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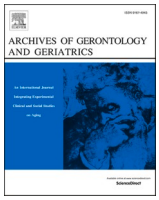

Review

Systematic review on attitudes towards death and dying in adults 50 years and older living in countries with community transmission of COVID–19

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HIGHLIGHTS

- COVID-19 direct effects, not mitigation measures, were primary risk factors for increased death anxiety.
- Health factors like chronic conditions, decreased intrinsic capacity and loneliness were linked to increased death anxiety.
- Protective factors against death anxiety included maintaining hobbies, employment, and spiritual well-being.
- This review identified significant gaps in research on a range of personal and environmental factors associated with death anxiety, which could have significant implications for understanding and mitigating it.
- Interventions at the level of the individual, health and care system and broader society offer opportunities to mitigate death anxiety during pandemics.

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ABSTRACT

Background: The COVID-19 pandemic has underscored older adults' vulnerability to severe illness or death. Increased public awareness of mortality, with daily reminders of preventive measures, spurred interest in understanding the impact on death-related thoughts. This systematic review analyses existing literature on death attitudes among individuals aged 50 and older during the COVID-19 pandemic and focuses on associated factors.
Methods: A systematic literature search was conducted using the WHO COVID database without any language limit, up until April 2023. The review protocol was registered in PROSPERO and PRISMA guidelines were followed. Included studies were systematically analysed and summarized using a predefined data extraction sheet.
Results: Of the 2297 studies identified, 9 met inclusion criteria. The review showed moderate to high levels of death anxiety during the pandemic, linked to direct health risks from COVID-19 rather than mitigation measures. The impact of health and personal factors on older people's death anxiety was complex, with a range of health and personal factors such as chronic conditions, loss of capacity, loneliness, occupation, and resilience associated with it, suggesting potential intervention avenues.
Conclusion: The systematic review shows a significant link between COVID-19 and heightened death anxiety among individuals aged 50 and above. Negative attitudes to death can harm physical and mental health, diminish life satisfaction, increase avoidance behaviour, impair coping mechanism and undermine end-of-life decision making. Findings underscore the need for further research into risk and protective factors (personal, health, and environmental) and the importance of standardized data collection to guide interventions and public health strategies aimed at mitigating death anxiety.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.This study did not involve research on human or animal subjects and was not subject to ethical approval. The research exclusively focused on a review of publicly available peer reviewed literature.

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1. Background

The COVID −19 pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has highlighted the fragility of life and increased the likelihood of death in older adults. As of 12 May 2024, COVID-19 has resulted in over 7 million deaths (World Health Organization, 2024). From January 2020 to May 2024, the highest death rates were in the Americas (3.0 million), Europe (2.3 million), and South-East Asia (808,705), while the lowest were in the Western Pacific (420,970), Eastern Mediterranean (351,975), and Africa (175,510) (World Health Organization, 2024). Older people and those with underlying chronic health conditions have been more likely to experience serious illness or die from COVID −19. In terms of the estimated 15 million global excess deaths associated with COVID-19, 82 percent are 60 years and older (World Health Organization, 2023a).

Vast differences in the timing and extent of responses to mitigate COVID-19 transmission across countries and territories impacted mortality rates (Ayouni et al., 2021; Tan et al., 2023). For example, multicounty studies on physical distancing and lockdown found that the effectiveness of these measures on COVID-19 spread varied due to differences in the stringency of the measures and the specific pandemic situations in each country at the time of implementation (Meo et al., 2020; Thu et al., 2020). Multiple public health measures such as mask-wearing, vaccinations, physical distancing, lockdowns, isolation and quarantine and contact tracking need to be applied together to control transmission (Ayouni et al., 2021).

The COVID-19 pandemic with daily updates on death tolls, along with widespread reminders of public health measures, made death public and salient (Menzies and Menzies, 2020). Past disease threats (e.g. Ebola) have been reported to increase death related thoughts and defensive behaviour (Arrowood et al., 2017).

The COVID-19 pandemic presented a unique global opportunity for researchers to investigate death attitudes and death anxiety on an unprecedented scale. This research not only contributes to our understanding of individuals' responses to a public health crisis but also provides insights into the psychological and emotional aspects that can influence public health interventions and strategies. Terror management theory suggests that individuals use different defence mechanisms when death related thoughts increase. When individuals are aware of thoughts about death, they activate "proximal defences," such as suppressing thoughts (e.g., avoiding news reports on COVID-19 death tolls), denying personal vulnerability (e.g., believing they are not at high risk), or taking preventive actions (e.g., using hand sanitizers) (Pyszczynski, 1999). Conversely, when thoughts of death are outside of conscious awareness, individuals engage in "distal defences" such as reinforcing their cultural worldviews and maintaining self-esteem.

Negative attitudes to death such as death anxiety can reduce physical and mental health, diminish life satisfaction, increase avoidance behaviour, impair coping mechanism and undermine preparedness for end-of-life decision making (Menzies and Menzies, 2020; Menzies et al., 2019; Yalom, 1980). The prevalence of death anxiety during the COVID pandemic across all age groups has been reported in two recent systematic reviews (Özgüç et al., 2021; Patra et al., 2023) with the most recent broken down by population groups including people with chronic conditions, older persons, general population, and health care workers. However, neither study analysed the COVID related factors or health, and personal factors associated with death attitudes, a requirement to move towards understanding risk and protective factors that could help to tailor interventions to specific populations to prevent or manage death anxiety, optimize resource allocation, and promote well-being (Fortner and Neimeyer, 1999).

This review will analyse existing studies on death attitudes of people 50 years and older in the context of COVID – 19 and the associated factors as a basis to identify potential relevance to public health policy and practice on ageing, COVID and end-of-life matters.

