies published in English language (33) (34) (35) (36) (37) (38) and up to 2013. Furthermore,
41
42 statistical synthesis of effectiveness data has been largely lacking (33) (34) (36) (38) (39), as well as
43
44 the assessment of the quality of the studies included using a validated tool (34) (35) (36) (39).
45
46 Previous systematic reviews that assessed the quality of the studies suggest that the literature
47
48 investigating the effectiveness of interventions aiming to reduce social isolation or loneliness is of
49
50 poor methodological quality and, although conclusions have been drawn, further investigation is
51
52 required (32). The aim of this review is therefore to identify health promotion interventions aiming
53
54 to alleviate social isolation or loneliness in older people and to assess their effectiveness.
55
56
57
58
59
60

Methods and analysis

Protocol and registration

We followed the reporting guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis for Protocols 2015 (PRISMA-P) (40). The completed PRISMA-P checklist is provided in supplementary file 1 (see on-line supplementary file 1). The protocol is registered with the PROSPERO international prospective register of systematic reviews (registration number CRD42016039650). The final review will be reported following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) statement (41) (42) (43). Important amendments to this protocol will be reported and published with the results of the review.

Study selection criteria

Type of participants

Studies will be included if the full or part of the study population is older persons. The agreed United Nations cut-off age of 60 years will define the older population (1).

Type of studies

This systematic review will include studies published in a peer-reviewed journal or doctoral thesis using a randomised control trial (RCT), non-randomised controlled trial (NRCT), controlled before-and-after (CBA) or uncontrolled before-and-after (BA) study design.

Type of outcome measure

The outcome of interest is social isolation or loneliness measured using appropriate instruments. Both validated (e.g. Lubben Social Network Scale (44) and Duke Social Support Index (45) (46) to measure social isolation and De Jong Gierveld Scale (47) and UCLA loneliness scale (48) to measure loneliness) and non-validated outcome instruments of social isolation or loneliness will be considered. To be included, studies must report a quantitative measure of the effect of the health promotion intervention on social isolation or loneliness.

Type of intervention

1
2
3 Studies will only be included if the health promotion intervention under analysis was designed
4
5 specifically to alleviate or prevent social isolation or loneliness.
6

7 Search strategy

8 *Electronic databases*

9
10 The selection of electronic databases and the search strategy were developed in conjunction with an
11
12 information specialist and were based on previous literature reviews' search strategies (33, 39, 49).
13
14 The following electronic databases were searched from 1995 until the end of 2015: Medline,
15
16 Embase, PsycINFO, Cinahl, ASSIA, LILACS, OpenGrey and The Cochrane Library. No language or
17
18 geography restrictions were applied to the search. The exact search terms used in all databases are
19
20 described in supplementary file 2 (see on-line supplementary file 2).
21
22
23

24 *Manual searches*

25
26 The reference list of the studies included in this review, as well as those of previous literature
27
28 reviews on health promotion interventions to reduce social isolation or loneliness, will be searched
29
30 in order to identify additional potentially relevant studies.
31
32

33 *Study selection*

34
35 ENDNOTE X7, Thomson Reuters, will be used to manage the references. Duplicates will be removed
36
37 by one reviewer (FL). Two reviewers (FL and PB) will then independently assess each abstract to
38
39 determine whether full text review is needed. Any disagreement between the two reviewers will be
40
41 resolved by a third reviewer (JL). Full text of potentially eligible studies will be retrieved and
42
43 reviewed and assessed for final inclusion by two reviewers (FL and PB) again with a third reviewer
44
45 (JL) being consulted if necessary. Following PRISMA guidelines (41) a flow diagram will be created to
46
47 illustrate the selection process.
48
49

50 *Data extraction*

51
52 Data extraction will be conducted independently by two authors (FL and PB) and disagreements will
53
54 be solved as described above. Non-English references will be reviewed by two native or fluent
55
56 speakers. The following information will be extracted using a data extraction form based on "The
57
58
59
60

1
2
3 Cochrane Group Data collection form for intervention reviews” (50). Data extracted will cover the
4
5 following points (see on-line supplementary file 3):
6

- 7 ➤ Study details: title, author, publication details, location, language (if not English);
- 8
- 9 ➤ Study design: type of study, duration, outcomes measured;
- 10
- 11 ➤ Participant demographics: setting, inclusion and exclusion criteria, population size and
- 12 demographics;
- 13
- 14 ➤ Intervention Characteristics: duration, type and mode of intervention;
- 15
- 16 ➤ Outcomes: Measure of outcome used, any other outcomes analysed;
- 17
- 18 ➤ Results: Raw data and effect size for social isolation or loneliness as main outcome as well as
- 19 secondary outcomes;
- 20
- 21 ➤ Conclusions: Author and reviewer conclusions.
22
23
24
25

26 *Risk of bias (quality) assessment*

27
28 Two reviewers (FL and PB) will perform a quality appraisal of each study independently using the
29 Effective Public Health Practice Project “Quality assessment tool for quantitative studies” (51)
30 recommended by the Cochrane Public Health Group as it is applicable to both experimental and
31 quasi-experimental study designs (52). Non-English references will be reviewed by two native or
32 fluent speakers for the quality assessment.
33
34
35
36
37
38

