Supplementary Material S1: Search Terms and Search Strings

1. Search Terms:

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| --- | --- | --- |
| **Population** | **Population** | **Exposure** |
| older adult(s) | immigrant(s) | loneliness |
| older people | migrants(s) | lonely |
| elderly | newcomer(s) | social isolation |
| elder | refugee(s) | isolated |
| senior(s) | asylum seeker(s) |  |
| ageing | ethnic(ity) |  |
| aging | ethic minority |  |
| old-age | minoritised ethnic(s) |  |
| old age | BAME |  |
|  | BME |  |
|  | people of color |  |

1. Search Strings for each database

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| --- | --- |
| **Database** | **Search String** |
| Scopus | (TITLE-ABS-KEY (“social isolation” OR isolated OR loneliness OR lonely) AND TITLE-ABS-KEY (immigrant\* OR migrant\* OR refugee\* OR ”asylum seeker\*” OR “new comer\*” OR ethnic\* OR minority OR “ethnic minority” OR “minoritis(z)ed ethnic” OR race OR bame OR bme OR “people of color”) AND TITLE-ABS-KEY (elderly OR elder OR senior\* OR “old\* adult\*” OR “old\* people” OR ageing OR aging OR “old age” OR old-age)) AND (LIMIT-TO (DOCTYPE, “ar”) OR LIMIT-TO (DOCTYPE, “re”)) AND (LIMIT-TO (LANGUAGE, “English”)) |
| Web of Science | “social isolation” OR “isolated” OR “lonely” OR “loneliness” and immigrant\* OR migrant\* OR “asylum seeker\*” OR “new comer\*” OR ethnic\* OR minority OR “ethnic minority” OR “minoritis(z)ed ethnic” OR race OR BAME OR BME OR “people of color” and elderly OR elder OR senior\* OR “old\* adult\*” OR “old\* people” OR ageing OR aging OR “old age” OR old-age. Refined By: Document Types: Articles or Review Articles; Languages: English |
| PsycINFO | Any Field: “social isolation” OR “isolated” OR “lonely” OR “loneliness” AND Any Field: immigrant\* OR migrant\* OR “asylum seeker\*” OR “new comer\*” OR ethnic\* OR minority OR “ethnic minority” OR “minoritis(z)ed ethnic” OR race OR BAME OR BME OR “people of color” AND Any Field: elderly OR elder OR senior\* OR “old\* adult\*” OR “old\* people” OR ageing OR aging OR “old age” OR old-age AND Age Group: Aged (65 yrs & older) OR Very Old (85 yrs & older) AND Peer-Reviewed Journals only |
| Medline | (“social isolation” OR isolated OR loneliness OR lonely).mp. AND (immigrant\* OR migrant\* OR “asylum seeker\*” OR “new comer\*” OR ethnic\* OR minority OR “ethnic minority” OR “minoritis(z)ed ethnic” OR race OR BAME OR BME OR “people of color”).mp. AND (elderly OR elder OR senior\* OR “old\* adult\*” OR “old\* people” OR ageing OR aging OR “old age” OR old-age).mp. limit to (english language) |
| PubMed | ((“social isolation” OR loneliness OR lonely) AND (immigrant\* OR migrant\* OR “asylum seeker\*” OR “new comer\*” OR ethnic\* OR minority OR “ethnic minority” OR “minoritis(z)ed ethnic” OR race OR BAME OR BME OR “people of color”)) AND (elderly OR elder OR senior\* OR “old\* adult\*” OR “old\* people” OR ageing OR aging OR “old age” OR old-age) |
| CINAHL | AB Abstract (“social isolation” OR “isolated” OR “lonely” OR “loneliness”) AND AB Abstract (immigrant\* OR migrant\* OR “asylum seeker\*” OR “new comer\*” OR ethnic\* OR minority OR “ethnic minority” OR “minoritis(z)ed ethnic” OR race OR BAME OR BME OR “people of color”) AND AB Abstract (elderly OR elder OR senior\* OR “old\* adult\*” OR “old\* people” OR ageing OR aging OR “old age” OR old-age) |
| SocINDEX | "social isolation" OR loneliness OR lonely (All Fields) and immigrant\* OR migrant\* OR refugee\* OR “asylum seeker\*” OR "new comer\*" OR ethnic\* OR minority OR "ethnic minority" OR race OR BAME OR BME OR "people of color" (All Fields) and elderly OR senior\* OR elder OR "old adult\*" OR "old people" OR ageing OR aging OR "old age" OR old-age (All Fields) and Articles (Document Types) and English (Languages) |
| ASSIA | ab(“social isolation” OR “isolated” OR “lonely” OR “loneliness”) AND ab(immigrant\* OR migrant\* OR “asylum seeker\*” OR “new comer\*” OR ethnic\* OR minority OR “ethnic minority” OR “minoritis(z)ed ethnic” OR race OR BAME OR BME OR “people of color”) AND ab(elderly OR elder OR senior\* OR “old\* adult\*” OR “old\* people” OR ageing OR aging OR “old age” OR old-age) |
| Embase | (“social isolation” OR isolated OR loneliness OR lonely).mp. AND (immigrant\* OR migrant\* OR “asylum seeker\*” OR “new comer\*” OR ethnic\* OR minority OR “ethnic minority” OR “minoritis(z)ed ethnic” OR race OR BAME OR BME OR “people of color”).mp. AND (elderly OR elder OR senior\* OR “old\* adult\*” OR “old\* people” OR ageing OR aging OR “old age” OR old-age).mp. limit to english language |

