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Effects of Climate Change in the Elderly's Health: A Scoping Review Protocol

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Effects of Climate Change in the Elderly's Health: A Scoping Review Protocol

ABSTRACT

Introduction: Climate change is a global problem that affects human health, especially the most vulnerable groups, including the elderly. However, no scope review includes the perspective of institutions specialized in climate change and health and whose reports are the basis for policies orientated on the environmental health. Therefore, this study aims to identify these effects on older people health. The results will allow health professionals to have valuable information enabling them to provide quality care in meeting the demand that this situation is producing.

Methods and analysis: A scoping review of the relevant literature will be performed from 2008 to 2021. The Joanna Briggs Institute (JBI) guidelines and the PRISMA-ScR checklist will be used. A peer-reviewed search will be conducted using the electronic databases Medline, Scopus, CINAHL, Cochrane, PsycInfo and Cuiden Plus. Original quantitative studies and reports from official agencies on the effects of climate change on the elderly health in any health and geographical context will be included. Literature selection will be made by two reviewers. The table format used for data extraction will be reviewed by the review team and tested by two reviewers.

Ethics and dissemination: This study does not require approval by an ethics committee to be conducted. This article will result in the mapping of the direct and indirect effects of climate change on the health of the elderly. The results will be published in scientific journals to be accessible to health professionals in the creation of care plans for the elderly at climate risk.

Key words: Climate change, health, older people, elderly, nursing, scoping review, protocol.

ARTICLE SUMMARY

Strengths and limitations of this study

- The review will follow the JBI guidance and will be subjected to the PRISMA-ScR checklist.
- The review will include publications from 2008 to the present.
- A peer-reviewed search and paper selection will be conducted according to the inclusion criteria.
- The reports made by specialized organisms in climate change and health contributing in the elaboration of environmental policies will be included in the review.
- Quality analysis is not required in the studies included in the review.

INTRODUCTION

There is a great global concern about climate change and its effect on human health. In 1979, the First World Climate Conference was held in Geneva, where it became clear that climate change is a serious problem for our planet. The 1994 United Nations Framework Convention on Climate Change defined climate change as 'a change of climate, which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'.^[1] Subsequently, several important facts were highlighted at the COP23 UN Conference in Bonn (Germany, 2017); indicators of long-term climate change (increasing carbon dioxide concentration, ocean acidification and rise in sea level) have increased significantly, as has the global average temperature (1.1°C higher than in industrial times).^[2] Additionally, the latest IPCC (Intergovernmental Panel on Climate Change) report warns that there is a high risk of intense heat waves, among other impacts, if the 1.5°C increase in the Earth's average temperature is exceeded, with corresponding impacts on human health.^[3] Climate change, along with other exceeded planetary boundaries, has increased the risk to human well-being, requiring change and transformation to enable human societies to develop in a just and safe manner.^[4]

Broadly speaking, climate change can influence human health by means of the following:^[5]

- *Direct effects:* through changes in the normal temperature range (heat waves or intense cold), extreme weather events (floods, hurricanes, droughts or wildfires) or exposure to ultraviolet radiation.
- *Indirect effects:* through changes in air quality (air pollution, pollen and allergens), access to unsafe food and water and increased risk of transmission of certain vector-borne diseases.

Moreover, the ageing of the world's population is an unprecedented phenomenon that has been accelerating in recent decades, especially in developed countries. The proportion of people over 60 years of age is expected to double in just 50 years, reaching 2 billion in 2050 (22% of the world's population). Recently, people in this age group have outnumbered children under 5 years of age.^[6]

Climate change is a problem that affects all human beings, but it will affect the most vulnerable population groups to a greater extent, including the elderly, defined as individuals over 65 years of age. The response of this population group to the effects of climate change is conditioned by the changes that occur in the body because of the physiological ageing process. Because their thermoregulatory system does not function properly, their response to heat waves and intense cold leads to increased mortality. Additionally, their reduced ability to eliminate pollutants from the body and decreased lung capacity lead to increased respiratory and heart disease due to air pollution, as well as decreased cognitive function. Despite extreme weather events, apart from the direct effects of disasters, there is also the interruption or difficulty of access to health care, as