39 *Description of studies and measurements of effect size*

40
41 We expect to find a diverse range of study designs and heterogeneous interventions aimed at social
42 isolation or loneliness. Hence, data will be divided by type of outcome: impact of interventions on
43 social isolation and impact of interventions on loneliness. Social isolation and loneliness are
44 intricately related but distinct concepts which are frequently used interchangeably (4). Social
45 isolation is defined as a scarcity of contacts or social encounters of adequate quality or quantity, and
46 is regarded as an objective measure of social interaction (6) (53) (54) (39) whereas loneliness is
47 described as the subjective counterpart of social isolation, where an individual’s perceived level of
48 interaction with others does not fulfil their expectations, often resulting in an unpleasant emotional
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 experience (6) (4) (55) (56). Given that these two concepts have been used interchangeably and
4
5 inconsistently in the literature, we will consider both collectively for search purposes but separately
6
7 in terms of analysis. Similarities and differences found in the literature will be compared and
8
9 discussed.

10
11 We will further divide the studies by type of study design (e.g. RCT, NRCT, CBA and BA) and sub-
12
13 divide them by type of intervention (e.g. group, one-to-one and other designs). A narrative synthesis
14
15 of all relevant studies will be provided by type outcome, divided in terms of study design and sub-
16
17 divided by type of intervention, describing study and participants' characteristics, interventions,
18
19 outcomes, results and author's conclusions.

20
21 The effectiveness of the health promotion interventions on alleviation or prevention of social
22
23 isolation or loneliness, will be presented in terms of mean effect size (e.g. standardised mean
24
25 difference) and respective confidence interval. The rationale for these summary statistics is the
26
27 expected variation in the instruments used to assess the same outcome. The effect size will be
28
29 calculated using Hedges' (adjusted) g , as it provides a superior estimate of the standardised mean
30
31 difference (SMD) in studies with small samples(57).

32
33 The primary effect size for each study will be calculated from the first available post-intervention
34
35 measurement time point. If a study has more than one intervention, the primary effect size will be
36
37 calculated for the main intervention group targeting social isolation or loneliness, or the group with
38
39 the most robust design (e.g. the intervention which yields the largest difference from the control
40
41 group) (35). If a study has more than one control group, the primary effect size will be calculated
42
43 using the group which theoretically is expected to generate the greatest difference from the
44
45 intervention group (35). In cases where there are more than two groups, we will firstly conduct
46
47 pairwise comparisons and also explore more complex analysis, if appropriate, as suggested by
48
49 Cochrane (58).

50
51 The authors of the studies included in this review will be contacted with the aim to retrieve any
52
53 missing data necessary for our analysis. We will attempt to calculate any missing SMDs for
54
55
56
57
58
59
60

1
2
3 continuous measures from the reported statistics (e.g. confidence intervals and standard errors) in
4
5 the relevant paper.

6
7 If sufficient data are available, subgroup analysis (i.e. type of intervention) will be conducted to
8
9 account for heterogeneity. If there are sufficient numbers of comparisons for the same outcome and
10
11 intervention across studies, the between-study heterogeneity will be quantified by calculating the χ^2
12
13 test for heterogeneity (significance level $p < 0.1$) and the I^2 statistic. We will report the sum of the
14
15 studies using both a fixed-effect and random-effects meta-analysis by type of study design and
16
17 intervention.
18

19 20 Ethics and dissemination

21
22 This systematic review is exempt from ethics approval because the work is carried out on published
23
24 documents. The included studies will be reviewed to see if ethical considerations were taken into
25
26 account. The systematic review will be disseminated in a related peer-reviewed journal. The findings
27
28 of the review will be presented at conferences and will contribute to a DPhil thesis.
29

30 31 32 33 **Discussion**

34
35 This systematic review will be performed to compare the effectiveness of health promotion
36
37 interventions in alleviating social isolation or loneliness in older persons. By grouping interventions
38
39 we will be able to determine which type of intervention is more likely to be effective and we will also
40
41 assess the role technology plays in promoting social contacts. We will use a validated tool to assess
42
43 the quality of evidence since previous reviews refer they were limited by the weak methodology of
44
45 studies analysed and we will synthesise the data using appropriate statistical methods, if feasible.
46
47 Furthermore, we will include studies conducted in the last 20 years without any languages or any
48
49 geographic restrictions. Previous reviews were restricted to studies published in English language
50
51 and up to 2013.
52

53
54
55 Our review aims to address an increasingly relevant problem not only in terms of the impact it has
56
57 on older people's health but also on health and social care systems worldwide. This review will
58
59

1
2
3 therefore provide policy makers with a better insight on how to tackle social isolation and loneliness
4
5 by identifying the type of interventions that alleviate or prevent social isolation or loneliness and
6
7 under which circumstances.
8
9

10 11 **Funding**

12
13 Filipa Landeiro is sponsored by Fundação para a Ciência e Tecnologia, I.P. (SFRH/BD/90910/2012,
14
15 financed by POPH-QREN) and by Fundação Calouste Gulbenkian via Instituto do Envelhecimento –
16
17 Universidade de Lisboa.
18
19