2. Methods

This systematic review aims to summarize attitudes towards death and dying in adults 50 years and older living in countries with community transmission of COVID–19.

The development of the search strategy adhered to the recommendations outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). A checklist is included in supplementary Table 1. To ensure transparency and prevent bias, the systematic review protocol was registered in PROSPERO with the registration number PROSPERO 2021 CRD42021238618.

2.1. Search strategy

A comprehensive literature search was conducted in collaboration with a skilled Medical librarian using the WHO COVID database Search | WHO COVID-19 Research Database (bvsalud.org) which includes the following: Medline, CAB Abstracts, Global Health, PsycInfo, Scopus, Academic Search Complete, Africa Wide Information, CINAHL, ProQuest Central, China CDC MMWR, CDC Reports, bioRxiv, medRxiv, chemRxiv, SSRN (preprints), Embase, Global Index Medicus, Web of Science, PubMed Central, Science Direct, Wiley Online, Eurosurveillance, American Chemical Society, Scielo, AIRITI, JMIR, Russian Science Index, Korean Science Citation index, Oxford Academic Group, Jstage, Mary Ann Liebert, Sage Publications, Taylor and Francis, BioMed Central and MDPI. The EPPI Centre living systematic map of the evidence EPPI-Mapper (ioe.ac.uk) was searched separately. (See supplementary Table 2 for COVID-19 search strategy by database).

The search was performed from 1 March 2020 to 17 February 2021 and updated on 17th April 2023. The search strategy incorporated specific terms to capture relevant literature on attitudes to death, including (tw:((attitude* OR sorrow) AND death*) OR mh:("Attitude to Death" OR "Bereavement" OR "Grief" OR "Mortuary Practice" OR "Funeral Rites" OR "Right to Die")) OR ti:(duelo OR luto) OR tw:(mourning OR bereavement OR bereaved) OR (tw:death AND mh:("Health Knowledge, Attitudes, Practice" OR "Terminal Care" OR "Anxiety" OR "Anxiety, Separation" OR "Social Support" OR "Adaptation, Psychological" OR "Patient Preference" OR "Social Behavior" OR "Social Conformity" OR "Social Isolation" OR "Right to Die" OR "Consumer Behavior" OR "Family Relations" OR "Ageism" OR "Psychological Trauma. No terms related to age or ageing were included in the strategy to avoid missing any potential sources of information.

After eliminating duplicate articles, two people (AO and SC for the first search) and (AO and AB for the updated search) conducted independent screening of the titles and abstracts to identify articles that met the criteria for full-text extraction. To ensure the inclusion of all pertinent articles backward author and reference searching of included studies and relevant systematic reviews were carried out as well as forward reference and author searching using Web of Science. Any discrepancies or disagreements regarding the inclusion of studies were resolved through discussion among the authors and documented in Covidence.

2.2. Inclusion and exclusion criteria

Studies included:

adults with a mean age of 50 years and older

living in the community in a COVID-19 affected country

attitudes towards one's own death

original observational studies including longitudinal studies/case reports and cross-sectional studies

full text papers, in any language, both published in peer review journals and preprint.

Studies excluded:

did not contain disaggregated data on adults 50 and older

were carried out in institutional settings and or before the COVID-19 pandemic

attitudes towards death of others or death in general

dissertations, conference proceedings, opinion papers, review articles, or clinical or intervention studies

studies with no accessible full text versions.

The main outcome of interest is people's attitudes towards their own death or dying, with attitudes having two components: cognitive (think) and affective (feel). Attitudes link death to our own existence, our lives, or significant facets of our lives (Tomer, 2000). Attitudes exist on a spectrum and can include neutral acceptance, approach acceptance, coping, anxiety, fearfulness, escape acceptance, avoidance, rejection, ideation, meaning, wishfulness. Associations between attitudes to death and COVID-19, personal, health and environmental factors where included were assessed in the eligible studies.

2.3. Data extraction

Data were extracted in Covidence after developing and testing a data extraction template created for this study which included: title, study aims, author(s), publication date, country of the study. Information pertaining to the study population, sample characteristics (such as number of participants, mean age, age-range, gender ratio), COVID-19 factors (e.g. COVID-19 status, protective behaviours), personal factors (e.g., education, health conditions, marital status, living arrangements), environmental factors (e.g., social support and relationships), health characteristics (health conditions, intrinsic capacity and health behaviours/risk factors). Additionally, study methods (e.g., inclusion and exclusion criteria, method of recruitment, representativeness of the sample, scales, tools and instruments used to measure death attitudes, methods of analysis) and resultant findings, funding sources, declaration of conflicts of were also documented during the data extraction process.

2.4. Data analysis and synthesis

Eight of the included studies were cross-sectional and one longitudinal. Given that the outcome measures and scales differed, data were analysed and findings on death attitudes, COVID–19 exposure, personal, health and environmental factors summarised in a narrative synthesis. Two researchers (AO and AB) independently extracted the data. Disagreements were resolved through regular meetings and deliberations and documented in Covidence.

2.5. Assessment of methodological quality

Quality assessment was carried out in Covidence after developing a quality assessment template that incorporated the JBI Critical Appraisal Checklist for analytical cross-sectional studies (JBI, 2020) https://view.officeapps.live.com/op/view.aspx?src=https://jbi.global/sites/default/files/2021–10/Checklist_for_Analytical_Cross_Sectional_Studies.docx&wdOrigin=BROWSELINK. There are eight scoring items with answers of "yes", "no", "unclear" and "not applicable" and a comments section for reviewers' explanations. Quality appraisal of included studies was conducted independently by two of the authors (AO and AB) see Supplementary Table 3.