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3 well as depression or post-traumatic shock.[7]In addition to physiological
4 characteristics, repeated exposure to these effects also plays a key role, leading to a
5 cumulative effect.[8] Socio-economic factors such as poverty, low educational level,
6 scarcity or absence of family and social networks may also increase the vulnerability of
7 this population group to climate change.[9]
8
9

10 11 12 **Background**

13
14 Nursing is witnessing this climate change and its consequences on the health of
15 individuals over the age of 65. Healthcare professionals are unprepared and only half-
16 task on environmental measures as few understand why extreme weather events are
17 related to climate change and how they affect the health of older adults.[10]Because of
18 this, they are unaware of strategies or interventions to lessen the impact on this
19 population.[11]Organisations such as ICN (International Council of Nurses), ANA
20 (American Nurse Association) and CNA (Canadian Nurses Association) have called on
21 nursing professionals to contribute to preventing the effects of climate change on the
22 most vulnerable groups, including the elderly.[12]
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27 Following the IPCC recommendations, nursing professionals should use both mitigation
28 and adaptation strategies: educate themselves on the health effects of climate change
29 and be able to address the deterioration of health in this population group;[13]promote
30 healthy lifestyles;[14]and work with communities to build resilience to the
31 consequences of climate change according to the context and resulting
32 needs.[15]Ultimately, it is up to nursing to make significant changes in order to improve
33 society's response to climate change and drive the transformation needed to achieve a
34 healthy future.[13]Significant advances in mitigation and adaptation are achieved when
35 health professionals are engaged in climate change, by demonstrating their central role
36 in understanding and maximising the health benefits of any intervention and
37 communicating the need for rapid response.[16]
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42 Thus, nursing professionals must have the competencies (knowledge, skills and
43 attitudes) necessary to do the following, for instance:[17]
44

- 45 • Be able to identify health problems related to climate change.
- 46 • Adjust the care and monitoring plan according to the increased climatic risk of the
47 exposed elderly (increased hydration, modification of their diet, etc.).
- 48 • Be informed of early warnings of weather events and the prediction of weather-
49 related disease outbreaks (epidemiological surveillance).
- 50 • Identify individuals with the greatest exposure or sensitivity to the effects of climate
51 change.
- 52 • Conduct educational interventions with the elderly on measures to prevent the
53 effects of climate change on health.
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58 For all of the above reasons, it was decided to carry out a scoping review as it is the most
59 suitable design to address this topic, considering the breadth of the subject to be
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3 studied.[18]The authors' intention is to provide an overview and to synthesise the
4 existing evidence on the effects of climate change and its consequences on the health
5 of the over-65 population. Additionally, in order to get a complete picture of the subject,
6 the aim is to take into account not only the results of primary research but also the
7 perspective of bodies and organisations specialising in climate change and health that
8 produce their own reports, some of which are used by governments for decision-making
9 on health policy issues.
10
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12

13 Before starting this review protocol, a preliminary search was conducted in March 2021
14 in the databases JBI Evidence Synthesis, Cochrane Library, Cumulative Index to Nursing
15 and Allied Health Literature (CINAHL) and Medline to locate the possible existence of
16 systematic or scoping reviews previously published or in process that dealt with the
17 same topic. No scoping review was found with the terms sought, although it is worth
18 noting the integrative review carried out by Leyva et al. (2017) that includes both
19 quantitative and qualitative studies to further explore the resilience of this population
20 group when faced with climate change.[19]This future review will provide an updated
21 and in-depth analysis of the available evidence on the influence of environmental factors
22 related to climate change on the health of the older population, including reports from
23 agencies and institutions specialising in climate change and health. A recent scoping
24 review of the effects of climate change focusing on children[20] highlights the need to
25 also review the effects of climate change on older people, as another group vulnerable
26 to such effects.
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32 The authors of this future scoping review believe that it is essential to have the results
33 of research and reports available on the websites of relevant institutions and
34 organisations in the field such as WHO (World Health Organization), the
35 Intergovernmental Panel on Climate Change (IPCC), the European Environment Agency
36 (EEA) and the Lancet, as they have been used as a basis or guide for political decision-
37 making on health issues and highlight the particularities of the most vulnerable
38 population groups, including the elderly. It is, therefore, advisable to carry out a review
39 that incorporates the point of view of these organisations.
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45 **Objective and Scoping review guiding questions**