20 21 **Competing interests**

22
23 The authors declare that they have no competing interests.
24
25
26
27

28 29 **Contributors**

30
31 FL conceived the initial idea for the study and is the guarantor of the review. FL and PB wrote the
32
33 protocol. ENM, AMG and JL critically appraised the protocol and also contributed to its development
34
35 by revising different versions. All authors read and approved the final version of the manuscript.
36
37
38

39 40 **Acknowledgments**

41
42 The publication of this article was funded by the Open Access fund of the Nuffield Department of
43
44 Population Health, University of Oxford. We would also like to thank our information specialists Eli
45
46 Harriss and Nia Roberts for their help in developing the search strategy and selecting databases.
47
48
49

50 51 **References**

- 52
53 1. The World Health Organization. Active ageing: a policy framework. 2002.
54 2. United Nations Department of Economic and Social Affairs Population Division. World
55 Population Aging. 2013.
56 3. Ibrahim R, Abolfathi Momtaz Y, Hamid TA. Social isolation in older Malaysians: prevalence
57 and risk factors. *Psychogeriatrics*. 2013;13(2):71-9.
58
59
60

4. Grenade L, Boldy D. Social isolation and loneliness among older people: issues and future challenges in community and residential settings. *Australian Health Review*. 2008;32(3):468-78.
5. Victor CR, Scambler SJ, Bowling A, Bond J. The prevalence of, and risk factors for, loneliness in later life: a survey of older people in Great Britain. *Ageing & Society*. 2005;25(06):357-75.
6. British Columbia Ministry of Health. *Social Isolation Among Seniors: An Emerging Issue*. 2004.
7. Nicholson NR. A Review of Social Isolation: An Important but Underassessed Condition in Older Adults. *The Journal of Primary Prevention*. 2012;33(2):137-52.
8. Tomaka J, Thompson S, Palacios R. The Relation of Social Isolation, Loneliness, and Social Support to Disease Outcomes Among the Elderly. *Journal of Aging and Health*. 2006;18(3):359-84.
9. Cacioppo JT, Hawkley LC, Norman GJ, Berntson GG. Social isolation. *Annals of the New York Academy of Sciences*. 2011;1231(1):17-22.
10. Cohen S, Doyle WJ, Skoner DP, Rabin BS, Gwaltney JM, Jr. Social ties and susceptibility to the common cold. *JAMA*. 1997;277(24):1940-4.
11. Cornwell EY, Waite LJ. Social Disconnectedness, Perceived Isolation, and Health among Older Adults. *Journal of Health and Social Behavior*. 2009;50(1):31-48.
12. Hastings SN, George LK, Fillenbaum GG, Park RS, Burchett BM, Schmader KE. Does lack of social support lead to more ED visits for older adults? *The American Journal of Emergency Medicine*. 2008;26(4):454-61.
13. Landeiro F, Leal J, Gray AM. The impact of social isolation on delayed hospital discharges of older hip fracture patients and associated costs. *Osteoporosis International*. 2015;27(2):737-45.
14. Mendieta M, Martin MAG. Effects of the social support groups on loneliness, social support and quality of life in the elderly. *Revista de Psicologia Social Aplicada*. 2003;13(1):55-72.
15. Stewart M, Craig D, MacPherson K, Alexander S. Promoting positive affect and diminishing loneliness of widowed seniors through a support intervention. *Public Health Nurs*. 2001;18(1):54-63.
16. Dammeyer MM. Does social isolation among facility-dwelling elderly decrease using a reminiscence group intervention? *Dissertation Abstracts International: Section B: The Sciences and Engineering*. 2004;65(5-B):2618.
17. Liu SJ, Lin CJ, Chen YM, Huang XY. The effects of reminiscence group therapy on self-esteem, depression, loneliness and life satisfaction of elderly people living alone. *Mid-Taiwan Journal of Medicine*. 2007;12(3):133-42.
18. Tsai H-H, Tsai Y-F, Wang H-H, Chang Y-C, Chu HH. Videoconference program enhances social support, loneliness, and depressive status of elderly nursing home residents. *Ageing & Mental Health*. 2010;14(8):947-54.
19. Fokkema T, Knipscheer K. Escape loneliness by going digital: a quantitative and qualitative evaluation of a Dutch experiment in using ECT to overcome loneliness among older adults. *Ageing & Mental Health*. 2007;11(5):496-504.
20. Banks MR, Willoughby LM, Banks WA. Animal-Assisted Therapy and Loneliness in Nursing Homes: Use of Robotic versus Living Dogs. *Journal of the American Medical Directors Association*. 2008;9(3):173-7.
21. Essen JJ, Cardiello F, Baun MM. Avian companionship in alleviation of depression, loneliness and low morale of older adults in skilled rehabilitation units. *Psychological Reports*. 1996;78(1):339-48.
22. MacIntyre I, Corradetti P, Roberts J, Browne G, Watt S, Lane A. Short papers. Pilot study of a visitor volunteer programme for community elderly people receiving home health care. *Health & Social Care in the Community*. 1999;7(3):225-8 4p.
23. Stevens N, van Tilburg T. Stimulating friendship in later life: A strategy for reducing loneliness among older women. *Educational Gerontology*. 2000;26(1):15-35.
24. Alaviani M, Khosravan S, Alami A, Moshki M. The Effect of a Multi-Strategy Program on Developing Social Behaviors Based on Pender's Health Promotion Model to Prevent Loneliness of Old Women Referred to Gonabad Urban Health Centers. *Int*. 2015;3(2):132-40.