Supplementary Material S2: Data charting form

| **Author(s)**  **Year of publication**  **Discipline1 Country of study** | **Aims/research questions** | **Study populations** | **Study focus** | | | **Research design**  **Quant & qual Method**  **Primary & secondary data** | **Sample Size** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Loneliness**  **&**  **social isolation** | **Ethnicity/race**  **& Immigration** | **Factors & outcomes & lived experience & others** |
| Adams Jr, Kaufman and Dressler (1989)  Social work  US | To examine whether race has a modifying effect on the predictors of three underlying dimensions of social isolation: interaction with relatives, feelings of loneliness, and interaction with friends and neighbours. | Black and white adults aged 60 and older | Social isolation | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=1839  White: 57%  Black: 43% |
| Ajrouch (2008)  Sociology  US | Do immigrants differ from U.S.-born Arab Americans in levels of social isolation and loneliness?  Does acculturation explain differences in social isolation and loneliness?  Do intergenerational relations explain differences in loneliness? | Arab from Lebanon, Syria, and Iraq aged 55 and older | Both | Immigration | Factors | Quant  Cross-sectional  Primary survey | n=101  US-born: n=38  Immigrants: n=62 |
| Albert (2021)  Psychology  Luxembourg | To explore the role of cultural and intergenerational belonging in order to identify both protective and risk factors regarding loneliness in middle and older age. | First-generation Portuguese immigrants aged 41–80 years | Loneliness | Immigration | Factors | Quant  Cross-sectional  Primary survey | n=131 |
| Ali *et al.* (2021)  Public health  US | To determine factors associated with mental health and loneliness within the South Asian older adult population in NYC. | Persons who identified as South Asian aged 60 and older | Loneliness | Both | Factors | Quant  Cross-sectional  Secondary survey data | n=682 |
| Beere, Keeling and Jamieson (2019)  Geography  New Zealand | To examine whether socio-spatial trends for loneliness within the interRAI-HC exist in New Zealand. The distribution of loneliness is analysed in regards to urban/rural status, ethnicity, and SES to identify whether particular groups are more at-risk of, or resilient to, being lonely. | Asian, European, Māori, Pasifika adults aged 65 and older and who are frail or at-risk-of frail | Loneliness | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=52937 |
| Berthold *et al.* (2018)  Social work  US | To better understand the phenomenon of social isolation of Cambodian elders and young people in order to inform health promotion efforts. | Cambodian elders and young people with refugee background | Social isolation | Immigration | Lived experience | Qual  Focus groups  Primary | n=7  (Cambodian community leaders) |
| Burholt and Dobbs (2014)  Social gerontology  US, South Asia | Can a new robust network typology be discerned in older populations with a preponderance of multigenerational or extended households?  Can a new network typology be validated through its predictive utility?  Whether network type predicts loneliness and isolation? | South Asians (Gujaratis, Punjabis and Sylhetis) aged 55 and older | Both | Both | Factors | Quant  Cross-sectional  Primary survey | n=590  UK: n=303  Asia: n=287 |
| Byrne *et al.* (2021)  Psychology  US | To examine whether the relationship between social technology use and loneliness diﬀers by race and geographic region. | non-Hispanic White/Caucasian and non-Hispanic Black/African-American, and other racial/ethnic group adults aged 50 and older | Both | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=4315  Non-Hispanic White/Caucasian:n= 3306  Non-Hispanic Black/African-American:n=692  Other: n=317 |
| Cela and Fokkema (2017)  Demography  Italy | To explore the lived experiences and perceived causes of loneliness amongst older migrants in Italy. | Albanian and Moroccan immigrants aged 50 and older | Loneliness | Immigration | Lived experience | Qual  In-depth interviews  Primary | n=34  Albania: n=19  Morocco: n=15 |
| Chatters *et al.* (2018)  Social work/public health  US | To investigate a broad set of sociodemographic, health, and family and friend network factors as correlates of objective social isolation from extended family members and friends among older adults. | African-Americans, Black Caribbeans and non-Hispanic Whites aged 55 years and older | Social isolation | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=1321  African-American: n=756  Black Caribbean: n=281  Non-Hispanic Whites: n=284 |
| Ciobanu and Fokkema (2017)  Sociology  Switzerland | How and to what extent does religion protect older Romanian migrants from loneliness? | Older Romanian immigrants aged 57 and over | Loneliness | Immigration | Lived experience | Qual  In-depth interviews  Primary | n=30 |
| Ciobanu and Fokkema (2021)  Sociology  Switzerland | Which coping strategies and underlying factors protect Romanian migrants in Switzerland from loneliness in later life? | Older Romanian immigrants aged 65 and over | Loneliness | Immigration | Lived experience | Qual  In-depth interviews  Primary | n=24 |
| Wright-St Clair and Nayar (2020)  Social Gerontology  New Zealand | What does the text say about Chinese, Indian and Korean late-life immigrants’ experiences of loneliness or social isolation? | Chinese, Indian and Korean immigrants aged 60 and older and who migrated at the age of 55 and above | Loneliness | Immigration | Lived experience | Qual  Hermeneutic analysis of text  Secondary text data | n=153 quotes |
| Compernolle *et al.* (2021)  Unknown  US | To examine (1) how momentary loneliness relates to (a) gender and race/ethnicity and (b) social and physical context (e.g., home, work); and the extent to which gender and racial/ethnic groups may be (2) differentially exposed to loneliness related contexts and/or (3) differentially reacting to these contexts. | Non-Hispanic White, non-Hispanic Black, and non-Black Hispanic aged 65 and older | Loneliness | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary ecological momentary assessment data | n=342  Non-Hispanic White: 27%  Non-Hispanic Black: 51%  Non-Black Hispanic: 22% |
| Dane *et al.* (2020)  Psychology  Australia | To test the role that ethnic group participation played in supporting older immigrants’ well-being as they  aged in their host country. | Older immigrants from Asia, Europe, South Africa, and the Middle East aged 63-91 | Loneliness | Immigration | Intervention | Quant  Quasi-experimental  Primary | n=66  Asian: 62.1%  European: 30.3%  South African and the Middle Eastern: 7.6% |
| de Jong Gierveld, Van der Pas and Keating (2015)  Social demography  Canada | To explore the loneliness of several groups of older immigrants in Canada compared to native-born older adults. | Natives, older immigrants of British or French origin; non-British or French European origin; non-European origin aged 65 and over | Loneliness | Immigration | Factors | Quant  Cross-sectional  Secondary survey data | n=3692  Natives: n=2988  Immigrants of British or French origin: n=269  Immigrants of non-British or French European origin: n=228  Immigrants of non-European origin: n=207 |
| De Witte and Van Regenmortel (2021)  Sociology  Belgium | To investigate the relation between loneliness and migration among older adults in Belgium by differentiating between first- and second-generation immigrants. | Natives, first- and second-generation immigrants aged 50 years and older | Loneliness | Immigration | Factors | Quant  Cross-sectional  Secondary survey data | n=4490  Natives: n=3477  First-generation immigrants: n=334  Second generation immigrants: n=323 |
| Dong and Chen (2017)  Population health  US | To: (a) examine gender differences in prevalence and symptoms of loneliness among Chinese older adults; and (b) compare gender differences in sociodemographic and health-related correlates of loneliness among U.S. Chinese older adults. | Chinese older adults aged 60 and over | Loneliness | Ethnicity/race | Factors | Quant  Cross-sectional  Primary survey | n=3135  Women: n=1819  Men: n=1316 |
| Dong *et al.* (2012)  Population health  US | To investigate the cultural understandings of loneliness, identify the contexts of loneliness, and to examine its effect on the health and well-being of U.S. Chinese older adults. | Chinese older adults aged 60 and over | Loneliness | Ethnicity/race | Lived experience | Qual  Open-ended questions in survey and focus groups  Primary | n=78 |
| Ehsan *et al.* (2021)  Social science  Switzerland | How older locals, newcomers (internal migrants), and expats (international migrants) engaged with a community-based intervention designed to reduce loneliness in older adults residing in one Swiss town, and whether participating reduced loneliness. | Locals, newcomers and expats aged 55 and over | Loneliness | Immigration | Intervention | Mixed  Longitudinal pre/post survey  Ethnographic observation, interviews, comments section from surveys  Primary | 1) Survey: n=235  Local: n= 109  Newcomers: n= 58  Expats: n=68  2) Group meeting participants: n=40 |
| Fokkema and Naderi (2013)  Demography  Germany | To examine whether Turkish older migrants are indeed lonelier than their peers with no migration background and to determine the factors that account for the differences in loneliness between them. | Turkish and native older adults aged 50 and over | Loneliness | Immigration | Factors | Quant  Cross-sectional  Secondary survey data | n=3742  Native: n=3248 Turkey immigrants: n=494 |
| Diaz *et al.* (2019)  Health science  Canada | To investigate the roles of acculturation and family values on loneliness and social isolation among ethnic minority elders. | Asian, Latin American, Black Canadian, European and Middle Eastern adults aged 50 and older | Both | Immigration | Factors | Quant  Cross-sectional  Primary survey | n=123  Asian: n=71  Latin American: n=48  Black Canadian: n=4  European: n=11  Middle Eastern: n=18 |
| Gerst-Emerson, Shovali and Markides (2014)  Gerontology  US | To determine the prevalence and the correlates of loneliness among a community dwelling older Mexican American population. | Mexican Americans aged 80 and older | Loneliness | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=873  US-born: 54%  Foreign-born: 46% |
| Han *et al.* (2017)  Medicine  US | To test the hypotheses that (1) older Black adults with HIV would experience greater loneliness than older White adults with HIV, and (2) the association of greater loneliness with lower cognitive function would be stronger in Black adults with HIV than in White adults with HIV. | Black and white adults with and without HIV aged 50 and older | Loneliness | Ethnicity/race | Outcomes | Quant  Cross-sectional  Primary survey | n=1550  Group 1: n=370  HIV+: n=177  HIV-: n=193  Black: 68.9%  White: 31%  Group 2: without dementia or HIV  n=1180  White: n=590 Black: n=590 |
| Hinojosa *et al.* (2011)  Sociology  US | To explore the relationship between social isolation, depressive symptomatology, and the ability to manage activities of daily living poststroke for white, African American, and Puerto Rican veterans. | African American, Puerto Rican Hispanic, and non-Hispanic white male veterans who are stroke survivors and aged 41-88 | Social isolation | Ethnicity/race | Outcomes | Mixed  Longitudinal  In-depth interviews, surveys  Primary | n=77  African Americans: n=18  Puerto Rican Hispanics: n=29  non-Hispanic whites: n=30 |
| Jang *et al.* (2016)  Social work  US | To examine the prevalence of social isolation and its risk factors in older Korean Americans, focusing on both social ties to family and friends. | Korean older adults aged 60 and over | Social isolation | Both | Factors | Quant  Cross-sectional  Primary survey | n=1301 |
| Jang, Choi*, et al.* (2021)  Social work  US | To examine associations among social isolation, loneliness, and cognitive health risks in older Korean Americans, focusing on the mediating role of loneliness in the relationship between social isolation and objective and subjective measures of cognitive impairment. | Korean older adults aged 60 and over | Both | Ethnicity/race | Outcomes | Quant  Cross-sectional  Primary survey | n=2061 |
| Jang, Yoon*, et al.* (2021)  Social work  US | To examine health risks posed by social and linguistic isolation in older Korean Americans. | Korean older adults aged 60 and over | Social isolation | Immigration | Outcomes | Quant  Cross-sectional  Primary survey | n=2032 |
| Jetten *et al.* (2018)  Psychology  Australia | To understand the factors contributing to social isolation and how this then impacts on older immigrants’ capacity to age well in a foreign land. | Older immigrants from nine cultural groups (i.e., Chinese, Croatian, Dutch, El Salvadorian, German, Polish, South African with Indian origins, Spanish and Vietnamese) aged 66-92 | Social isolation | Immigration | Lived experience | Qual  In-depth interviews | n=29  Vietnamese: n=12  Chinese: n=4  Dutch: n=4 |
| Jiang *et al.* (2019)  Psychology  Canada | To examine (1) affective experience in daily solitude; and (2) the association between everyday affect in solitude and well-being, focusing on the distinct roles of culture and immigration in moderating these associations. | Native Caucasians in Canada, native Chinese in Hong Kong, Caucasian immigrants from Europe or US, Chinese immigrants aged 61-93 | Social isolation (solitude) | Immigration | Outcomes | Quant  Cross-sectional  Primary survey and time sampling | n=162  Native Caucasians in Canada: n=48  Native Chinese in Hong Kong: n=38  Immigrated Caucasians: n=33  Immigrated Chinese: n=43 |
| ten Kate, Bilecen and Steverink (2020)  Sociology  Netherlands | To examine quantitative and qualitative aspects of social relationships to better understand differences in loneliness experienced by older first-generation migrants and natives in the Netherlands. | Immigrants and natives aged 40 years and older who use formal care | Loneliness | Immigration | Factors | Quant  Cross-sectional  Secondary survey data | n=7920  Native Dutch: n=6658  Immigrants: n=1262 |
| Kim (1997)  Nursing  US | To examine whether loneliness predicts perceptions of health (i.e., emotional and physical health) of older Korean immigrants. | Older Korean immigrants aged 60 and over | Loneliness | Immigration | Outcomes | Quant  Cross-sectional  Primary survey | n=174 |
| Kim (1999b)  Nursing  US | To examine the predictors of loneliness in elderly Korean immigrant women. | Older Korean immigrant women aged 60 and over | Loneliness | Immigration | Factors | Quant  Cross-sectional  Primary survey | n=110 |
| N. S. Park *et al.* (2020)  Social work  US | To develop a typology of social engagement in older Korean immigrants in the US and compare the groups in the typology regarding their level of loneliness and self-rated health. | Older Korean immigrants aged 60 and over | Loneliness | Immigration | Factors | Quant  Cross-sectional  Primary survey | n=2149 |
| Kim (1999a)  Nursing  US | To investigate the mediating effect of emotional and tangible support between ethnic attachment and loneliness in older Korean immigrants. | Older Korean immigrants aged 60 and over | Loneliness | Immigration | Factors | Quant  Cross-sectional  Primary survey | n=174 |
| Klok *et al.* (2017)  Sociology  Netherlands | To investigate how a sense of belonging functions as protective mechanism against loneliness. | Turkish and Moroccan older immigrants aged 55–66 | Loneliness | Immigration | Factors | Quant  Cross-sectional  Secondary survey data | n=461 |
| Koehn, Ferrer and Brotman (2020)  Social gerontology  Canada | To examine how life events, timing and structural forces shape participants’ experiences of social isolation and loneliness. | Diverse immigrant older adults (i.e., two Korean: 77 and 75-year-old, one Pakistani: 76-year-old, one Filipina: 62-year-old ) | Both | Immigration | Lived experience | Qual  Case study: structural life-story narrative interviews and photovoice | n=4 |
| Kong, Davitt and Dong (2018)  Social work  US | To investigate the relationship between loneliness and cognitive functioning and examine whether depressive symptoms moderate the relationship between loneliness and cognitive functioning. | Chinese older adults aged 60 and above | Loneliness | Ethnicity/race | Outcomes | Quant  Cross-sectional  Secondary survey data | n=3051 |