3. Results

Nine out of the 2297 reviewed studies met the inclusion criteria (see Fig. 1), with the quality assessment of each study provided in Supplementary Table 3. Based on the World Bank classification of country incomes, two studies were from lower-middle-income countries (Iran and Jordan), five from upper-middle-income countries, including 4 from Turkey and one from China, and two from high-income countries (Germany, Israel). The studies included 3341 participants of which 1737 (52 %) were female or non-binary and 1604 (48 %) male (World Bank, 2023) See Table 1.

The reported results have been organized into distinct categories: death attitudes and COVID-19, personal factors, and health factors. Within these categories, a total of 19 subcategories were identified.

3.1. Death attitudes

The nine studies used five different questions/instruments to measure death attitudes. All studies focused on negative attitudes notably anxiety, fear and worry. One study also looked at neutral or positive attitudes (Kaplan Serin and Bülbüloglu, 2021). No study investigated attitudes to dying. The Templar Death anxiety scale was the most frequently used measure. Two different scoring methods were used with two studies using a two-point Likert scale of true (1)/false (0), resulting in scores ranging from 0 to 15 (Guner et al., 2023; Rayatpisheh et al., 2023) and the other study used a five-point Likert-type score, with final scores ranging from 15 to 75 (Yang et al., 2023). The remaining six studies used six different questions or measures (Aslaner et al., 2022; Kaplan Serin and Bülbüloglu, 2021; Korkut, 2022; Rababa et al., 2021; Ring et al., 2022; Rupprecht et al., 2022). Out of the eight studies that provided mean death anxiety scores, seven of them indicated that participants experienced moderate to high levels of death anxiety (see Table 1).

3.2. COVID-19 related factors

The studies examined people's attitudes towards death in connection with a variety of COVID related issues including COVID-19 status, level of COVID related knowledge, adoption of protective behaviours, isolation and quarantine status, and experience of COVID related restrictions (see Table 1).

3.2.1. COVID status of participants or family members

Aslaner et al. (2022) reported that of the 539 participants who were isolated with a positive real time polymerase chain reaction (RT-PCR) result, 56 % had death anxiety (p= .253). Of the participants with mild or moderate symptoms, 63.4 % had thoughts of death ($p < .001$). It was found that being RT-PCR positive increases the odds of death anxiety by 1.983 (p= 0.008) and in the presence of symptoms the odds of death anxiety increased by 0.146 (p< 0.001). In a different study, a family member being diagnosed with COVID–19 was also found to increase death anxiety ($t = 1.319$, p=.018) (Guner et al., 2023).

3.2.2. Anxiety about COVID

Anxiety, fear and worry about COVID-19 and their relationship to death attitudes were explored in four studies. Participants that were worried about COVID – 19 (e.g., being infected, infecting others by COVID −19 or that people close to them will become infected) or had high coronavirus anxiety scores - a self-assessment scale used to determine the frequency of coronavirus anxiety symptoms - had higher levels of death anxiety (Aslaner et al., 2022; Guner et al., 2023; Ring et al., 2022). One pf these studies revealed that lacking sufficient knowledge about COVID-19 was associated with increased death anxiety ($X^2 = 99.36$, $p = .012$) compared to those who responded positively or partially to the question about sufficient knowledge (Aslaner et al., 2022). More than half of participants (59.1 %) who thought they could

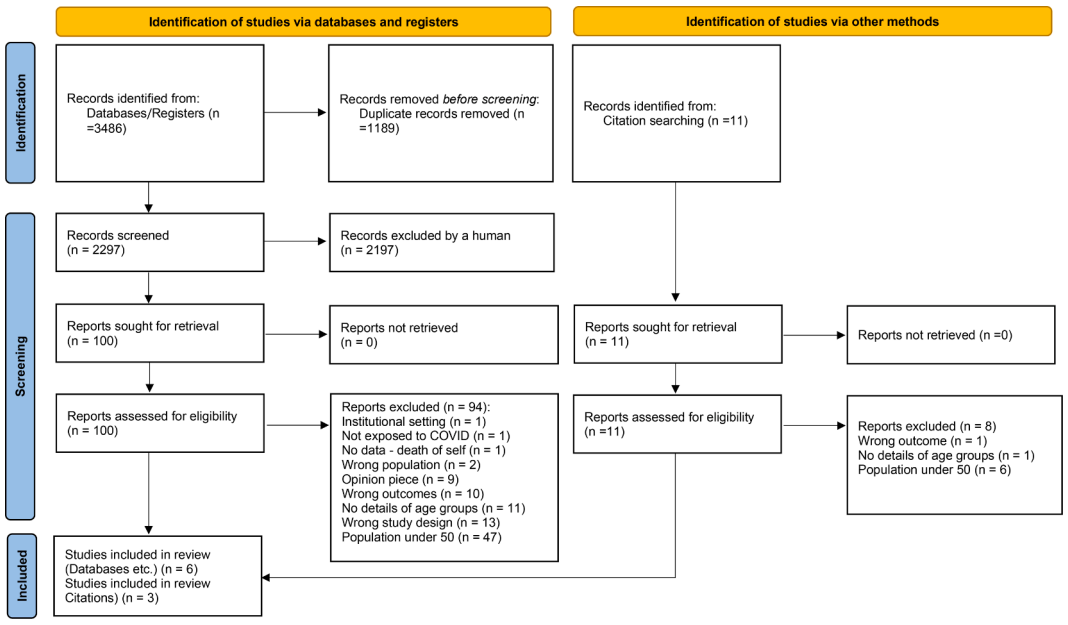

Fig. 1. PRISMA figure.
From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71.