- 1
- 2
- 3 25. Robertson R. J. Indirect measurement of results in a project for improving socialization
- 4 among the elderly. *Journal of Gerontology*. 1970;25(3):265-7.
- 5 26. Wright L, Vance L, Sudduth C, Epps JB. The Impact of a Home-Delivered Meal Program on
- 6 Nutritional Risk, Dietary Intake, Food Security, Loneliness, and Social Well-Being. *J Nutr Gerontol*
- 7 *Geriatr*. 2015;34(2):218-27.
- 8 27. Brennan PF, Moore SM, Smyth KA. The effects of a special computer network on caregivers
- 9 of persons with Alzheimer's disease. *Nurs Res*. 1995;44(3):166-72.
- 10 28. White H, McConnell E, Clipp E, Bynum L, Teague C, Navas L, et al. Surfing the net in later life:
- 11 A review of the literature and pilot study of computer use and quality of life. *Journal of Applied*
- 12 *Gerontology*. 1999;18(3):358-78.
- 13 29. Kahlbaugh PE, Sperandio AJ, Carlson AL, Hauselt J. Effects of Playing Wii on Well-Being in the
- 14 Elderly: Physical Activity, Loneliness, and Mood. *Activities, Adaptation & Aging*. 2011;35(4):331-44.
- 15 30. Tse MM. Therapeutic effects of an indoor gardening programme for older people living in
- 16 nursing homes. *J Clin Nurs*. 2010;19(7-8):949-58.
- 17 31. Kremers IP, Steverink N, Albersnagel FA, Slaets JPJ. Improved self-management ability and
- 18 well-being in older women after a short group intervention. *Ageing and Mental Health*.
- 19 2006;10(5):476-84.
- 20 32. Franck L, Molyneux N, Parkinson L. Systematic review of interventions addressing social
- 21 isolation and depression in aged care clients. *Qual Life Res*. 2015.
- 22 33. Dickens AP, Richards SH, Greaves CJ, Campbell JL. Interventions targeting social isolation in
- 23 older people: a systematic review. *BMC Public Health*. 2011;11(1):1-22.
- 24 34. Findlay RA. Interventions to reduce social isolation amongst older people: where is the
- 25 evidence? *Ageing & Society*. 2003;23(05):647-58.
- 26 35. Masi CM, Chen H-Y, Hawkey LC, Cacioppo JT. A Meta-Analysis of Interventions to Reduce
- 27 Loneliness. *Personality and Social Psychology Review*. 2011;15(3):219-66.
- 28 36. Hagan R, Manktelow R, Taylor BJ, Mallett J. Reducing loneliness amongst older people: a
- 29 systematic search and narrative review. *Ageing & Mental Health*. 2014;18(6):683-93.
- 30 37. Choi M, Kong S, Jung D. Computer and Internet Interventions for Loneliness and Depression
- 31 in Older Adults: A Meta-Analysis. *Healthc Inform Res*. 2012;18(3):191-8.
- 32 38. Medical Advisory Secretariat. Social isolation in community-dwelling seniors: an evidence-
- 33 based analysis. Ontario health technology assessment series. 2008;8(5):1-49.
- 34 39. Cattan M, White M, Bond J, Learmouth A. Preventing social isolation and loneliness among
- 35 older people: a systematic review of health promotion interventions. *Ageing & Society*.
- 36 2005;25(01):41-67.
- 37 40. Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, et al. Preferred reporting
- 38 items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and
- 39 explanation. *BMJ*. 2015;349.
- 40 41. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews
- 41 and meta-analyses: the PRISMA statement. *BMJ*. 2009;339.
- 42 42. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gotzsche PC, Ioannidis JP, et al. The PRISMA
- 43 statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare
- 44 interventions: explanation and elaboration. *Bmj*. 2009;339:b2700.
- 45 43. Welch V, Petticrew M, Tugwell P, Moher D, O'Neill J, Waters E, et al. PRISMA-Equity 2012
- 46 Extension: Reporting Guidelines for Systematic Reviews with a Focus on Health Equity. *PLoS Med*.
- 47 2012;9(10):e1001333.
- 48 44. Lubben JE. Assessing social networks among elderly populations. *Family & Community*
- 49 *Health*. 1988;11(3):42-52.
- 50 45. Bernard S. Loneliness and social isolation among older people in North Yorkshire, Working
- 51 Paper (WP2565). Social Policy Research Unit, University of York. 2013.
- 52 46. Powers JR, Goodger B, Byles JE. Assessment of the abbreviated Duke Social Support Index in
- 53 a cohort of older Australian women. *Australasian Journal on Ageing*. 2004;23(2):71-6.
- 54
- 55
- 56
- 57
- 58
- 59
- 60