| Kotwal *et al.* (2021)  Medicine  US | To assess the effect of a peer intervention in addressing loneliness, isolation, and behavioural health needs among low-income, community-dwelling older adults of diverse racial and ethnic backgrounds. | Mixed ethnicity older adults: African American, Latino, Native American, Asian, White, Multi-ethnic low-income adults aged 70 and older | Loneliness | Ethnicity/race | Intervention | Mixed  Longitudinal, survey, in-depth interviews  Primary | Participants in a 24-month study period:  6-month: n = 74 12-months: n=58  24-months: n=20.  (Total 228 individual encounters)  Interviews:  Participants: n=15  Peers: n=6 |
| Lai *et al.* (2020)  Social work  Canada | To examine the effectiveness of a peer-based intervention in reducing loneliness, social isolation, and improving psychosocial well-being with a sample of aging Chinese immigrants. | Older Chinese immigrants aged 65 and above | Loneliness | Immigration | Intervention | Quant  Randomised control parallel trial  Primary survey | n=60 |
| LaVeist *et al.* (1997)  Public health  US | To examine the effect of extreme social isolation and use of community-based senior support services (i.e., formal social support) on mortality. | African American older women aged 55-96) | Social isolation | Ethnicity/race | Outcomes | Quant  Cross-sectional  Secondary survey data | n=726 |
| Lin *et al.* (2016)  Psychology  Australia | To provide preliminary data on psychological well-being (i.e., depression, anxiety, loneliness, and quality of life) among older Chinese immigrants living in Australia. | Older Chinese immigrants and native Australians aged 65 and above | Loneliness | Immigration | Description/comparison only | Quant  Cross-sectional  Primary survey |  |
| J. Liu *et al.* (2021)  Social work  US | To examine associations between loss of friends and psychological well-being among older Chinese immigrants and whether such associations are moderated by age, gender, marital status, and social connection. | Older Chinese immigrants aged 60 and above | Loneliness | Immigration | Factors | Quant  Cross-sectional  Secondary survey data | n=3157 |
| L. Liu (2011)  Epidemiology  US | To examine the independent and joint effects of having a lack of social connections and diabetes mellitus on the risk of mortality among older white and African-American adults. | White and African American adults aged 70 and older | Social isolation | Ethnicity/race | Outcomes | Quant  Longitudinal observational  Secondary survey data | n=9106  African-American: n=1049  White: n=8057 |
| Locher *et al.* (2005)  Medicine  US | To examine the relationships between social isolation, social support, social capital and nutritional risk in older black and white women and men. | Black and White older adults aged 65 and above | Social isolation | Ethnicity/race | Outcomes | Quant  Cross-sectional  Secondary survey data | n=1000  Black: n=500  White: n=500 |
| Mannes *et al.* (2016)  Psychology  US | To test the hypothesis that there would be an association between loneliness and substance moderated by gender in HIV+ older adults. | HIV+ Black/African American men and women aged 50 and above | Loneliness | Ethnicity/race | Outcomes | Quant  Cross-sectional  Primary survey | n=96 |
| Miyawaki (2015)  Social work  US | To examine the association of social isolation and physical and mental health among Black, White and Hispanic elders in the US. | Non-Hispanic Black, non-Hispanic White and Hispanic adults aged 57-85 | Social isolation | Ethnicity/race | Outcomes | Quant  Cross-sectional  Secondary survey data | n=2923  White: n=2110  Black: n=509  Hispanic: n=304 |
| Morgan *et al.* (2020)  Public health  New Zealand | To comparatively outline the meanings of loneliness and social isolation from the perspective of four ethnically diverse groups of older adults. | Māori, Pacific, Asian, and European adults aged 65 and above or self-identifying as older | Both | Ethnicity/race | Lived experience | Qual  In-depth interviews, focus groups  Primary | n=76  Interview: n=44  Māori: n=10  Pacific: n=10  Asian: n=10  New Zealand European: n=13  Other: n=1  3 focus groups (i.e. Korean, Chinese, Mixed ethnicity focus group): n=32 |
| Ng and Northcott (2015)  Psychology  Canada | To examine the relationships between self-reported loneliness and living arrangements. | South Asian immigrants aged 60 and older | Loneliness | Both | Factors | Quant  Cross-sectional  Primary survey | n=161  India: 82%  Pakistan: 14%  Sri Lanka: 3%  Bangladesh: 1% |
| Olofsson *et al.* (2021)  Psychology  Sweden | To explore older immigrants’ experience of existential loneliness. | Older immigrants aged 65 and above | Loneliness | Immigration | Lived experience | Qual  In-depth interviews  Primary | n=15  Austrian: n=1  German: n=2  Hungarian: n=1  Iranian: n=1  Poles: n=3  Portuguese: n=1  Serbs: n=5  Slovenian: n=1 |
| Pan *et al.* (2021)  Psychology  Belgium, Netherlands | What are the consequences of the coronavirus pandemic for older Chinese immigrants in terms of increased loneliness and its risk factors and protective factors?  Which risk and protective factors have contributed to the incidence and prevention of higher loneliness levels? | Chinese immigrants aged 50 and older | Loneliness | Immigration | Factors | Quant  Cross-sectional  Primary survey | n=98 |
| Panagiotopoulos, Walker and Luszcz (2013)  Public health  Australia | To examine the well-being (i.e. self-rated health, depression and loneliness) of older immigrant widows from two groups in South Australia. | British-born and Greek-born widowed immigrants aged 60 and older | Loneliness | Both | Factors | Quant  Cross-sectional  Primary survey | n=121  British-born: n = 61  Greek-born: n = 60 |
| H. J. Park *et al.* (2019)  Social work  New Zealand | To further develop a conceptual understanding of loneliness and social isolation from the perspective of older Asian immigrants themselves. | Chinese or South Korean immigrants aged 65 and older and who immigrated in their old age to join adult children | Both | Both | Lived experience | Qual  In-depth interviews, focus groups  Primary | n=25  Interviews: n=10  Focus groups: older adults n=10; Chinese professionals n=5 |
| N. S. Park *et al.* (2017)  Social work  US | To explore the relations of living alone, loneliness, and depressive symptoms adjusted for socio-demographic characteristics, health, and general social integration characteristics. | Older Korean adults aged 60 and above | Both | Ethnicity/race | Outcomes | Quant  Cross-sectional  Primary survey | n=209 |
| N. S. Park *et al.* (2013)  Social work  US | To conceptualise loneliness as a mediator in the relation between social engagement and depressive symptoms and explore gender differences in the mediation model. | Older Korean adults aged 60 and above | Both | Ethnicity/race | Outcomes | Quant  Cross-sectional  Primary survey | n=674 |
| Salma and Salami (2020)  Nursing Canada | To understand the experiences of healthy ageing in Muslim communities in an urban centre in Alberta. | People aged 55 and older and self-identified as Muslim. | Both | Ethnicity/race | Lived experience | Qual  Interviews, focus groups  Primary | n=67  Interviews: n=23  7 focus groups.  Muslim older adults: n=51  Stakeholders (i.e., religious leaders, service providers, community volunteers/leaders): n=16 |
| Simon *et al.* (2014)  Medicine  US | To describe the overall prevalence of loneliness, identify the prevalence of specific symptoms, and examine loneliness prevalence by various socio-demographic characteristics among Chinese older adults in the United States. | Chinese older adults aged 60 and over | Loneliness | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=3129 |
| Sol *et al.* (2021)  Psychology  US | To examine whether the association between reading ability and episodic memory is moderated by loneliness and whether these associations differ by race. | Non-Hispanic White and non-Hispanic Black older adults aged 65 and over | Loneliness | Ethnicity/race | Outcomes | Quant  Cross-sectional  Secondary survey data | n=425 |
| H. O. Taylor and Nguyen (2020)  Social work  US | To determine whether race moderated the relationship between loneliness and depressive symptoms. | Black and white older adults aged 54 and over | Loneliness | Ethnicity/race | Outcomes | Quant  Cross-sectional  Secondary survey data | n=6469 |
| R. J. Taylor, Chatters and Taylor (2019)  Social work  US | To investigate the correlates of objective social isolation among older African Americans, Black Caribbean immigrants, and non-Hispanic Whites. | African Americans, non-Hispanic Whites and Black Caribbeans aged 55 and older | Social isolation | Ethnicity/race | Description/comparison only | Quant  Cross-sectional  Secondary survey data | n=1439  African American: n=837  Black Caribbean: n=304  non-Hispanic White: n=298 |
| Tomaka, Thompson and Palacios (2006)  Public health  US | To examine relations between social isolation, loneliness, and social support to health outcomes in a sample of New Mexico seniors. | Caucasian and Hispanic adults aged 60 and older | Both | Ethnicity/race | Outcomes | Quant  Cross-sectional  Secondary survey data | n=755  Caucasian: 72%  Hispanic: 23%  Others: 5% |
| Jamieson *et al.* (2018)  Medicine  New Zealand | To explore the patterns of living arrangements, ethnicity and loneliness amongst older adults living at home. | Asian, European, Māori, Pasifika adults aged 65 and older and who are frail or at-risk-of frail | Loneliness | Ethnicity/race | Description/comparison only | Quant  Cross-sectional  Secondary survey data | n=71859  Māori: n=3897  Pasiﬁka: n=2225  Asian: n=1658  European: n=63535  Other: n=544 |
| Uysal-Bozkir *et al.* (2017)  Psychology  Netherlands | To focus on Turkish, Moroccan, and Surinamese older adults living in the Netherlands and to (a) translate the DJGLS into their home-country language and (b) evaluate psychometric properties of the DJGLS to assess its cross-cultural validity. | Turkish, Moroccan, and Surinamese descent immigrants and native Dutch aged 55 and older | Loneliness | Ethnicity/race | Measurement | Quant  Cross-sectional  Secondary survey data | n=1078  Turkish: n=215  Moroccan: n=138  Surinamese Creole: n=172  Surinamese Hindustani: n=65  Native Dutch: n=488 |
| van Tilburg and Fokkema (2021)  Sociology  Netherlands | To examine whether differences in loneliness between Moroccan, Turkish and Dutch origin can be understood based on three factors: in comparison with non-migrants, migrants (1) have a different understanding of the concept of loneliness and report loneliness relatively quickly; (2) have higher loneliness-related risks; and (3) suffer more severe consequences when protective factors are lacking. | Moroccan, Turkish immigrants and native Dutch aged 55 and older | Loneliness | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=703  Native Dutch: n=292  Moroccan: n=176  Turkish: n=235 |
| Vang, Thor and Sieng (2021)  Social work  US | To explore the factors influencing loneliness in the premigration, displacement, and postmigration phases among older Hmong refugees. | Hmong older adults aged 65 and older with a refugee background | Loneliness | Both | Lived experience | Qual  In-depth interviews  Primary | n=17 |
| Victor, Burholt and Martin (2012)  Gerontology  UK | To consider the prevalence of loneliness amongst older people from the key minority groups (i.e., Indian, Pakistani, Bangladeshi, African Caribbean, and Chinese) growing old in Britain and draw explicit comparisons for these groups with the prevalence of loneliness reported for the general population and with older people in their countries of origin. | African, Chinese, Caribbean, Indian, Pakistani and Bangladeshi people aged 65 years and over | Loneliness | Ethnicity/race | Description/comparison only | Quant  Cross-sectional  Secondary survey data | n=469  Group 1: n=300  Indian: n=50  Pakistani: n=50  Bangladeshi: n=50  African: n=50  Chinese: n=50  Caribbean: n=50  Group 2: n=169  Punjabi: n=66  Gujarati: n=55  Sylheti: n=48 |
| Victor *et al.* (2021)  Gerontology  UK | To explore the utility of two standard measurement tools (i.e. six-item DJG scale and a single-item question) and the prevalence of loneliness for mid-life and older adults from six different ethnic minority groups resident in England and Wales. | Black Caribbean, Black African, Indian, Pakistani, Bangladeshi, Chinese adults aged 40 and older | Loneliness | Ethnicity/race | Factors/ Measurement | Quant  Cross-sectional  Primary survey | n=1206  Black Caribbean: n=224  Black African: n=215  Indian: n=201  Pakistani: n=211  Bangladeshi: n=199  Chinese: n=156 |
| Wang and Dong (2018)  Public health  US | To examine the associations between personality traits (i.e. neuroticism and conscientiousness) and the lonely feelings within Chinese older adults. | Chinese older adults aged 60 and over | Loneliness | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=3157 |
| Weeks and Cuellar (1983)  Demography  US | Is older people who have migrated are more socially isolated than other older people?  Do people who have lived in an area for a long time enjoy greater integration into a social network when they grow old than those who arrived more recently? | People aged 60 and older from ten ethnic groups (Black, Hispanic, Pilipino, Guanmanian, Samoan, Japanese, Chinese, Korean, American Indian, and nonminority) | Social isolation | Both | Factors | Quant  Cross-sectional  Primary survey | n=1139  Hispanic: n=235  Black: n=231  Pilipino: n=74  Samoan: n=58  Guamanian: n=65  Japanese: n=109  Chinese: n=57  Korean: n=54  American Indian: n=89  Nonminority: n=167 |
| Weng (2019)  Social work  US | To focus on the development and implementation of intergenerational programs as examples of an Asian American community’s response to older adult isolation and loneliness. | Older Asian American adults | Both | Ethnicity/race | Intervention | Qual  Case study: observations,  documents, in-depth interviews  Primary | Case: n=2  Interviews: n=7 |
| Wippold *et al.* (2021)  Psychology  US | To examine the impact of perceived stress and loneliness on the health-related quality of life of low-income senior African Americans | Older low-income African Americans aged 60 and over | Loneliness | Ethnicity/race | Outcomes | Quant  Cross-sectional  Primary survey | n=281 |
| Wu and Penning (2015)  Sociology  Canada | To examine the effects of immigrant status as well as immigrant generation, length of residence in Canada and race/ethnicity on loneliness among older adults. | Older immigrants and Canadian-born people aged 60+ from different ethnic groups (i.e., French, other European origin, Chinese, South Asian, British/French and other, Other, British Isles) | Loneliness | Both | Factors | Quant  Cross-sectional  Secondary survey data | n=10553  Immigrants: n=2012  Canadian-born: n=8541 |
| Ip, Lui and Chui (2007)  Sociology  Australia | To ascertain the problems encountered by older Chinese Australians in their daily lives and social activities. | Chinese immigrants aged 60 and older | Both | Both | Lived experience | Mixed  Survey, focus groups  Primary | Survey: n=74  5 Focus group: n=42 (older Chinese adults: n=34; service providers: n=8) |
| Dong, Zhang and Chang (2015)  Population health  US | To examine the association between ﬁlial piety and loneliness among Chinese older adults in the U.S. | Chinese older adults aged 60 and over | Loneliness | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=3159 |
| Creecy, Wright Jr and Berg (1983)  Social work  US | To examine the relationship of selected demographic, activity and social-psychological variables to feelings of loneliness among a national sample of non-institutionalized black elderly. | Black adults aged 55 and older | Loneliness | Ethnicity/race | Factors | Quant  Cross-sectional  Secondary survey data | n=479 |
| Lam (2021)  Sociology  Australia | Whether older adults from a migrant or Indigenous background report variation in loneliness, as compared with the majority native-born, non-Indigenous group?  How the neighbourhood as a social environment might shape loneliness?  Whether and how variation in the neighbourhood environment could explain any observed differences in loneliness across ethnic–migrant groups? | Australia-born, non-Indigenous adults, immigrants from English-speaking countries, immigrants from non-English-speaking countries, Australia-born, Indigenous adults aged 50 and older | Loneliness | Immigration | Factors | Quant  Cross-sectional  Secondary survey data | n=9305  Australia-born, non-Indigenous respondents: 68%;  Immigrants from English-speaking countries: 15%;  Immigrants from non-English-speaking countries: 16%;  Australia-born, Indigenous respondents: 2% |