be reinfected by COVID-19 had death anxiety ($p < .004$) (Aslaner et al., 2022). Participants, with no history of COVID-19, who perceived that they were susceptibility to the disease reported higher levels of death anxiety in two waves (Rupprecht et al., 2022). Participants perception that COVID would progress severely was positively associated with death anxiety in wave 1 (B(SE) 0.24 (0.04), β=0.20, p <.001) but not in wave 2 (Rupprecht et al., 2022). Another study surveyed the impact of COVID-19 exposure on people's lives by evaluating the frequency and duration of COVID related events, along with the degree of mental impact. The researchers found that the impact of COVID-19 varied significantly between individuals with low and high levels of death anxiety ($t = -9.347$, p<.001, $R = 0.569$, $p < 0.01$) (Yang et al., 2023).

3.2.3. Protective behaviours

Two studies found that participants that were exposed to quarantine, self-isolation, knowing someone in isolation, did not report higher levels of death anxiety (Ring et al., 2022; Yang et al., 2023). Furthermore, adopting protective behaviours e.g., wearing a mask ($T = 0.899$, $P = 0.371$), use of disinfectants ($T = 0.796$, $P = 0.428$) and social distancing ($T = -1.096$, $P = 0.276$) was not associated with death anxiety (Guner et al., 2023).

3.2.4. Impact of social restrictions

The impact of COVID-19 social restrictions and resultant changes in habits and death attitudes were assessed in two studies. Guner and colleagues found that not being able to manage hobbies at home was associated with higher anxiety than those who could partly or fully manage ($F = 73.10$, $p = .000$) (Guner et al., 2023).

When participants were asked about the restrictions on social contacts and financial situation due to COVID-19 and their association with death anxiety, it was found that only in wave 1 were social restrictions associated with death anxiety (B(SE) 0. 13 (0.06), β=0.07, $p = 0.05$) (Rupprecht et al., 2022).

3.3. Personal factors and death attitudes

3.3.1. General personal characteristics

3.3.1.1. Age. Participants ages spanned 77 years (range 18 – 95) and were categorized into age groups spanning ten-to-34-year intervals. Six of the nine studies reported correlations between age and death attitudes. One study found no relationship between participants age and death attitudes (Aslaner et al., 2022). Two studies reported that death anxiety increased with age (Guner et al., 2023; Korkut, 2022) with Korkut et.al indicating that death anxiety was higher in persons 76 and older than those in the 50 −75 age bracket. Three studies reported that death anxiety decreased with age (Kaplan Serin and Bülbüloglu, 2021; Ring et al., 2022; Rupprecht et al., 2022). Rupprecht et al., found the decrease was consistent across a range of age categories 45–64, 65–74, and 75–95 and stable over a period of 7.9 months (Rupprecht et al., 2022).

3.3.1.2. Gender. The relationship between gender and death attitudes was mixed. Four studies found that female sex was associated with higher levels of death anxiety (Kaplan Serin and Bülbüloglu, 2021; Korkut, 2022; Rababa et al., 2021; Rupprecht et al., 2022). One of these studies found that the association between gender and death anxiety declined between the first and second peaks of the pandemic in Germany (Rupprecht et al., 2022). Two studies found that male sex was associated with higher anxiety levels (Aslaner et al., 2022; Rayatpisheh et al., 2023), while another two studies reported no association between sex and death attitudes (Guner et al., 2023; Ring et al., 2022).

3.3.1.3. Personality. One study explored if personality traits were associated with death attitudes (Yang et al., 2023). Participants were divided into two different groups – high death anxiety (DAS score 35 and higher) and low death anxiety ($t = 24.35$, p<.001). Significant differences ($p < .001$). were found between the two groups in terms of conscientiousness, extraversion, agreeableness, and neuroticism. Based on multiple regression analysis neuroticism increased death anxiety ($B = 0.386$, $t = 5.433$, p<.001) while openness ($B = -0.279$, $t = -2.359$, p<.05) decreased death anxiety.

3.3.2. Socioeconomic and socio-cultural factors

3.3.2.1. Education. 6 studies investigated the relationship between levels of education and death attitudes of which 5 found no correlation

Table 1
Prevalence of death attitudes in 9 studies that met the inclusion criteria.

Author, Year	Country	No of Participants	Age Range	Mean Age (SD)	Gender ratio (Female: Male: Nonbinary)	Mean Death Anxiety Score (SD) or% of Participants with Death anxiety	Data collection period	COVID Exposure	Death attitude scales/tools	Contents of scale
Aslaner et al. (2022)	Turkey	656	65–80	69·9 (5·7)	50·5:49·5	55·3 %	September 30, 2020 - January 10, 2021	In Quarantine	Five death related questions	What were you most worried about during the COVID-19 process? Do you have death anxiety? Does postmortem make you anxious? Are you worried about suffering in the premortem period? Are you worried about suffering at the moment of death? Do you feel anything when you think of the moment of death?
Guner et al. (2023)	Turkey	354	Not reported	68·28	23·4:76·6	8·54 (4.82)	10 June - 15 October 2020	COVID affected country	Death Anxiety Scale (DAS)	Death Anxiety Scale (DAS): 15-item scale that measures the anxiety and fears of the individuals about their own death and answered as true-false. The sum of the scores obtained from the scale gives the death anxiety score, 0–4 points "mild", 5–9 points "moderate", 10–14 points "severe", 15 points "panic level" death anxiety
Kaplan Serin and Bülbüloglu (2021)	Turkey	103	Not reported	50·12	51·5: 48·5	122·13 (4·65)	Not stated	COVID affected country	Death Attitude Profile-Revised (DAP-R)	32 item, multi-dimensional and Likert-type and is scored from strongly disagree (1) to strongly agree (7). There are 5 sub-scales in the scale: fear of death, death avoidance, neutral acceptance, approach acceptance, and escape acceptance. Possible total score range: 26 - 182.
Korkut (2022)	Turkey	114	22–90	60.61	47·4: 52·6	36·47 ± 20·28	July - October 2021	COVID affected country	Turkish Death Anxiety Scale	According to the total score range, death anxiety levels are evaluated as: very low (0–7), low (8–25), medium (26–44), high (45–63), and very high (64–80).
Rababa et al. (2021)	Jordan	248	60–68	63.95	42·3: 57·7	68·76 (19·2)	Not stated	COVID affected country	Arabic Scale of Death Anxiety (ASDA)	20 statements answered on a 5-point intensity scale (ranging from 1 = "No" to 5 = "Very much"). The total possible score of the ASDA ranges from 20 to 100, with higher scores indicating