- 1
2
3 47. De Jong-Gierveld J, Kamphuis F. The development of a Rasch-type loneliness scale. *Applied Psychological Assessment*. 1985;9(3):289-99.
- 4 48. Russell D, Peplau LA, Cutrona CE. The revised UCLA Loneliness Scale: concurrent and discriminant validity evidence. *Journal of personality and social psychology*. 1980;39(3):472-80.
- 5 49. Masi CM, Chen H-Y, Hawkley LC, Cacioppo JT. A Meta-Analysis of Interventions to Reduce Loneliness. *Personality and social psychology review : an official journal of the Society for Personality and Social Psychology, Inc.* 2011;15(3):10.1177/1088868310377394.
- 6 50. The Cochrane Collaboration. Data collection forms for intervention reviews: RCTs and non-RCTs. Version 3. 2014 [cited 2016 27th April]. Available from:
7 <http://training.cochrane.org/resource/data-collection-forms-intervention-reviews>.
- 8 51. McMaster University Faculty of Health Sciences. Quality assessment tool for quantitative studies. In: *Effective public health practice project*. 2009 [cited 2016 27th April]. Available from:
9 <http://www.ehphp.ca/tools.html>.
- 10 52. Armijo-Olivo S, Stiles CR, Hagen NA, Biondo PD, Cummings GG. Assessment of study quality for systematic reviews: a comparison of the Cochrane Collaboration Risk of Bias Tool and the Effective Public Health Practice Project Quality Assessment Tool: methodological research. *Journal of Evaluation in Clinical Practice*. 2012;18(1):12-8.
- 11 53. Nicholson NR. Social isolation in older adults: an evolutionary concept analysis. *J Adv Nurs*. 2009;65(6):1342-52.
- 12 54. Delisle M-A. What does Solitude Mean to the Aged? *Canadian Journal on Aging/La Revue canadienne du vieillissement*. 1988;7(04):358-71.
- 13 55. Peplau LA, & Perlman, D. . Perspectives on loneliness. *Loneliness; A Sourcebook of current theory, research and therapy*. UCLA: Los Angeles: Wiley-Interscience; 1982. p. 1-18.
- 14 56. Victor C, Scambler S, Bond J, Bowling A. Being alone in later life: loneliness, social isolation and living alone. *Reviews in Clinical Gerontology*. 2000;10(04):407-17.
- 15 57. Lipsey M. W., Wilson D. B. *Practical Meta-Analysis*. Thousand Oaks, CA: Sage; 2001.
- 16 58. The Cochrane Collaboration. *Cochrane Handbook for Systematic Reviews of Interventions* 2011 [cited 2016 26th May]. Version 5.1.0:[Available from:
17 http://handbook.cochrane.org/front_page.htm.
- 18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Reducing social isolation in older people: a systematic review protocol

Supplementary files

Supplementary file 1: PRISMA-P checklist..... 2

Supplementary file 2: Search strategy..... 4

Supplementary file 3: Pro-forma for Data Extraction..... 9

For peer review only

Supplementary file 1: PRISMA-P checklist

Table A.1: PRISMA-P 2015 checklist

Section and topic	Item No.	Checklist Item	Reported on page #
A) Administrative Information			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	Identify protocol as an update of a previous systematic review if applicable	n/a
Registration	2	Name of registry and registration number	2
B) Authors			
Contact		Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions		Describe contributions of protocol authors and identify the guarantor of the review	1 + 6 + 7
Amendments		If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	n/a
Support			
- Sources	5a	Indicate Sources of financial or other support for the review	10
- Sponsor	5b	Provide name for the review funder and/or sponsor	9
- Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s) and/or institution(s), if any, in developing the protocol	n/a
C) Introduction			
Rationale	6	Describe the rationale for the review in the context of what is already known	3 + 4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	3 + 4
D) Methods			
Eligibility Criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	5
Information Sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	5 + 6
Search Strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	5 + Additional file 2
E) Study Records			
Data Management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	6
Selection Process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	5 - 7
Data Collection Process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	6 + 8 + Additional file 3
Data Items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	6
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	6

Section and topic	Item No.	Checklist Item	Reported on page #
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	7
Data Synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	7 + 8
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency	7 + 8
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	7 + 8
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	7 + 8
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	7
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed	7

Supplementary file 2: Search strategy

Table A.2.1: Ovid MEDLINE and Embase- search date 15/01/16

Searches	Search Terms
1	exp "Aged, 80 and over"/ or exp Aged/
2	older*.ti,ab.
3	elder*.ti,ab.
4	senior*.ti,ab.
5	geriatric.ti,ab.
6	aged.ti,ab.
7	OR/1-6
8	Social Isolation/
9	Loneliness/
10	isolation.ti,ab.
11	loneliness.ti,ab.
12	(social* adj3 isolat*).ti,ab.
13	(emotional* adj3 isolat*).ti,ab.
14	OR/ 8-13
15	exp Social Support/
16	"social support*".ti,ab.
17	loss.ti,ab.
18	access.ti,ab.
19	(social* adj3 activ*).ti,ab.
20	"social network*".ti,ab.
21	"social intervention*".ti,ab.
22	(promot* or prevent* or support* or self-help or "self help" or educat*).ti,ab.
23	Self Care/
24	exp Policy/
25	policy.ti,ab.
26	program*.ti,ab
27	OR/ 15-26
28	7 AND 14 AND 27
29	limit 28 to yr="1995 -Current"