1The discipline of the first author.

Supplementary Material S3: National Database used in the included studies

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| **National Database** | **Country** | **Description** | **Studies using this database** |
| Health and Retirement Study (HRS) | US | A nationally representative longitudinal study of Americans aged 50 and older, including demographics, health, and cognitive measures | Byrne *et al.* (2021), H. O. Taylor and Nguyen (2020) |
| The National Survey of American Life: Coping with Stress in the 21st Century (NSAL) | US | A national survey investigating mental disorders among national samples of the black and non-Hispanic white populations | R. J. Taylor, Chatters and Taylor (2019), Chatters *et al.* (2018) |
| The Longitudinal Studies of Aging (LSOAs) | US | A longitudinal study with a nationally representative sample of persons aged 70 and over to measure changes in health, functional status, living arrangements, and health services utilization | L. Liu (2011), LaVeist *et al.* (1997) |
| National Social Life, Health, and Aging Project (NSHAP) | US | A longitudinal, population-based study of health and social factors consisting of a nationally representative sample of community-dwelling adults aged  from 57 to 85 | Miyawaki (2015) |
| General Social Survey | Canada | An annual national survey that gathers individual- and household-level data to monitor changes in the social conditions and wellbeing of Canadians | de Jong Gierveld, Van der Pas and Keating (2015), Wu and Penning (2015) |
| Longitudinal aging study Amsterdam (LASA) | Netherlands | A longitudinal, population-based study of predictors and consequences of ageing, studying the physical, emotional, cognitive and social functioning of older adults (aged 55-84 at baseline data collection) | van Tilburg and Fokkema (2021), Klok *et al.* (2017) |
| Household, Income, and Labour Dynamics in Australia (HILDA) Survey | Australia | A household-based, ongoing annual longitudinal study collecting information about economic and social well-being, labour market and family life from individuals aged 15 and  older living in the same households | Lam (2021) |
| Home Care International Residential Assessment Instrument (interRAI-HC） | New Zealand | A standardised instrument that is used to produce clinically assessed needs and risk profiles, consisting of 236 questions over twenty domains and covering approximately 90% of all frail or at-risk-of-frail older adults | Jamieson *et al.* (2018), Beere, Keeling and Jamieson (2019) |
| Belgian Survey of Health, Ageing and Retirement in Europe (SHARE) | Belgium | A cross-national and longitudinal survey conducted in 20 European countries and Israel, containing data about life domains of community-dwelling older adults aged 50 and older | De Witte and Van Regenmortel (2021) |
| German Generations and Gender Survey (GGS) | Germany | A survey focused on the relationship between generations (i.e. children and parents) and in couples (i.e. gender) of non-institutionalised individuals aged 18-79 from 19 countries. | Fokkema and Naderi (2013) |

Supplementary Material S4-1: Focus of studies

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| **Predictors**  **n=34**  Adams Jr, Kaufman and Dressler (1989), Ajrouch (2008), Albert (2021), Ali *et al.* (2021), Beere, Keeling and Jamieson (2019), Burholt and Dobbs (2014), Byrne *et al.* (2021), Chatters *et al.* (2018), Compernolle *et al.* (2021), de Jong Gierveld, Van der Pas and Keating (2015), De Witte and Van Regenmortel (2021), Dong and Chen (2017), Fokkema and Naderi (2013), Diaz *et al.* (2019), Gerst-Emerson, Shovali and Markides (2014), Jang *et al.* (2016), ten Kate, Bilecen and Steverink (2020), Kim (1999b), N. S. Park *et al.* (2020), Kim (1999a), Klok *et al.* (2017), J. Liu *et al.* (2021), Ng and Northcott (2015), Pan *et al.* (2021), Panagiotopoulos, Walker and Luszcz (2013), Simon *et al.* (2014), van Tilburg and Fokkema (2021), Victor *et al.* (2021), Wang and Dong (2018), Weeks and Cuellar (1983), Wu and Penning (2015), Dong, Zhang and Chang (2015), Creecy, Wright Jr and Berg (1983), Lam (2021) | **Outcomes**  **n=18**  Han *et al.* (2017), Hinojosa *et al.* (2011), Jang, Choi*, et al.* (2021), Jang, Yoon*, et al.* (2021), Jiang *et al.* (2019), Kim (1997), Kong, Davitt and Dong (2018), LaVeist *et al.* (1997), L. Liu (2011), Locher *et al.* (2005), Mannes *et al.* (2016), Miyawaki (2015), N. S. Park *et al.* (2017), N. S. Park *et al.* (2013), Sol *et al.* (2021), H. O. Taylor and Nguyen (2020), Tomaka, Thompson and Palacios (2006), Wippold *et al.* (2021) | | **Lived Experiences**  **n=14**  Berthold *et al.* (2018), Cela and Fokkema (2017), Ciobanu and Fokkema (2017), Ciobanu and Fokkema (2021), Wright-St Clair and Nayar (2020), Dong *et al.* (2012), Jetten *et al.* (2018), Koehn, Ferrer and Brotman (2020), Morgan *et al.* (2020), Olofsson *et al.* (2021), H. J. Park *et al.* (2019), Salma and Salami (2020), Vang, Thor and Sieng (2021), Ip, Lui and Chui (2007) | |
| **Prevalence Description/Comparison**  **n=5**  Lin et al. (2016), Victor et al. (2012), Taylor et al. (2019), Jamieson et al. (2018), Ip et al. (2007) | **Intervention Programme Evaluation**  **n=5**  Dane *et al.* (2020), Ehsan *et al.* (2021), Kotwal *et al.* (2021), Lai *et al.* (2020), Weng (2019) | | **Measurement Validation**  **n=2**  Uysal-Bozkir *et al.* (2017), Victor *et al.* (2021) |