46
47 The aim of this scoping review is to map the existing literature in order to identify and
48 conduct a description of the effects of climate change on the health of people over 65
49 years of age. The purpose is to provide nursing professionals with an overview of the
50 issues to enable them to plan and implement appropriate care plans for the older
51 population at risk from the effects of climate change.
52
53

54 Therefore, this review will be guided by the following research questions:

- 56 • What effects does climate change have on the health of older people?
 - 57 • Which climate change factors pose the greatest threat to older people?
- 58
59
60

METHODS AND ANALYSIS

Design

This study will use the scoping review methodology. It will follow the Joanna Briggs Institute (JBI) guidance[21] developed by a working group of experts in scoping review methodology.[22]

The review will be subjected to the PRISMA Scoping Review Extension (PRISMA-ScR) checklist[23] to confirm that it has the necessary reporting elements for this type of review and thus complies with reporting standards.[22]

Inclusion criteria

Population:

The participants of interest for this review are older people, defined as individuals over 65 years of age.[24]

Concept:

The direct and indirect effects of climate change (such as temperature, extreme weather events and air pollution) and their consequences on the health of older people will be identified, both physically, in terms of mortality and morbidity, and in terms of their impact on mental health. Its impact on cognitive decline and its influence on the possible acceleration of cognitive decline will also be explored.

Context:

All studies conducted in any geographical area will be taken into account, since climate change is a problem that affects the entire planet and all countries are affected to a greater or lesser extent by its consequences.

In addition, we will consider studies that are carried out at any level of health care, from primary care to hospitalisations and care in emergency departments.

Sources:

Quantitative and epidemiological primary study designs will be considered. As grey literature, conference reports and abstracts published on climate change and ageing on websites of specialised organisations will be considered. Qualitative studies, integrative reviews, narrative reviews, systematic reviews, commentaries, editorials, letters, case series and opinion pieces will not be included as they do not provide original data on the effects of climate change on the health of older people.

Search strategy

Three steps will be performed:[18, 22]

1. *Initial search of* Medline and CINAHL databases to identify key terms and words in the title and abstract of potential articles to be included in the review. Because of this initial search, the following keywords were identified: climate change, global warming, health (effect, problem, impact, issue, hazard), elder, elderly, aged, older people and older adult.

2. *Second search* using the terms identified above to form the appropriate search chains used in the databases as outlined in table 1. After eliminating duplicates, a peer-reviewed search will be conducted according to the inclusion criteria, reviewing title and abstract. Grey literature will be obtained through the official websites of the most relevant specialised bodies identified during the reading of documents for the pre-documentation phase. Papers published in English and Spanish from 2008 to the present will be reviewed.

Table 1. Search chains for different databases

Database	Search Chain
PubMed	(climate change) AND (health AND (effect* OR problem* OR impact* OR issue OR hazard*)) AND (elder* OR aged OR (older AND (people OR adult*)))
Scopus	(climate change) AND (health AND (effect* OR problem* OR impact* OR issue OR hazard*)) AND (elder* OR aged OR (older AND (people OR adult*)))
CINAHL	(Climate change OR global warming) AND (health AND (effect* OR impact* OR problem* OR issue OR hazard*)) AND (elderly or aged or older or elder or geriatric or elderly people or old people or old people or senior)
Cochrane	(Climate change) AND health AND (elderly OR (older people))
PsycInfo	(climate change) AND (health AND (effect* OR problem* OR impact* OR issue OR hazard*)) AND (elder* OR aged OR (older AND (people OR adult*)))
Cuiden plus	Cambio climático AND ancianos