ti: title; ab: abstract

Table A.2.2: PsycINFO - search date 15/01/16

Searches	Search Terms
1	exp "Aged, 80 and over"/ or exp Aged/
2	older*.ti,ab.
3	elder*.ti,ab.
4	senior*.ti,ab.
5	geriatric.ti,ab.
6	aged.ti,ab.
7	OR/1-6
8	Social Isolation/
9	Loneliness/
10	isolation.ti,ab.
11	loneliness.ti,ab.
12	(social* adj3 isolat*).ti,ab.
13	(emotional* adj3 isolat*).ti,ab.
14	OR/ 8-13
15	exp Social Support/
16	"social support*".ti,ab.
17	loss.ti,ab.
18	access.ti,ab.
19	(social* adj3 activ*).ti,ab.
20	"social network*".ti,ab.
21	"social intervention*".ti,ab.
22	(promot* or prevent* or support* or self-help or "self help" or educat*).ti,ab.
23	Self Care/
24	exp Policy Making/ or exp Health Care Policy/ or exp Government Policy Making/
25	policy.ti,ab.
26	program*.ti,ab
27	OR/ 15-26
28	7 AND 14 AND 27
29	limit 28 to yr="1995 -Current"

ti: title; ab: abstract

Table A.2.3: Cinahl - search date 15/01/16

Searches	Search Terms
1	exp "Aged, 80 and over"/ or exp Aged/
2	older*.ti,ab.
3	elder*.ti,ab.
4	senior*.ti,ab.
5	geriatric.ti,ab.
6	aged.ti,ab.
7	OR/1-6
8	Social Isolation/
9	Loneliness/
10	isolation.ti,ab.
11	loneliness.ti,ab.
12	(social* adj3 isolat*).ti,ab.
13	(emotional* adj3 isolat*).ti,ab.
14	OR/ 8-13
15	exp "Support, Psychosocial+/"
16	"social support*".ti,ab.
17	loss.ti,ab.
18	access.ti,ab.
19	(social* adj3 activ*).ti,ab.
20	"social network*".ti,ab.
21	"social intervention*".ti,ab.
22	(promot* or prevent* or support* or self-help or "self help" or educat*).ti,ab.
23	Self Care/
24	(MH "Public Policy+") OR (MH "Policy Making") OR (MH "Policy Studies+") OR (MH "Health Policy Studies") OR (MH "Health Policy+") OR (MH "Policy and Procedure Manuals") OR (MH "Organizational Policies+") OR (MH "Hospital Policies+")
25	policy.ti,ab.
26	program*.ti,ab
27	OR/ 15-27
28	7 AND 14 AND 27
29	limit 28 to yr="1995 -Current"