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| **Studies focus on predictors of loneliness or social isolation n=34** | | | | |
| **References** | | **Predictors** | | **Outcomes** |
| Adams Jr, Kaufman and Dressler (1989) | | Social participation, sociodemographic factors (i.e. sex, age, education, marital status), health status (i.e. self-rated heath, number of health problems), functional status. | | Social isolation |
| Ajrouch (2008) | | Acculturation, support from adult children, sociodemographic factors (i.e. gender, age, education, marital status), self-rated health. | | Loneliness, social isolation |
| Albert (2021) | | Cultural belonging: cultural attachment to both country of host and orgin, bicultural identity orientation, acculturative stress.  Intergenerational belonging: family cohesion, family conflict, perceived intergenerational value consensus. | | Loneliness |
| Ali *et al.* (2021) | | Living status: living alone, living close to family/friends.  Acculturation: Time in US, citizenship status, English proficiency.  Health status: have a primary care doctor, self-rated health.  Finance: annual household income, source of personal income (from savings, social security, or employment), household ownership.  Socioemographic factors: age, gender, education, country of birth | | Loneliness, depression, emotional distress |
| Beere, Keeling and Jamieson (2019) | | Urban/rural status, ethnicity, socioeconomic deprivation, living alone, carer stress, negative social interaction | | Loneliness |
| Burholt and Dobbs (2014) | | Types of support networks | | Loneliness, social isolation |
| Byrne *et al.* (2021) | | Race, urban/rural, social technology use, perceived social support, perceived social negativity, social engagement, social contact | | Loneliness |
| Chatters *et al.* (2018) | | Sociodemographic factors: age, race/ethnicity, gender, family income, education, marital  status, household status.  Functional status, self-rated health, quality of family and friend relationships. | | Social isolation |
| Compernolle *et al.* (2021) | | Sociodemographic factors: age, gender, race/ethnicity, education.  Physical Context (Location): at home, in transit (any form), at work, and someplace else.  Social Context: whether the participant was with a spouse/partner, family member, friend, pet, or other.  Household composition: lived alone and household size.  Self-rated health, marital status, employment status. | | Momentary loneliness |
| de Jong Gierveld, Van der Pas and Keating (2015) | | Social context factors: number of, frequency of communication, satisfaction of frequency of communication with relatives and friends.  Community context factors: community organisation participation, informal involvement in the neighborhood, sense of belonging to the local community.  Socio-Cultural Embeddedness factors: composition of friend network (i.e., language speaking, different ethnic friends), sense of belonging to the host country (i.e., Canada) | | Loneliness |
| De Witte and Van Regenmortel (2021) | | Immigration status (i.e., natives, first-generation, second-generation immigrants), migration region, length of residence.  Health factors: self-rated health, the number of mobility limitations, depression, memory.  Sociodemographic factors: age, gender, living alone, the number of children, education, income.  Number of social activities, network size. | | Loneliness |
| Dong and Chen (2017) | | Sociodemographic factors: age, gender, education, income, marital status, number of children/grandchildren, living arrangement.  Years in the community/US, quality of life, self-rated health, health change over the last year. | | Loneliness |
| Fokkema and Naderi (2013) | | Health: self-rated health, objective health status.  Socioeconomic factors: education, employment, perceived financial difficulties, satisfaction with housing.  Social embeddedness in family: whether having partner, relationship quality with partner, children co-reside, frequency of contacts and quality of relationship with non-co-reside children.  Informal support exchange: emotional support received & given, personal care received & given, financial support received & given, look after grandchildren | | Loneliness |
| Diaz *et al.* (2019) | | Familism (i.e., family as referents), acculturation. | | Loneliness, social isolation (i.e., social network) |
| Gerst-Emerson, Shovali and Markides (2014) | | Sociodemographic factors: age, gender, foreign-born/US-born, education.  Linguistic preference (i.e., using language of interview).  Health: self-rated health, activities of daily living (ADLs) limitation, cognitive impairment, depressive symptoms.  Marital status, living alone, interpersonal and family relationships with relatives. | | Loneliness |
| Jang *et al.* (2016) | | Sociodemographic factors: age, gender, marital status, living arrangement (living alone), education, perceived financial status.  Health: Chronic conditions, functional impairment, self-rated health.  Length of stay in the host country (i.e., US), English proficiency. | | Social isolation |
| ten Kate, Bilecen and Steverink (2020) | | Social satisfaction: satisfaction with social relationships in general, satisfaction with the living arrangement, satisfaction with friends and acquaintances.  Social activities/participation, living arrangement, contact frequency (with relatives, friends and acquaintances, and neighbours), relationship quality with the partner. | | Loneliness |
| Kim (1999b) | | Social network size, satisfaction with social support,  ethnic attachment, functional status. | | Loneliness |
| N. S. Park *et al.* (2020) | | Social participation. | | Loneliness, self-rated health |
| Kim (1999a) | | Ethnic attachment, social support (i.e., emotional and tangible support) as mediator. | | Loneliness |
| Klok *et al.* (2017) | | National belonging to the mainstream society, national belonging to the own group, transnational belongings. | | Loneliness |
| J. Liu *et al.* (2021) | | Loss of friends, gender, age, marital status.  Social connection: number of friends, social participation, social support. | | Loneliness, depressive symptoms, quality of life |
| Ng and Northcott (2015) | | Living arrangements, time spent alone at home, the frequency of eating with household members, driving licence, English proficiency, family relationship. | | Loneliness |
| Pan *et al.* (2021) | | Change of social contacts: reduced in-person contact with children/non-kin, increased non-in-person contact with children/other kin/non-kin.  Reduced social participation, increased participation in individual activities.  Fear of becoming infected, financial insecurity. | | Increased loneliness |
| Panagiotopoulos, Walker and Luszcz (2013) | | Mourning rituals, continuing bonds, religiosity.  Social support: emotional and instrumental support from family (i.e., children and relatives) and from friends. | | Loneliness, self-rated health, depressive symptoms. |
| Simon *et al.* (2014) | | Sociodemographic factors: age, sex, education, income, marital status, number of children, living arrangement.  Years in the US, years residing in the current community.  Self-rated health, quality of life, health changes over last year. | | Loneliness |
| van Tilburg and Fokkema (2021) | | Gender, age, mastery.  Social relationships: marital status; size of household; number of children; contact frequency with children/grandchildren, other relatives, friends, acquaintances, neighbours and others in the neighbourhood, relationships with co-ethnicities, native-Dutch or others.  Socio-economic status: education, income, income satisfaction.  Social participation: whether worked, member of organisation, Internet usage, church/mosque attendance.  Health status: self-rated health, the number of chronic diseases, functioning status, cognitive function, depressive symptoms. | | Loneliness |
| Victor *et al.* (2021) | | Sociodemographic factors: age, gender, marriage status, number of children.  Financial strain, self-rated health, ethnicity. | | Loneliness |
| Wang and Dong (2018) | | Personality: neuroticism, conscientiousness. | | Loneliness |
| Weeks and Cuellar (1983) | | Native-born/foreign-born, length of residence, ethnicity, language barrier, size of social support network, education, income, whether immigrate as a follower of children. | | Social isolation |
| Wu and Penning (2015) | | Immigration generation (i.e., first/1.5/second-generation), years in Canada, race/ethnicity, age (i.e., young-old, middle-old, oldest-old). | | Loneliness |
| Dong, Zhang and Chang (2015) | | Filial piety: expectation and perceived receipt of respect, happiness, care, greetings, obedience, and financial support. | | Loneliness |
| Creecy, Wright Jr and Berg (1983) | | Demographic factors: age, sex and marital status.  Activity: number of contacts with relatives and close friends, time spent working/reading/watching television/hobbies, participation in clubs/fraternal/community organisations.  Social-psychological factors: fear of crime, not enough friends, not feeling needed, poor health and financial inadequacy. | | Loneliness |
| Lam (2021) | | Ethnic–migrant status (i.e., Non-Indigenous Australians/Indigenous Australians/English-speaking-country-origin immigrants/non-English-speaking-origin immigrants.  Neighbourhood characteristics: neighbourhood sociality, neighbourhood conditions, satisfaction with the neighbourhood (i.e., with its safety, the neighbourhood itself, and “feeling part of local community”). | | Loneliness |
| **Studies focus on outcomes that affected by loneliness and/or social isolation n=18** | | | | |
| **References** | | **Outcomes** | **Predictors** | |
| Han *et al.* (2017) | | Cognitive function | Loneliness | |
| Hinojosa *et al.* (2011) | | Depressive symptoms, functional independence | Social isolation | |
| Jang, Choi*, et al.* (2021) | | Cognitive function | Social isolation, loneliness as mediator | |
| Jang, Yoon*, et al.* (2021) | | Self-rated health, mental distress, cognitive function | Social isolation, linguistic isolation | |
| Jiang *et al.* (2019) | | Well-being | Social isolation (i.e., solitude-positive and solitude-negative affect) | |
| Kim (1997) | | Life satisfaction, self-rated health, emotional health | Loneliness | |
| Kong, Davitt and Dong (2018) | | Cognitive function | Loneliness, depressive symptoms | |
| LaVeist *et al.* (1997) | | Mortality | Social isolation, use of community senior services | |
| L. Liu (2011) | | Mortality | Social isolation (i.e., lack of social connections), diabetes | |
| Locher *et al.* (2005) | | Nutritional risk | Social isolation, social support, social capital | |
| Mannes *et al.* (2016) | | Substance use | Loneliness, gender as moderator | |
| Miyawaki (2015) | | Self-rated physical health, self-rated mental health | Social isolation | |
| N. S. Park *et al.* (2017) | | Depressive symptoms | Living alone, loneliness as mediator | |
| N. S. Park *et al.* (2013) | | Depressive symptoms | Social engagement (i.e., living arrangement, social network, social participation), loneliness as mediator | |
| Sol *et al.* (2021) | | Cognitive function | Loneliness, reading ability, loneliness as mediator | |
| H. O. Taylor and Nguyen (2020) | | Depressive symptoms | Loneliness, race as moderator | |
| Tomaka, Thompson and Palacios (2006) | | Disease diagnosis: diabetes, hypertension, heart disease, liver disease, arthritis, emphysema, tuberculosis, kidney disease, cancer, asthma, and stroke. | Subjective and objective social isolation, loneliness, family support, belongingness social support | |
| Wippold *et al.* (2021) | | Health-related quality of life | Loneliness, perceived stress | |
| **Studies only describe or compare loneliness and/or social isolation prevalence n=5** | | | | |
| **References** | **Description** | | | |
| Lin *et al.* (2016) | | Comparison of psychological well-being (i.e., depression, anxiety, loneliness and quality of life) between older Chinese immigrants and older Australian-born people. | | |
| Victor, Burholt and Martin (2012) | | Description of the loneliness prevalence of older Indian, Pakistani, Bangladeshi, African Caribbean and Chinese adults in the UK and comparison of these groups with the general British older adults and their peers in their countries of origin. | | |
| R. J. Taylor, Chatters and Taylor (2019) | | Comparison of eight indicators of objective social isolation (i.e., isolated from neighbours, neighbourhood groups, congregational members, family members, friends, and being childless, living alone, being unmarried and no romantic relationship) among older African Americans, Black Caribbeans, and Non-Hispanic White in the US. | | |
| Jamieson *et al.* (2018) | | Descriptive profile of living arrangements and loneliness of older adults from 5 ethnic groups (i.e., European, Māori, Pasifika, Asian and other) in New Zealand. | | |
| Ip, Lui and Chui (2007) | | Descriptive profile of loneliness, social contact, emotional and social needs of older Chinese immigrants in Brisbane, Australia. | | |
| **Studies explore lived experiences of loneliness and/or social isolation n=14** | | | | |
| **References** | **Description** | | | |
| Berthold *et al.* (2018) | | Lived experiences of social isolation and its possible solutions from Cambodian community leaders’ perspectives in the US. | | |
| Cela and Fokkema (2017) | | Lived experiences of loneliness and its perceived causes of older Albanian and Moroccan immigrants in Italy. | | |
| Ciobanu and Fokkema (2017) | | Lived experiences of loneliness and its perceived causes, religion’s protective role and other coping styles of older Romanian immigrants in Switzerland. | | |
| Ciobanu and Fokkema (2021) | | Lived experiences of loneliness and coping strategies in times during communism, migration, and in later life of Romanian older migrants who fled communism and aged in place in Switzerland. | | |
| Wright-St Clair and Nayar (2020) | | Lived experiences of loneliness and social connectedness of later-life Chinese, Indian and Korean immigrants in New Zealand. | | |
| Dong *et al.* (2012) | | Lived experiences of loneliness, perception, perceived determinants, and perceived negative effects of loneliness of older Chinese adults in the US. | | |
| Jetten *et al.* (2018) | | Lived experiences of social isolation, its perceived contribution factors, and its impacts on older immigrants’ capacity to ageing well in a foreign land (i.e., Australia). | | |
| Koehn, Ferrer and Brotman (2020) | | Lived experiences of loneliness and social isolation of older immigrants in Canada, and how life events, timing and structural factors shape such experiences. | | |
| Morgan *et al.* (2020) | | Four ethnically diverse groups of older adults (i.e., Māori, Pacific, Asian, and NZ European) in New Zealand tell the meanings of loneliness and social isolation from their perspectives and lived experiences. | | |
| Olofsson *et al.* (2021) | | Lived experiences of existential loneliness of older immigrants in Swedish nursing homes or senior citizen centres. | | |
| H. J. Park *et al.* (2019) | | Lived experiences, perceptions and coping strategies of social isolation and loneliness of older Chinese or Korean-speaking immigrants in New Zealand. | | |
| Salma and Salami (2020) | | Lived experiences of social isolation, social exclusion and loneliness of Muslim immigrants in Canada and their proactive counter-measures. | | |
| Vang, Thor and Sieng (2021) | | Premigration, displacement, and postmigration experience of loneliness of Hmong older adults with refugee backgrounds in the US and its perceived influencing factors. | | |
| Ip, Lui and Chui (2007) | | Lived experiences of social contacts and social isolation of older Chinese immigrants in Australia, restrictions in their activities and their needs. | | |
| **Studies examine the effectiveness of intervention programmes for loneliness and/or social isolation n=5** | | | | |
| **References** | **Description** | | | |
| Dane *et al.* (2020) | | A quasi-experimental study investigates the impact of heritage culture group activity participation on older immigrants’ loneliness, happiness living in Australia, and closeness to people of the same heritage culture. | | |
| Ehsan *et al.* (2021) | | A longitudinal embedded mixed-methods study investigates the awareness of community-based interventions and their effectiveness and mechanism in reducing loneliness for older local, internal migrant, and immigrant older adults in Switzerland. | | |
| Kotwal *et al.* (2021) | | A longitudinal mixed-method study assesses the effect of a peer intervention in addressing loneliness and isolation for older adults of diverse racial and ethnic backgrounds in the US. | | |
| Lai *et al.* (2020) | | A randomized controlled trial examines the effectiveness of a peer-based intervention in reducing loneliness, social isolation, and improving psychosocial well-being for older Chinese immigrants in Canada. | | |
| Weng (2019) | | A case study examines the development and implementation of two intergenerational programmes that aim to prevent loneliness and social isolation in an Asian American community. | | |
| **Studies validate loneliness** **measurement n=2** | | | | |
| **References** | **Description** | | | |
| Uysal-Bozkir *et al.* (2017) | | Translation and validation of the De Jong Gierveld Loneliness Scale (DJGLS) in older Turkish, Moroccan and Surinamese immigrants in the Netherlands. | | |
| Victor *et al.* (2021) | | Validation of the six-item De Jong Gierveld and single-item loneliness scales in 6 ethnic minority older groups (i.e., Black Caribbean, Black African, Indian, Pakistani, Bangladeshi, Chinese) in the UK. | | |