(*continued on next page*)

Table 1 (*continued*)

Author, Year	Country	No of Participants	Age Range	Mean Age (SD)	Gender ratio (Female: Male: Nonbinary)	Mean Death Anxiety Score (SD) or% of Participants with Death anxiety	Data collection period	COVID Exposure	Death attitude scales/tools	Contents of scale
										greater death anxiety levels.
Rayatpisheh et al. (2023)	Iran	283	Not reported	67.29	69:31:00	6·3 (2·95)	July - September 22	COVID affected country	Death Anxiety Scale (DAS)	15 items on five dimensions scored from zero ("no death anxiety") to 15 ("very high death anxiety"). The midpoint is set at 6–7 (cutoff point); a score higher than the cutoff point (7–15) represents high death anxiety, whereas a score lower than the cutoff point (0–6) denotes low death anxiety.
Ring et al. (2022)	Israel	277	60–92	69.59	2.90	1·77 (0·75)	March 16 - April 14, 2020	COVID affected country	Death anxiety sub-scale from the Fear of Death Scale (Carmel & Mutran, 1997).	This subscale includes six items to examine death anxiety due to the COVID-19 pandemic (e.g. "I am very afraid of death"). Participants were asked to rate their answer on a scale ranging from 1 (completely disagree) to 5 (completely agree). The final score was based on the average of answers. Higher scores reflect high death anxiety.
Rupprecht et al. (2022) Wave 1 Wave 2	Germany	1042	18 - 95	59.1	68:31:01	3·29 (0·06) 2·98 (0·04)	March 31 -April 30, 2020 November 20 - December 20, 2020	COVID affected country	Single question	Death anxiety was assessed with the single item. When I think of my own death, I become fearful. Participants indicated their agreement on a scale ranging from I strongly disagree (1) to strongly agree (7).
Yang et al. (2023) Exposure group Control group	China	264	60–94	74.5	37:63	40·5 (8·84) 41·46 (8·82)	July 21 - November 22	Were in quarantine preceding the survey Covid affected Country (no local outbreak)	Death Anxiety Scale (DAS)	15 items on four dimensions (emotion, pressure and pain, time awareness, and cognition). Likert 5 level scoring method, in which 9 items are scored positively and six items negatively, with a total score of 75 points. The higher score the higher death anxiety. Scores of 35 and above were high death anxiety. There was no significant difference in death anxiety between the exposure and control groups and data is reported for groups combined.

(Kaplan Serin and Bülbüloglu, 2021; Korkut, 2022; Rayatpisheh et al., 2023; Ring et al., 2022; Yang et al., 2023). One study found that people with a primary school education had greater fear of death ($F = 17.954$, p=.038) than those with higher levels of education (Guner et al., 2023).

3.3.2.2. Employment. Two studies examined the connection between occupation and death anxiety (Kaplan Serin and Bülbüloglu, 2021; Rayatpisheh et al., 2023). Rayatpisheh et al., found a significant association between employment status among older adults and their level of death anxiety. Unemployed individuals showed higher levels of death anxiety compared to those with employment (Rayatpisheh et al., 2023). Kaplan et al., investigated various categories of workers e.g., civil servant, business owner, retired or unemployed, but did not find a significant relationship with death anxiety (F= 1.993, p= 0.102). However, when examining the duration and place of work, they found that adults working 6–7 days outside the home had higher fear of death than those who worked from home or fewer days (2–5 days) outside the home (F= 4.243, p = .007) (Kaplan Serin and Bülbüloglu, 2021).

3.3.2.3. Income and socioeconomic status. Two studies investigated socioeconomic factors. Kaplan et al., found no relationship between death anxiety and income, assessed as less than, equal to or higher than current expenses (F= 1.339, p= 0.267) (Kaplan Serin and Bülbüloglu, 2021). The other study found that subjective assessments of socioeconomic status were not associated with death anxiety during the first (B(SE) = 0.04 (0.03), β =0.03) or second waves (B(SE) = 0.03 (0.03), β =0.03) (Rupprecht et al., 2022).

3.3.3. Life situation

3.3.3.1. Marital status. Seven studies examined the connection between marital status and death attitudes, with six of them showing an association, albeit with mixed results. Three studies reported higher death attitudes in people that are married (Kaplan Serin and Bülbüloglu, 2021; Korkut, 2022; Rababa et al., 2021). One study found higher death anxiety in single people (Guner et al., 2023), while another reported that divorcees had the highest levels of death anxiety (Rayatpisheh et al., 2023). In a post hoc analysis Yang et al., found that death anxiety was higher in widows than divorced older people (p < .05). Older people who were married but separated for more than 1 month exhibited higher death anxiety than divorced individuals (p < .05). Additionally people married but separated for more than 1 month had higher death anxiety than those who were unmarried (p < .05) (Yang et al., 2023).