ti: title; ab: abstract

Table A.2.4: ASSIA - search date 20/01/16**Search Terms**

((SU.EXACT.EXPLODE("Terminally ill elderly people") OR SU.EXACT.EXPLODE("Disabled elderly women") OR SU.EXACT.EXPLODE("Low income elderly people") OR SU.EXACT.EXPLODE("Visually impaired elderly women") OR SU.EXACT.EXPLODE("Visually impaired elderly people") OR SU.EXACT.EXPLODE("Terminally ill elderly women") OR SU.EXACT.EXPLODE("Widowed elderly men") OR SU.EXACT.EXPLODE("Married elderly men") OR SU.EXACT.EXPLODE("Terminally ill elderly men") OR SU.EXACT.EXPLODE("Language disordered elderly people") OR SU.EXACT.EXPLODE("Elderly widows") OR SU.EXACT.EXPLODE("Mentally ill elderly women") OR SU.EXACT.EXPLODE("Elderly husbands") OR SU.EXACT.EXPLODE("Remarried elderly people") OR SU.EXACT.EXPLODE("Elderly fathers") OR SU.EXACT.EXPLODE("Sick elderly people") OR SU.EXACT.EXPLODE("Learning disabled elderly people") OR SU.EXACT.EXPLODE("Mentally ill elderly men") OR SU.EXACT.EXPLODE("Divorced elderly people") OR SU.EXACT.EXPLODE("Sick elderly women") OR SU.EXACT.EXPLODE("Emotionally disturbed elderly people") OR SU.EXACT.EXPLODE("Disabled elderly people") OR SU.EXACT.EXPLODE("Elderly married couples") OR SU.EXACT.EXPLODE("Elderly mothers") OR SU.EXACT.EXPLODE("Mentally ill elderly people") OR SU.EXACT.EXPLODE("Disabled elderly men" OR "Elderly men" OR "Married elderly men" OR "Mentally ill elderly men" OR "Terminally ill elderly men" OR "Widowed elderly men") OR SU.EXACT.EXPLODE("Single elderly people") OR SU.EXACT.EXPLODE("Elderly relatives") OR SU.EXACT.EXPLODE("Disabled elderly men") OR SU.EXACT.EXPLODE("Brain damaged elderly people" OR "Centenarians" OR "Disabled elderly people" OR "Divorced elderly people" OR "Elderly people" OR "Emotionally disturbed elderly people" OR "Gifted elderly people" OR "Hearing impaired elderly people" OR "Homeless elderly people" OR "Housebound elderly people" OR "Language disordered elderly people" OR "Learning disabled elderly people" OR "Low income elderly people" OR "Mentally ill elderly people" OR "Remarried elderly people" OR "Retired people" OR "Sick elderly people" OR "Single elderly people" OR "Terminally ill elderly people" OR "Visually impaired elderly people") OR SU.EXACT.EXPLODE("Blind-Deaf elderly women" OR "Disabled elderly women" OR "Elderly women" OR "Married elderly women" OR "Mentally ill elderly women" OR "Sick elderly women" OR "Single elderly women" OR "Terminally ill elderly women" OR "Visually impaired elderly women") OR SU.EXACT.EXPLODE("Homeless elderly people") OR SU.EXACT.EXPLODE("Married elderly women") OR SU.EXACT.EXPLODE("Hearing impaired elderly people") OR SU.EXACT.EXPLODE("Housebound elderly people") OR SU.EXACT.EXPLODE("Elderly housing assistance programmes") OR SU.EXACT.EXPLODE("Elderly parents")) OR (ab(older* OR elder* OR senior* OR geriatric OR aged) OR ti(older* OR elder* OR senior* OR geriatric OR aged))) AND (SU.EXACT.EXPLODE("Isolation" OR "Purdah" OR "Seclusion") OR SU.EXACT.EXPLODE("Loneliness") OR (ti(isolation OR loneliness OR (social* NEAR/3 isolat*) OR (emotion* NEAR/3 isolat*)) OR ab(isolation OR loneliness OR (social* NEAR/3 isolat*) OR (emotion* NEAR/3 isolat*))) AND ((SU.EXACT.EXPLODE("Computer based social support" OR "Perceived social support" OR "Social support") OR SU.EXACT.EXPLODE("Perceived social support")) OR SU.EXACT.EXPLODE("Selfcare") OR SU.EXACT.EXPLODE("Agricultural policy" OR "Colonial policy" OR "Constitutional policy" OR "Criminal justice policy" OR "Criminal policy" OR "Economic policy" OR "Energy policy" OR "Environmental policy" OR "Fiscal equalization" OR "Fiscal policy" OR "Foreign policy" OR "Health policy" OR "Housing policy" OR "Incomes policy" OR "Industrial policy" OR "Mental health policy" OR "Monetary policy" OR "Organizational policy" OR "Penal policy" OR "Policy" OR "Public health policy" OR "Public policy" OR "Regional policy" OR "Science policy" OR "Social housing policy" OR "Social policy" OR "Technological policy" OR "Transport policy" OR "Urban policy" OR "Welfare policy") OR (ab("social support*" OR ti("social support*")) OR (ab(loss) OR ti(loss)) OR (ab(access) OR ti(access)) OR (ab((social* NEAR/3 activ*) OR "social network*" OR "social intervention*") OR ti((social* NEAR/3 activ*) OR "social network*" OR "social intervention*")) OR (ab(promot* OR prevent* OR support* OR self-help OR "self help" OR educat*) OR ti(promot* OR prevent* OR support* OR self-help OR "self help" OR educat*)) OR (ab(policy OR program*) OR ti(policy OR program*)))

Table A.2.5: LILACS - search date 21/01/16**Search Terms**

(aged OR older* OR elder* OR senior* OR geriatric) AND (isolat* OR loneliness) AND ("social support*" OR loss OR access OR "social* activ*" OR "social network*" OR "social intervention*" OR promot* OR prevent* OR support* OR self-help OR "self help" OR educat* OR policy OR program*)

Table A.2.6: OpenGrey - search date 21/01/16**Search Terms**

(aged OR older* OR elder* OR senior* OR geriatric) AND (isolat* OR loneliness) AND ("social support*" OR loss OR access OR "social* activ*" OR "social network*" OR "social intervention*" OR promot* OR prevent* OR support* OR self-help OR "self help" OR educat* OR policy OR program*))

Table A.2.7: The Cochrane Library – search date 21/01/16**Searches****Search Terms**

1	MeSH descriptor: [Aged] explode all trees
2	older* or aged or elder* or senior* or geriatric.ti,ab.
3	#1 or #2
4	MeSH descriptor: [Social Isolation] explode all trees
5	isolation.ti,ab.
6	loneliness.ti,ab.
7	(social* near/3 isolat*) .ti,ab.
8	(emotional* near/3 isolat*) .ti,ab.
9	#4 or #5 or #6 or #7 or #8
10	MeSH descriptor: [Social Support] explode all trees
11	"social support*" .ti,ab.
12	loss.ti,ab.
13	access.ti,ab.
14	(social* near/3 activ*) .ti,ab.
15	"social network*" .ti,ab.
16	"social intervention*" .ti,ab.
17	(promot* or prevent* or support* or self-help or "self help" or educat*) .ti,ab.
18	MeSH descriptor: [Self Care] explode all trees
19	MeSH descriptor: [Policy] explode all trees
20	policy.ti,ab.
21	program*.ti,ab.
22	#10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21
23	#3 and #9 and #22
	Limit by date: 1995 to present

ti: title; ab: abstract

Supplementary file 3: Pro-forma for Data Extraction

Reviewer	
Date form completed	

Study Details

Title	
Author	
Year Published	
Journal	
Location (country/city)	
Language (if not English)	