Supplementary Material S4-2: Frequency of factors investigated in either quantitative or qualitative studies

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| **Factors in quantitative studies** | **Frequency** | **Factors in qualitative studies** | **Frequency** |
| Gender | 14 | Discrimination | 7 |
| Education | 13 | Transportation | 7 |
| Social contact frequency | 8 | Meeting place | 6 |
| Race/ethnicity | 7 | Don't want to burden family | 5 |
| Country of birth | 6 | Cultural barriers | 5 |
| Familism | 2 | Positive psychology | 5 |
| Immigration generation | 2 | Community-based organisation | 4 |
| Employment | 2 | Negative psychology | 4 |
| Mastery | 2 | Social exclusion from mainstream society | 4 |
| Acculturation | 2 | Disconnection with family | 3 |
| Quality of life | 2 | Relativisation | 3 |
| Urban/rural | 2 | Gender norms | 3 |
| Immigration reason (follower of children) | 1 | Solitary | 3 |
| Physical context | 1 | Past experiences | 2 |
| Citizenship | 1 | Ageism | 2 |
| Socioeconomic deprivation | 1 | Immigration policy | 1 |
|  |  | Dispersal | 1 |
|  |  | Nights/weekends | 1 |
|  |  | Uncertainty about future care | 1 |
|  |  | Near to death | 1 |
|  |  | Bilingual professionals | 1 |
|  |  | Family structures & customs changes | 1 |
|  |  | Trauma | 1 |
|  |  | War & violence | 1 |
|  |  | Non-recognition of education & status | 1 |
|  |  | Integration to new country | 1 |
|  |  | High expectations | 1 |
|  |  | Political environment | 1 |
|  |  | Acceptance | 1 |
|  |  | Elder mistreatment | 1 |
|  |  | Ethnic-specific service availability | 1 |
|  |  | Personal appearance | 1 |
|  |  | Retirement | 1 |
|  |  | Place-mountain/hill | 1 |
|  |  | Pension | 1 |

*Note: The control variables as stated in included quantitative studies are not included in this record.*