3.3.3.2. Living arrangements. Five studies investigated the relationship between living arrangements and death anxiety. One study reported that living with family increased death anxiety (p = .003) (Korkut, 2022). However, three other studies did not find any association between death anxiety and whether participants lived alone or with others (Aslaner et al., 2022; Guner et al., 2023; Yang et al., 2023). Similarly, the type of residence, such as a private house or a child's home, was not found to be associated with death attitudes (Rayatpisheh et al., 2023).

3.3.4. Beliefs about ourselves

Five studies investigated different self-beliefs and their relationship with death attitudes.

3.3.4.1. Resilience and coping. One study explored if subjects' resilience – their psychological adaptability - was associated with death anxiety and found a significant correlation (r=−0.290, p<0.01) (Ring et al., 2022). Yang et al. explored people's level of death anxiety and their perceived ability to cope, a construct that includes a mixture of personal, health and environmental factors including positive coping, planning, positive reframing, acceptance, humour, religion, emotional support, instrumental support, self-distraction, denial, venting, substance use and behavioural disengagement. Active coping, positive reframe, self-distraction, capacity for self-distraction and behaviour disengagement were all significantly associated with death anxiety (p < .001) as were planning, humour and instrumental support (p < .05) (Yang et al., 2023).

3.3.4.2. Future and the time remaining in life. Other researchers explored if death anxiety was associated with people's subjective evaluation with regards to the time they have left until death and found that subjective nearness to-death was correlated with death anxiety (0.250, p < 0.001) (Ring et al., 2022). How individuals represent the future and the time remaining in life within the context of the pandemic were another area of investigation. Three components were studied: perceptions of future time opportunities and possibilities, perceptions of future time extension and the time in life remaining, and perceptions of future time constraints and limitations. Higher death anxiety was correlated in the first wave to weaker future time opportunity (−0.09, p<.001), weaker future time extension (−0.08, p<.001), stronger future time constraint (0.19, p<.001), and higher ideal life expectancy (0.10, p<.001) (Rupprecht et al., 2022). In the second wave death anxiety was only correlated with stronger future time constraint (0.16, p<.001), and higher ideal life expectancy (0.12, p<.001) (Rupprecht et al., 2022).

3.3.4.3. Loneliness. Loneliness, a subjective feeling of being alone, was found to be significantly related to death anxiety (p < .01; r: 0.77) (Guner et al., 2023). Participants that could manage communication with social media and mobile phones had lower levels of death anxiety than those who could not manage or only partly (X^2= 68.01, p=.013) (Guner et al., 2023).

3.3.4.4. Religiosity and spirituality. Yang et al. explored if identifying as religious (Buddhism, Christian, Catholic, Taoism) or not was associated with death attitudes and found no relationship (Yang et al., 2023). Rababa and colleagues explored if greater levels of spiritual wellbeing were associated with death anxiety and found a correlation when controlling for gender and marital status (Rababa et al., 2021). Another study explored if an increase in feeling of spirituality during the pandemic (yes, no, or partly) was associated with death anxiety. Positive responses to increased spirituality were significantly different to those that responded partial increases (p= 0.000) (Guner et al., 2023).

3.4. Health factors

3.4.1. Chronic conditions

Six studies assessed the relationship between attitudes to death and the presence of one or more chronic health condition.

Two studies found no association with death anxiety in their subjects (Aslaner et al., 2022; Rupprecht et al., 2022).

The other 4 studies found a relationship between chronic conditions and death anxiety. Guner et al., found that the presence of a chronic disease increased death anxiety (t =−11.470; p= 0.000) (Guner et al., 2023). This finding was supported by Ring et al., who investigated if the existence of chronic diseases, including cardiovascular disease, diabetes, chronic respiratory disease, hypertension, and cancer, was associated with higher levels of death anxiety (B −0.250, p= 0.041) (Ring et al., 2022). A study on persons with diabetes mellitus found results varied by chronic condition for example the presence of diabetic foot (t= 1.720, p= 0.008) and cardiovascular disease (t= 1.425, p= 0.005) were associated with higher death anxiety while other chronic conditions such as cerebrovascular disease (t= 0.058, p= 0.954) and peripheral vascular disease (t= 0.617, p= 0.539) were not associated with death anxiety (Kaplan Serin and Bülbüloglu, 2021). In a study of individuals with chronic kidney disease on haemodialysis, those with a history of psychiatric disorders (not currently receiving treatment) were not associated with death anxiety. However, the study did reveal a positive

correlation between death anxiety and the presence and severity of various psychopathological symptoms, including somatization, depression, obsession-compulsion, interpersonal sensitivity, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism (Korkut, 2022).

3.4.2. Intrinsic capacity

People who reported their health as good (Ring et al., 2022) and people capable of performing activities of daily living did not report having death anxiety (Aslaner et al., 2022). While people whose intrinsic capacity declined such that they needed self-care and social support had higher levels of death anxiety (p= 0.001) (Korkut, 2022).

3.4.3. Risk factors and health-related behaviours

Three studies looked at risk factors (alcohol and smoking) and death attitudes (Kaplan Serin and Bülbüloglu, 2021; Rayatpisheh et al., 2023; Yang et al., 2023). No association was found between death anxiety and smoking or alcohol use, including addiction. One study with people with diabetic mellitus found that those who exercised regularly had higher fear of death (t =−3.490, p= 0.001) specifically escape acceptance which considers death as an escape from the suffering of life (Kaplan Serin and Bülbüloglu, 2021). The same study found no association between death anxiety and dietary control.