		Location in text (page/figure/table/other)
Type of study	Randomised controlled trial	<input type="checkbox"/>
	Non-randomised controlled trial	<input type="checkbox"/>
	Controlled before and after study	<input type="checkbox"/>
	Uncontrolled before and after study	<input type="checkbox"/>
A. Start Date	A.	
B. End Date	B.	
Outcomes Measured (aims)		

Participants

		Location in text (page/figure/table/other)
Setting	Large population in unspecified setting	<input type="checkbox"/>
	Community:	<input type="checkbox"/>
	Supported living	<input type="checkbox"/>
	Other:	
Type of Participants		
Enrolment Eligibility		
A. Inclusion Criteria	A.	
B. Exclusion Criteria	B.	
Recruitment process (e.g. phone, mail, clinic)		
Total number randomised (or total population for non-RCT)		
Age range (mean age)		
Gender (% female)		
Ethnicity		
Sample size		
Any other relevant sociodemographic information		
Any subgroups established		
Notes		

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Intervention		Location in text (page/figure/table/other)
Intervention	Description	
	Duration of each intervention episode	
	Duration of intervention studied (total study duration)	
	Frequency (daily/weekly etc.)	
	Provider (i.e. no., profession, training)	
	Economic information (cost, resource requirements)	
Type of intervention	Group Intervention	Community based: At home <input type="checkbox"/> Centralised location <input type="checkbox"/> Supported Living* <input type="checkbox"/>
	One-to-one Intervention	Community based: At home <input type="checkbox"/> Centralised location <input type="checkbox"/> Supported Living* <input type="checkbox"/>
	Focus of intervention	Social skills training <input type="checkbox"/> Enhanced social support <input type="checkbox"/> Increased opportunity for social interaction <input type="checkbox"/> Social cognitive training <input type="checkbox"/> Provision of services** <input type="checkbox"/> Other..... <input type="checkbox"/>
Intervention Mode	Technology assisted <input type="checkbox"/> Non-technology assisted <input type="checkbox"/>	
Compliance		
Notes		

Outcomes		Location in text (page/figure/table/other)
Measure of social isolation/loneliness	Description as stated in paper/report	
Outcome tool validated	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Any outcomes other than social isolation/loneliness measured?	Yes <input type="checkbox"/> Details	
	No <input type="checkbox"/>	

Results: effect of the intervention on social isolation or loneliness

							Location in text (page/figure/ table/other)
Comparison							
Outcome							
Subgroup							
Time point (from start or end of intervention)							
Results	Intervention			Comparison			
	Mean	SD (or other variance, specify)	No participants	Mean	SD (or other variance, specify)	No participants	
Effect size	Effect size: _____ Standard error: _____ Inverse variance: _____ 95% confidence interval: _____						
Any other results reported (e.g. Odds ratio)							
Statistical method used							
Notes							

Results: effects of the intervention on other outcome continuous variables

							Location in text (page/figure/ table/other)
Comparison							
Outcome							
Subgroup							
Time point (from start or end of intervention)							
Results	Intervention			Comparison			
	Mean	SD (or other variance, specify)	No participants	Mean	SD (or other variance, specify)	No participants	
Effect size	Effect size: _____ Standard error: _____ Inverse variance: _____ 95% confidence interval: _____						
Any other results reported (e.g. Odds ratio)							
Statistical Method used							
Notes							

Results: effect of the intervention on other outcome categorical variables

					Location in text (page/figure/table/other)
Comparison					
Outcome					
Subgroup					
Time point (from start or end of intervention)					
Results	Intervention		Comparison		
	No. with event	No. in group	No. with event	No. in group	
Effect size (95% CI)					
Any other results reported (e.g. Odds ratio)					
Statistical method used					
Notes					

Other Information

					Location in text (page/figure/table/other)
Author's conclusions					
References to other relevant studies					
Reviewer's conclusions					
Notes					

*Residential or nursing care

**Provision of services such as transport, medical services, etc.

PRISMA-P checklist

Table A.1: PRISMA-P 2015 checklist

Section and topic	Item No.	Checklist Item	Reported on page #
A) Administrative Information			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	Identify protocol as an update of a previous systematic review if applicable	n/a
Registration	2	Name of registry and registration number	2
B) Authors			
Contact		Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions		Describe contributions of protocol authors and identify the guarantor of the review	1 + 6 + 7
Amendments		If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	n/a
Support			
- Sources	5a	Indicate Sources of financial or other support for the review	10
- Sponsor	5b	Provide name for the review funder and/or sponsor	9
- Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s) and/or institution(s), if any, in developing the protocol	n/a
C) Introduction			
Rationale	6	Describe the rationale for the review in the context of what is already known	3 + 4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	3 + 4
D) Methods			
Eligibility Criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	5
Information Sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	5 + 6
Search Strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	5 + Additional file 2
E) Study Records			
Data Management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	6
Selection Process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	5 - 7
Data Collection Process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	6 + 8 + Additional file 3
Data Items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	6
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	6
Risk of bias in	14	Describe anticipated methods for assessing risk of bias of individual	7

individual studies		studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	
Data Synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	7 + 8
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency	7 + 8
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	7 + 8
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	7 + 8
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	7
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed	7