Supplementary Material S5-1: Definition and measurement

|  |  |  |  |
| --- | --- | --- | --- |
| **Social Isolation Studies** | | | |
| **Author(s)** | **Definition** | **Measurement** | |
| Adams Jr, Kaufman and Dressler (1989) | Not Given (NG) | Ad hoc index  1) Kin interaction: the frequency of interaction with relatives.  2) Non-kin interaction: the frequency of interaction with friends and neighbours.  3) Affective isolation: the feelings of loneliness expressed by the respondents. | |
| Berthold *et al.* (2018) | Social isolation: “both subjective and objective components.”  Subjective social isolation: “self-report of loneliness and isolation.”  Objective social isolation: “those who are socially disconnected from others, as measured by living alone, having a small social network, being unmarried, lack of regular participation in social activities, and limited contact with family and friends.” (p.811) | Open-ended interview question  Example questions: “How much do you view members of your community being homebound as a problem? People who are isolated, who don’t leave their homes much – is that a big problem in your community?” | |
| Chatters *et al.* (2018) | NG | Ad hoc index  1) Objective social isolation: the frequency of contact with family and friends.  2) Subjective social isolation: “How close do you feel towards your family members/friends?” (Very close, fairly close, not too close, not close at all). | |
| Hinojosa *et al.* (2011) | NG | Ad hoc index  1) Unavailability of others.  2) Perceptions of a lack of support from others. 3) Inability to contribute.  4) not having an intimate relationship. | |
| Jang *et al.* (2016) | NG | Revised Lubben Social Network Scale (6-item) | |
| Jang, Yoon*, et al.* (2021) | NG | Lubben Social Network Scale | |
| Jetten *et al.* (2018) | NG | Single-item self-reported question  Participants were asked to rate their perceptions of social isolation (very low, not at all, very high, totally). | |
| Jiang *et al.* (2019) | Solitude: “the objective state of being alone.” (p.1095). | Single ad hoc item  Whether participants were alone or with a social partner (‘alone’, with ‘family members’, ‘friends’, etc.). | |
| LaVeist *et al.* (1997) | Extreme social isolation: “a lack of interaction or contact with individuals within one's social network.” (p.723) | Ad hoc index  1) Living alone.  2) Not having had contact with family or friends in the 2 weeks prior to the baseline interview. | |
| L. Liu (2011) | NG | LSC score was created by the use of seven social connection measures.  Ad hoc index  1) Social communication: (a) During the past two weeks, did you talk on the phone with friends or neighbors? (b) Did you talk on the phone with relatives?  2) Social activity: during the past 2 weeks: (a) Did you get together with friends or neighbors? (b) Did you get together with relatives? (c) Did you go to a church or a temple? (d) Did you go to movies or sports? (e) Did you go out to a restaurant? | |
| Locher *et al.* (2005) | Literal meaning of social isolation: “the personal isolation of individuals from one another”. (p.2) | Ad hoc index  1) Rural versus urban residence.  2) Having an adequate transportation system (“Over the past 4 weeks, have you had any difficulty getting transportation to where you want to go?”).  3) Mobility status: the independent life–space measure. | |
| Miyawaki (2015) | Social isolation: “an objective measure that is highly associated with the subjective concept of loneliness” and “a deprivation of social contacts.” (p.2) | Ad hoc index  1) Perceived isolation: (a) feelings of loneliness (3-item Revised UCLA Loneliness Scale); (b) lack of perceived social support: the frequency of “opening up to your” and “relying on your” family members, friends, spouse/partner.  2) Social network: (a) social network size; (b) number of social network relationship types (spouse/ex-spouse, parent/parent-in-law, child/step-child, brother or sister/other relatives, friend/neighbour/co-worker/minister/other); (c) proportion of social network members in the household (do not live with, live with); (d) average frequency of interaction (talk) with network members (no  contact, every day).  3) Social participation: the frequency of (a) attending meetings of organised group; (b) getting together socially with friends and relatives; and (c) volunteering; the number of friends. | |
| R. J. Taylor, Chatters and Taylor (2019) | Objective social isolation: “the absence of relationships with other people”. (p.1430) | Ad hoc index  Objective isolation from 1) neighbours, 2) neighbourhood groups, 3) congregational members, 4) family members, 5) friends.  6) Being childless.  7) Living alone.  8) Being unmarried and no romantic relationship. | |
| Weeks and Cuellar (1983) | NG | Ad hoc index  1) Household isolation: marital status, the number of people with whom the respondent lived, whether the person regularly ate alone.  2) Neighbourhood isolation: how many friends the respondent had in the area, frequency of interaction with friends and neighbours. | |
| **Loneliness Studies** | | | |
| **Author(s)** | **Definition** | **Measurement** | |
| Albert (2021) | Loneliness: “an individual’s perceived divergence between their desired and their actual social network.” (p.300) | 3-item Revised UCLA Loneliness Scale. | |
| Ali *et al.* (2021) | NG | Single-item self-reported question:  1) Do you feel lonely sometimes?  2) Have you ever experienced any of these: loneliness; Depression; Anger; Sadness; Stress; Anxiety; Panic attacks; Posttraumatic stress disorder (PTSD); None. | |
| Beere, Keeling and Jamieson (2019) | NG | Single-item self-reported question:  A binary self-reported loneliness question. | |
| Cela and Fokkema (2017) | Loneliness: “the unpleasant experience that occurs when a person’s network of social relations is deﬁcient in some important way, either quantitatively or qualitatively” and “a subjective negative assessment of one’s relationships, because of a mismatch between a person’s actual and desired quality and number of social relations.” (p.1200) | Open-ended interview questions. | |
| Ciobanu and Fokkema (2017) | Loneliness: “unpleasant feelings arising when one perceives a discrepancy between desired and actual number and quality of social relations.” (p.200) | 11-item de Jong Gierveld Loneliness Scale.  Open-ended interview questions. | |
| Ciobanu and Fokkema (2021) | Loneliness: “an unpleasant, subjective, personal experience caused by a discrepancy between the number and quality of the relationships one desires and those one actually has.” (p.324) | 11-item de Jong Gierveld Loneliness Scale.  Open-ended interview questions. | |
| Wright-St Clair and Nayar (2020) | Loneliness: “subjective distress, or sense of detachment, when social relationships are experienced as dissatisfying or deficient in quantity and/or quality.” (p.2395) | Open-ended interview questions. | |
| Compernolle *et al.* (2021) | Loneliness: “an aversive experience that accompanies a perceived discrepancy between desired and attained social relationships.” (p.1) | Single-item self-reported question:  “Did you feel lonely?”: not at all, slightly, moderately, very), or don’t know. | |
| Dane *et al.* (2020) | NG | Single-item self-reported question:  “How lonely do you feel at this moment?” A 5-point scale (1 = not at all lonely to 5 = very lonely). | |
| de Jong Gierveld, Van der Pas and Keating (2015) | Loneliness: “an unpleasant experience resulting from a person’s evaluation that their network of social relations is inadequate in either its’ quantity or quality.” (p.253) | 6-item de Jong Gierveld Loneliness Scale. | |
| De Witte and Van Regenmortel (2021) | Loneliness: “the unpleasant experience that occurs when a person’s network of social relations is deficient in some important way, either quantitatively or qualitatively” and “the result of a cognitive process whereby individuals subjectively evaluate the quantity and quality of their relations”.  Emotional loneliness: “the absence of a meaningful, intimate and exclusive relationship (e.g., with a partner or close friend).”  Social loneliness: “the lack of an adequate, broad social network of friends and acquaintances.” (p.2) | 3-item Revised UCLA Loneliness Scale. | |
| Dong and Chen (2017) | Loneliness: “an unpleasant experience that arises when a person’s network of social relations is deficient.” (p.115) | 3-item Revised UCLA Loneliness Scale. | |
| Dong *et al.* (2012) | Loneliness: “a subjectively experienced emotional state, which is commonly related to the  unfulfilled needs in intimate and social relationships” and “is manifested by intense feelings of emptiness, abandonment, and forlornness.”  Emotional loneliness: “results from the absence or lost of a close, intimate attachment.”  Social loneliness: “a response to the absence of an accessible social network which may be experienced following relocation.”  (p.1,p3) | 3-item Revised UCLA Loneliness Scale. | |
| Ehsan *et al.* (2021) | Loneliness: “the unpleasant experience that occurs when a person feels that their network of relationships is deficient in some important way” and has both emotional and social components.”  Emotional loneliness: “occurs when an individual feels a deficiency in close emotional relationships”.  Social loneliness: “occurs when an individual does not have a broader social network, or a sense of belonging to their environment.” (p.334) | 6-item de Jong Gierveld Loneliness Scale. | |
| Fokkema and Naderi (2013) | Loneliness: “the number of persons in a network but also to the quality of contacts” and “the outcome of  evaluating the match between the amount and quality of existing relationships and one’s relationship desires.” (p.291) | 6-item de Jong Gierveld Loneliness Scale. | |
| Gerst-Emerson, Shovali and Markides (2014) | Loneliness: “the perception of discrepancy between desired and actual relationships” and “captures the personal experience of social integration.” (p.2) | 3-item Revised UCLA Loneliness Scale. | |
| Han *et al.* (2017) | NG | De Jong Gierveld Loneliness Scale.  A modified version with a focus on emotional loneliness. | |
| ten Kate, Bilecen and Steverink (2020) | Loneliness: “an unpleasant experience due to a lack of quality or quantity of social contact.”  Emotional loneliness: “may result when social relationships are not as intimate as desired.”  Social loneliness: “may arise when the number of social relationships and contact frequency are lower than the desired amount.”  (p.292) | 6-item de Jong Gierveld Loneliness Scale. | |
| Kim (1997) | Loneliness: “the unpleasant experience that occurs when an individual's network of social relationships is more deficient either quantitatively or qualitatively than desired.” (p.591) | 20-item Revised UCLA Loneliness Scale. | |
| Kim (1999b) | Loneliness: “an unpleasant experience that occurs when an individual's network of social relationships is significantly deficient in either quality or quantity.”  Emotional loneliness: “results from the absence of a close, intimate attachment.”  Social loneliness: “a response to the absence of an accessible social network.” (p.1082) | 20-item Revised UCLA Loneliness Scale. | |
| Kim (1999a) | Loneliness: “occurs when an individual’s network of social relationships is quantitatively or qualitatively less than desired.” (p.169) | 20-item Revised UCLA Loneliness Scale. | |
| N. S. Park *et al.* (2020) | Loneliness: “the subjective evaluation of one’s lack of social involvement, indicates the discrepancy between one’s actual versus ideal social engagement.” (p.302) | 3-item Revised UCLA Loneliness Scale. | |
| Klok *et al.* (2017) | Loneliness: “a situation experienced by an individual as one where there is a dissatisfying quality or quantity of personal relationships”, “concerns the subjective evaluation of actual social relationships and interactions”, and “the negative evaluation, or feelings of ‘missing’ of a particular situation and results from a deﬁciency to effectuate certain standards regarding social relationships.” (p.342) | 11-item de Jong Gierveld Loneliness Scale. | |
| Kong, Davitt and Dong (2018) | Loneliness: “an individual’s subjective experience about a lack of satisfying human relationships.” (p.1) | 3-item Revised UCLA Loneliness Scale. | |
| Kotwal *et al.* (2021) | NG | 3-item Revised UCLA Loneliness Scale. | |
| Lai *et al.* (2020) | NG | 6-item de Jong Gierveld Loneliness Scale. | |
| Lin *et al.* (2016) | NG | De Jong Gierveld Loneliness Scale | |
| J. Liu *et al.* (2021) | NG | 3-item Revised UCLA Loneliness Scale. | |
| Mannes *et al.* (2016) | Loneliness: “a feeling attributed to perceived low quantity or quality social relationships.” (p.2) | 20-item Revised UCLA Loneliness Scale. | |
| Ng and Northcott (2015) | Loneliness: “subjective state of affect that results from social isolation and feelings of being disconnected from intimate others and from social others more generally” and “is experienced when there is a relational deﬁcit, that is, the lack of relationships of the desired quantity and/or quality.” (p.554) | Sing-item, self-report question:  How often do you feel lonely? ‘never’, ‘occasionally’, ‘frequently’ and ‘all of the time’. | |
| Olofsson *et al.* (2021) | Existential loneliness:  1) “an immediate awareness of being fundamentally separated from other people and from the universe, primarily through experiencing oneself as mortal.”  2) “a deeper sense of loneliness.”  3) “the ultimate aloneness.”  4) “a part of being human that cannot be avoided during the course of life” but “can also be a peaceful positive experience if one chooses freely between a social network and solitude and lead to personal growth.” (p.1184) | Open-ended interview questions.  Example questions: “Have you experienced existential loneliness?” “What was the reason for leaving your country of origin?” “Is there anything you are missing and longing for from your country of origin?” and “What do you think about the future?” | |
| Pan *et al.* (2021) | NG | Sing-item, self-report question:  Whether participants felt more lonely because of the coronavirus pandemic. | |
| Panagiotopoulos, Walker and Luszcz (2013) | NG | 8-item UCLA Loneliness Scale. | |
| Simon *et al.* (2014) | NG | 3-item Revised UCLA Loneliness Scale. | |
| Sol *et al.* (2021) | Loneliness: “desiring companionship and the distress that accompanies a perceived lack of companionship.” (p.1004) | Short form from the NIH Toolbox-Emotion Module. | |
| H. O. Taylor and Nguyen (2020) | Loneliness: “a highly subjective and perceived state” and “the individual’s dissatisfaction with the frequency and closeness of their social contacts or the discrepancy between the relationships they have and the relationships they would like to have.” (p.2) | 3-item Revised UCLA Loneliness Scale. | |
| Jamieson *et al.* (2018) | NG | Sing-item, self-report question:  The assessment statement ‘says or indicates that he/she feels lonely’. | |
| Uysal-Bozkir *et al.* (2017) | NG | 11-item de Jong Gierveld Loneliness Scale. | |
| van Tilburg and Fokkema (2021) | Loneliness: “a negative feeling in a situation of loss and dissatisfaction with the social network” and “the outcome of a process in which a person weighs up his existing personal relationships against his own wishes and social expectations with regard to relationships.”  “If the network of relationships is too small, or the relationships are of insufficient quality, there is often loneliness.” (p.312) | 11-item de Jong Gierveld Loneliness Scale. | |
| Vang, Thor and Sieng (2021) | Loneliness: “the subjective experience of isolation, either from discrepancies in the desired or from existing relationships.” (p.3465) | Open-ended interview questions.  Example questions: ‘When you are lonely, how do you feel?’, ‘Please describe a time when you felt lonely during life in Laos’, and ‘What was going on in your life at the time?’ | |
| Victor, Burholt and Martin (2012) | Loneliness: “an unpleasant subjective experience that describes the deficit between desired and achieved levels of social interaction in terms of both quantity and/or quality of relationships and the modality of the relationships.” (p.66) | Sing-item, self-report question:  1) Rate themselves as ‘never’, ‘sometimes’, ‘often’ or ‘always’ lonely.  2) If participants were more lonely, less lonely or experiencing the about the same level of loneliness as 10 years ago and if they expected to be more/less lonely or experiencing about the same level of loneliness in 10 years time. | |
| Victor *et al.* (2021) | Loneliness: “the negative outcome of the discrepancy between an individual’s expectations and actuality of their quality and/or quantity, and potentially mode (in person, online) of social relationships.” (p.6) | Sing-item, self-report question:  How often do you feel lonely? (‘never’, ‘sometimes’, ‘often’ or ‘always’)  6-item de Jong Gierveld Loneliness Scale. | |
| Wang and Dong (2018) | Loneliness: “a pervasive condition” and “a feeling that occurs when a person’s intimate and social needs are inadequately met.” (p.1) | 3-item Revised UCLA Loneliness Scale. | |
| Wippold *et al.* (2021) | Loneliness: “a subjective sense of social isolation that results from a discrepancy between an individual’s desired sense of fulfillment from relationships and their actual sense of fulfillment from their relationships.” (p.1090) | Campaign to End Loneliness Measurement Tool (CELMT). | |
| Wu and Penning (2015) | Loneliness: “an unpleasant feeling or dissatisfaction that arises when one’s network of social relations is considered deﬁcient, either in terms of quantity or quality.” (p.65) | 6-item de Jong Gierveld Loneliness Scale. | |
| Dong, Zhang and Chang (2015) | Loneliness: “a distress experience associated with psychological and social well-being” and “caused by a lack of quality or quantity in social relationships.” (p.62) | 3-item Revised UCLA Loneliness Scale. | |
| Creecy, Wright Jr and Berg (1983) | Loneliness: “a conscious experience of separation from something or someone desired, required or needed” and “there must be experienced a need, a desire for contact, and an inability to make it.” (p.10) | Sing-item, self-report question:  “Would you say that loneliness is hardly a problem, a somewhat serious problem, or a very serious problem for you?” | |
| Lam (2021) | Loneliness: “the discrepancy between desired and actual social relationships, both in quantity and quality.” (p.1) | Sing-item, self-report question:  “I often feel very lonely.” Ranged from 1 to 7, with 1 = strongly disagree and 7 = strong agree. | |
| **Studies on Both Social Isolation and Loneliness** | | |
| **Author(s)** | **Definition** | **Measurement** |
| Ajrouch (2008) | NG | Social isolation: ad hoc index  The total number of important people the respondent named who are closest (inner circle), close (middle circle), and somewhat close (outer circle) in their lives with possible values ranging from 0 through 10.  Loneliness: single-item, self-report question  In the last two weeks, how often—if at all—did you feel lonely? Would you say Never, Seldom, Quite often, Very often, Always? |
| Burholt and Dobbs (2014) | Social isolation: “a more objective concept than loneliness” and “the absence of contact with other people at one extreme versus high levels of social contact at the other extreme.” (p.1148)  Loneliness: “an element of the social dimension of wellbeing from a discrepancy perspective” and “a subjective state of mind concerning negative feelings about the discrepancy between the desired and achieved level of social contact.” (p.1147) | Social isolation: single ad hoc item  Reported number of hours spent home alone during the day (rarely isolated: up to three hours home alone each day; isolated for most of the day: three or more hours alone each day).  Loneliness: single-item, self-report question  Whether they were lonely: never, rarely, sometimes, often or most of the time. |
| Byrne *et al.* (2021) | Social isolation: “the objective absence of others in one’s social milieu” and “having few social contacts and social connections”.  Loneliness: “perceived lack of close and meaningful social relationships” and “the subjective negative feeling of being psychologically distant from others.” (p.2) | Social isolation: ad hoc index  1) Social engagement: the frequency of engagement in seven activities (work with children or young people; do activities with grandchildren, nieces/nephews, or neighborhood children; volunteer; attend educational or training courses; go to a sport, social, or other club, participate in a local community arts group such as choir, dance,  etc.; attend meetings of non-religious organizations, such as political or community groups.  2) Social contact: the frequency with which  participants (a) meet up, (b) talk on the phone, or (c) write/email with their children, other family members, or friends.  Loneliness: 11-item Revised UCLA Loneliness Scale. |
| Diaz *et al.* (2019) | Social isolation: “a condition in which the individual lacks a sense of belonging socially, has minimal number of social contacts, and lacks social engagement” and “the objective physical separation from other individuals.”  Loneliness: “a subjective experience of feeling alone and apart from others.” (p.114-115) | Social isolation: Revised Lubben Social Network Scale.  Loneliness: UCLA Loneliness Scale (Version 1). |
| Jang, Choi*, et al.* (2021), | Social isolation: “an objective lack of interpersonal ties or contacts.”  Loneliness: “the subjectively perceived discrepancy between one’s actual and desired social relationships.” (p.2) | Social isolation: Lubben Social Network Scale− 6.  Loneliness: 3-item Revised UCLA Loneliness Scale. |
| Koehn, Ferrer and Brotman (2020) | Social isolation: “quantifiable social networks have been proposed as indicative of where people stand on a continuum ranging from social isolation (no or few meaningful ties) to social participation.”  Loneliness: “individual’s perception of a deficit in the desired number or intimacy of social relationships, that  may be experienced as a lack of a sense of belonging or social embeddedness.” (p.2) | Open-ended interview questions. |
| Morgan *et al.* (2020) | Social isolation: “an objective measure related to quantity and frequency of social contacts.”  Loneliness: “a subjective phenomenon linked with people’s perceptions about the quality of their relationships”. (p.1627) | Open-ended interview questions. |
| H. J. Park *et al.* (2019) | Social isolation: “an objective measure characterised by the quantity and frequency of social contacts.”  Loneliness: “a subjective phenomenon linked with people’s perceptions about the quality of their relationships”. (p.741) | Open-ended interview questions. |
| N. S. Park *et al.* (2017) | Social isolation: “an objective indicator of lack of social ties and  denotes limited or missing contacts with others including family and friends.”  Loneliness: “subjective perceptions about one’s social ties and contacts.” (p.304) | Social isolation: single ad hoc item  Living arrangement: living alone, living with spouse or children, or else.  Loneliness: 3-item Revised UCLA Loneliness Scale. |
| N. S. Park *et al.* (2013) | Social isolation: “lack of social contacts, a smaller social network, or lack of social interactions.”  Loneliness: “subjective evaluation of one’s social condition.” (p.193) | Social isolation (social engagement): ad hoc index  1) living arrangement: living alone or others.  2) social network consisting of family and friends networks adapted from Social Network Scale of Lubben.  3) participation in social activities: how often they participated in six activities: religious meetings, social gatherings (e.g., elder association, alumni association), senior centers, leisure or sporting activities, volunteer activities, and education/learning activities).  Loneliness: single-item, self-report question  How often have you felt lonely during the past week?: rarely or none of the time, some  or a little of the time, occasionally or a moderate amount of time, most or all of the time. |
| Salma and Salami (2020) | NG | Open-ended interview questions.  Example questions: (a) Tell me about the social connections in your daily life, (b) Describe your daily recreation and social activities, (c) Describe the challenges you experience with staying connected to your family/ Friends/Community. |
| Tomaka, Thompson and Palacios (2006) | Social isolation: “objective physical separation from other people, such as living alone or residing in a rural geographic area.”  Loneliness: “the more subjective feeling state of being alone, separated, or apart from others” and “an unfavorable balance between actual and desired social contact.” (p.360) | Social isolation: ad hoc index  1) Structural/objective social isolation: lived alone or with others.  2) Functional/subjective social isolation: “Do you feel socially isolated?” no or yes).  Loneliness: Revised UCLA Loneliness Scale (4 questions)  The frequency of feeling a lack of companionship, feeling alone, feeling no longer close to anyone, and time spent by themselves. |
| Weng (2019) | Social isolation: “not having close contacts or sharing private feelings due to lack of social relationships and connections.” (p.259)  Loneliness: NG. | NA: qualitative case study about intervention |
| Ip, Lui and Chui (2007) | NG | Social isolation: ad hoc index  1) Contacts and activities with friends and children.  2) Transport dependency.  3) Participation in Chinese community activities.    Loneliness: single-item, self-report question  "Life here is lonely." Agree, not agree, no comment. |