See Supplementary Table 4 for an overview of personal and health factors by included study.

3.5. Environmental factors and death attitudes

No studies explored environmental factors beyond the pandemic.

4. Discussion

This systematic review summarised the available studies on the effects of COVID-19 on death attitudes in persons 50 and older and the association with personal and health factors. Nineteen factors (COVID-19, health and personal) were assessed in relation to death anxiety. Direct effects of COVID-19, rather than pandemic mitigation measures, were risk factors for increased death anxiety. While the impact of health and personal factors on older people's death anxiety during the pandemic was not straightforward or easily predictable, a range of these factors, including chronic conditions, loss of capacity, loneliness, occupation, and resilience, were found to be associated with death anxiety. These findings suggest that certain factors could protect or increase the risk of death anxiety, offering opportunities for intervention strategies.

The studies found moderate to high levels of death anxiety during the pandemic, which are consistent with findings from other reviews assessing death anxiety in older people and other population groups during the COVID-19 pandemic (Özgüç et al., 2021). A growing body of evidence suggests that death anxiety, a transdiagnostic construct, is a fundamental fear that predicts COVID anxiety and other mental health disorders (Menzies et al., 2019; Zuccala and Menzies, 2022). Research from this review, and from studies conducted before the pandemic, found that death anxiety predicted psychopathology and symptom severity (Menzies et al., 2019 and Fortner and Neimeyer, 1999) and neuroticism did not account for these relationships (Menzies et al., 2019). Moreover, older people who experienced COVID-19 anxiety or were directly affected by the virus, either through infection or, for example, the illness of a loved one, were more likely to have heightened levels of death anxiety which aligns with the findings of prior studies (Çıkrıkçı et al., 2022; Lee et al., 2020; Patra et al., 2023). Knowing that there is a possibility of severe illness or death from COVID-19 could lead to increased awareness of mortality, while the experience of dealing with the virus itself or its consequences likely intensified the personalization and tangibility of the threat, making death more salient and increasing fears about mortality. The study highlights the need to address death anxiety in the general population, as it can have significant impacts on mental well-being and quality of life. Health professionals should pay particular attention to recognising and responding death anxiety as existential and cognitive-behavioural therapies, are likely to lead to significant improvements in a person's quality of life and mental well-being (Menzies et al., 2018; Spitzenstätter and Schnell, 2022; Zamiri-Miandoab et al., 2022).

Mitigation measures to reduce viral spread, such as mask wearing, social distancing, and quarantine, were not found to exacerbate death anxiety, in contrast to suggestions made by Menzies and Menzies (2020), Menzies and Menzies (2020). These measures, framed as necessary steps to save lives and mitigate the health risks posed by the virus, may have provided a sense of security and control over personal safety and mitigated death anxiety. It is also possible that other personal and environmental factors such as improved knowledge of the virus (Rupprecht et al., 2022), access to practical support (e.g., food deliveries, economic security), vaccinations and emotional and psychological support (Pedrosa et al., 2020; Yang et al., 2023) may have helped to lower levels of death anxiety (Rupprecht et al., 2022).

It was also found that health related risk factors for serious COVID – 19 illness and death, existing chronic conditions and loss of capacity requiring care and support, may also be risk factors for death anxiety (Geng et al., 2021; World Health Organization, 2024). In this review, while higher death anxiety scores were associated with chronic diseases, results were mixed, possibly due to variations in the conditions studied, condition severity, the lack of disaggregated data by health condition and other mediating factors such as subjective nearness to death Other factors such as treatment delays for chronic diseases, concerns about the availability of home-based care, and the associated risks, such as the increased infection risk among care workers, may have all contributed to death anxiety (World Health Organization, 2020; 2023b; Rocard et al., 2021). Health professionals should be aware that patients with chronic conditions or requiring home-based care may be at higher risk for death anxiety due to concerns about their health, treatment delays, and infection risks. Furthermore, ensuring continuity in essential health and care services, safe service delivery, and address disruptions are fundamental and may mitigate death anxiety among these patient groups. Health systems could consider integrating screening and management of death anxiety, especially among high-risk groups like those with chronic conditions. Additionally, investing in public health measures that promote social connections and reduce loneliness could indirectly help mitigate death anxiety at the population level.

Understanding personal risk/protective factors can guide professionals in screening for death anxiety and providing appropriate interventions or referrals. A range of personal risk factors for death anxiety may include loneliness, perceptions of finitude, and neuroticism. These findings align with pre-pandemic research (Bernier et al., 2020; Bužgová and Zapletalová, 2021; Friedman, 2019; Greenblatt-Kimron et al., 2021; Taylor, 2022; Wysokiński et al., 2019). For instance, social restrictions, such as stay-at-home orders, may threatened existing and new social relationships. During the pandemic, the prevalence of loneliness showed small but robust increases across all age groups (Ernst et al., 2022). Older individuals lacking internet may have been particularly vulnerable to isolation (Dahlberg, 2021). Interventions that promote contact with friends and relatives or alter expectations about social interactions could help alleviate loneliness (Welch et al., 2022). While education levels did not show consistent results in their relationship to death anxiety, education levels should be considered when developing and testing interventions, as they can significantly impact the effectiveness of measures aimed at reducing death denial (Georgemiller and Maloney, 1984).

Potentially protective person factors include occupation, resilience and coping, spiritual wellbeing, and self-beliefs such as the perception that death is far. Being able to maintain hobbies and employment, without daily exposure, were found to be protective against death anxiety, a trend also seen in younger populations (Shakil et al., 2022). Additionally, resilience and coping mechanisms that promoted emotional processing and self-care during the pandemic, such as

establishing a daily routine, engaging in electronic communication with others or emphasizing the positive aspects of the situation reduced death anxiety among older individuals. Moreover, spiritual wellbeing which predicted death anxiety in this review (Rababa et al., 2021), in contrast with pre-COVID findings (Kim, 2019), suggests that increased spirituality during the pandemic may reflect efforts to reinforce one's worldview and perceive life as meaningful, aligning with terror management theory. Enabling people to reinforce their world view through work or hobbies, spiritual activities or by developing adaptive coping mechanism may prevent or reduce the impact of COVID related death anxiety (Taylor, 2022).

Other personal factors – age, gender, life situation and religiosity - previously associated with death anxiety showed inconsistent results or were missing. The lack of a clear and strong relationship between age and death attitudes has also been found in other reviews before and during the pandemic (Fortner and Neimeyer., 1999; Patra et al., 2023; Soleimani et al., 2020). Age may not be a good predictor of death attitudes given the heterogeneity that exists within age groups (Diaz et al., 2021; World Health Organization, 2015, 2021) due to diverse health and functional states, different life events and differing societal, technological, and cultural influences. Gender displayed divergent outcomes across studies, unexplained by measurement methods, sample demographics, or gender ratios. A systematic review on death anxiety and COVID-19 across all ages (Özgüç et al., 2021) concluded death anxiety was higher in females based on the results of one study which included younger populations (mean age 33.53). Religiosity has traditionally been posited as a protective buffer against death anxiety. This review examined extrinsic religiosity and did not find an association with death anxiety. There may be no association as recently suggested (Jong, 2021) or this may be attributed to the limited diversity of religious beliefs within the study context and the influence of pandemic-induced restrictions on in-person religious activities. Investigations into intrinsic religiosity (e.g. belief in an afterlife, faith in God) may have proven protective as has been found in pre pandemic research (Fortner and Neimeyer., 1999; Thorson and Powell, 1989).

This systematic review has several methodological limitations related to the heterogeneity among the nine included studies. This variability included differences in study design, population characteristics, definitions of health, and personal factors, differences in measurement instruments and scales complicating any direct comparisons and pooling of data for a meta-analysis. The inability to conduct a meta-analysis restricts our capacity to quantify the overall effect size. Therefore, our review's findings are presented in a narrative synthesis, which, while providing valuable insights, does not offer the quantitative precision that a meta-analysis could confer. Additionally, only four of the nine studies met all eight criteria for methodological rigor, raising concerns about research quality, notably the identification and management of confounding factors. Potential confounding bias exists due to numerous uncontrolled personal and environmental factors associated with death attitudes (Officer et al., 2024). The reliance on cross-sectional designs and convenience samples questions the generalizability of results. Fewer studies from high-income settings than from low-middle-income settings, is concerning because death anxiety has been found to differ across regions (Soleimani et al., 2020), limiting cross-cultural applicability of this review. Data disaggregation was often lacking, which could obscure vital nuances. Only one study reported data from two separate time periods, limiting our ability to speculate if death anxiety would have reduced as the pandemic progressed and which factors may have been associated with the change.

This review identified significant gaps in the assessment of personal, health, and environmental factors, such as ethnicity, psychological issues, self-esteem, and access to vaccinations, healthcare provision, and community responses, all of which could have significant implications for understanding and mitigating death anxiety (Officer et al., 2024). Future research should consider these factors to provide a more comprehensive understanding of death anxiety dynamics during the pandemic. Further research on the personal and health factors that showed more consistent results would enhance understanding of how these factors influence death anxiety during a pandemic and can inform targeted interventions and support strategies. Exploring the interplay of environmental factors and psychological constructs such as self-esteem and intrinsic religiosity may offer new insights into the mitigation of death anxiety. Given the individual and societal importance of these findings, there is a need for in-depth studies that can guide targeted interventions.

This study breaks new ground by going beyond reporting only death anxiety prevalence figures to investigating risk and protective factors related to COVID–19, pandemic mitigation measures, and health and personal factors of people 50 and older. Understanding risk and protective factors for death anxiety is essential for tailoring interventions to specific populations, preventing death anxiety, optimizing resource allocation, and promoting well-being. It forms the foundation for evidence-based, effective, and targeted approaches to address complex conditions like death anxiety and in times of serious resource constraints such as the pandemic are even more important.

5. Conclusion

Death anxiety can be very damaging to health and wellbeing in the absence of protective factors. This systematic review has shed light on the intricate relationship between COVID-19 and death anxiety among individuals aged 50 and above. The moderate to high levels of death anxiety identified during the pandemic are primarily attributed to the direct health risks and consequences of the virus, rather than the preventive measures (such as lockdowns, social distancing, mask-wearing, etc.) implemented to reduce its spread. The findings show possible health and personal risk and protective factors for death anxiety that require further research. The mixed findings highlight the need for a comprehensive model of death anxiety that includes personal, health and environmental factors and the importance of assessing personal and health factors to guide interventions to prevent or reduce death anxiety.

CRediT authorship contribution statement

Alana Officer: Writing – original draft, Validation, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Sophie Pautex:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Andreea Badache:** Writing – review & editing, Methodology, Formal analysis, Data curation. **Barbara Broers:** Writing – review & editing, Supervision, Conceptualization. **Matthew Prina:** Writing – review & editing, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors report there are no competing interests to declare.

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Surkhraj Cheema (SC) screened titles and abstracts in the initial search to identify articles that met the criteria for full-text extraction.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.archger.2024.105573.

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