Supplementary Material S5-2: Frequency[[1]](#footnote-1) of items used in ad hoc measurement of social isolation

|  |  |  |  |
| --- | --- | --- | --- |
| **Items** | **Frequency** | **Items** | **Frequency** |
| Social contact frequency | 9 | Do you feel socially isolated? | 1 |
| Living alone | 6 | Inability to contribute | 1 |
| Social activity participation | 5 | Lubben Social Network Scale | 1 |
| Social network size | 4 | Physical mobility | 1 |
| Social relationship quality | 3 | Rural/urban | 1 |
| Loneliness | 2 | Social network composition | 1 |
| Marital status | 2 | Alone&with others | 1 |
| Perceived social support | 2 | Ate alone at home | 1 |
| Transportation | 2 | Hours spent home alone | 1 |
| Childless | 1 |  |  |

Supplementary Material S6: Multidimensional socio-ecological model for loneliness and social isolation factors

A diagram with text and colorful circles

Description automatically generated with medium confidence

Note: ▲ Represent ethnicity/immigration-specific factors. ● Represents general factors.

Supplementary Material S7: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

| **SECTION** | **ITEM** | **PRISMA-ScR CHECKLIST ITEM** | **REPORTED ON PAGE #** |
| --- | --- | --- | --- |
| **TITLE** | | | |
| Title | 1 | Identify the report as a scoping review. | 1 |
| **ABSTRACT** | | | |
| Structured summary | 2 | Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives. | 0 |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach. | 1-2 |
| Objectives | 4 | Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives. | 2 |
| **METHODS** | | | |
| Protocol and registration | 5 | Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number. | NA |
| Eligibility criteria | 6 | Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale. | 4-5 |
| Information sources\* | 7 | Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed. | 4 |
| Search | 8 | Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated. | Supplementary Material S1 |
| Selection of sources of evidence† | 9 | State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review. | 6 |
| Data charting process‡ | 10 | Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators. | 5-6 |
| Data items | 11 | List and define all variables for which data were sought and any assumptions and simplifications made. | 5-6 |
| Critical appraisal of individual sources of evidence§ | 12 | If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate). | NA |
| Synthesis of results | 13 | Describe the methods of handling and summarizing the data that were charted. | 6 |
| **RESULTS** | | | |
| Selection of sources of evidence | 14 | Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram. | 6, Figure 1 |
| Characteristics of sources of evidence | 15 | For each source of evidence, present characteristics for which data were charted and provide the citations. | 6-7, Table 1 |
| Critical appraisal within sources of evidence | 16 | If done, present data on critical appraisal of included sources of evidence (see item 12). | NA |
| Results of individual sources of evidence | 17 | For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives. | Supplementary Material S2 |
| Synthesis of results | 18 | Summarize and/or present the charting results as they relate to the review questions and objectives. | 8-14 |
| **DISCUSSION** | | | |
| Summary of evidence | 19 | Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups. | 14-22 |
| Limitations | 20 | Discuss the limitations of the scoping review process. | 3-6 (embedded in the method section) |
| Conclusions | 21 | Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps. | 22 |
| **FUNDING** | | | |
| Funding | 22 | Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review. | 23 |

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O’Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting*.*

§The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

*From:* Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. [doi: 10.7326/M18-0850](http://annals.org/aim/fullarticle/2700389/prisma-extension-scoping-reviews-prisma-scr-checklist-explanation).

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1. Frequency: The number of studies that have employed the item. [↑](#footnote-ref-1)