The number of references returned by the search in the different databases will be detailed in a table containing the following information:

- Databases
- Search chains
- Filters
- Number of references/articles retrieved

1
2
3 3. *Search for additional studies* in the reference list of articles and reports selected for
4 inclusion in this review.
5

6 **Analysis**

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8 The software used for managing the results will be Refworks ProQuest, where the
9 references returned by the databases will be exported and duplicates will be eliminated.

10
11 The selection of articles and papers to be finally included in the review will be guided by
12 the inclusion criteria. The degree of agreement between the two reviewers must be
13 equal to or greater than 75% for the selection to continue. If the two reviewers have
14 major disagreements about the inclusion of an article and cannot agree, a third reviewer
15 will analyse the source and determine its eligibility.[22]
16
17

18
19 The PRISMA flowchart will be used along with a narrative description to report the
20 number of studies and reports initially identified in the search, as well as the review
21 decision process, the number of duplicate citations removed, study selection, full-text
22 article retrieval and additional reference list searching.[18]
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25 Separate appendices will be prepared to detail the articles included and a brief mention
26 of those excluded with reasons for their deletion.
27

28
29 As this is a scoping review, the JBI guidance indicates that it is not necessary to analyse
30 the quality of the included studies, as such reviews provide an overview of the existing
31 evidence regardless of the methodological quality,[21] unless there is a specific
32 requirement in relation to the objective of the review.[25]
33
34

35 **Extraction and presentation of data**

36
37 The results will be categorised according to the effects of climate change that have
38 negative consequences on health, e.g., extreme temperatures (category), heat waves
39 (subcategory). This will result in as many categories and subcategories as effects
40 identified during the review of the selected studies. In addition, the results will be
41 presented by geographical area depending on the country conducting the research to
42 be able to assess which climate change effect might affect that region the most,
43 determined by the number of studies addressed on each effect. In any case, these and
44 other results that should be taken into account, for the information they yield will be
45 presented in the form of a table or diagram for better understanding.
46
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48
49 The format of the table will be reviewed and pre-tested by another researcher to
50 corroborate the adequacy of the data collection in relation to the guiding research
51 question. One author will analyse the full text of the selected articles and perform the
52 relevant data extraction; in addition, another author will review the adequacy of the
53 data extraction and analysis.
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3 The most relevant information contained in the selected articles and reports will be
4 extracted in the form of a table created by the research team and which will contain the
5 items detailed below:
6

- 7 • Author and date
- 8 • Title of the study
- 9 • Study location
- 10 • Target population
- 11 • Aim of the study
- 12 • Type of design
- 13 • Results
- 14 • Conclusions/Key findings

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19 Additionally, a narrative description of the results will be provided in relation to the
20 research objective and research questions.
21

22
23 The researchers will contact the authors of the original articles if additional data of
24 particular relevance to the research are required.
25
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28 **Patient and Public Involvement**

29
30 No patient involved.
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34 **ETHICS AND DISSEMINATION**

35
36 The present study is a secondary research using findings from primary researches.
37 Therefore, it does not involve any person as a patient and does not require approval by
38 an ethics committee for its conduct.
39

40
41 The results of this study will provide nursing professionals with relevant and updated
42 information that will help them to evaluate the environmental health of the elderly.
43 Simultaneously, they will be able to conduct health promotion activities and education
44 on environmental health, as well as care plans adapted to the climatic risk to which this
45 population is exposed. To this end, it is intended to disseminate the results of this
46 research through publication in peer-reviewed scientific journals and communications
47 in congresses whose subject matter is climate change, health and the elderly.
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52 **AUTHOR CONTRIBUTIONS**

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54 All authors have conducted substantial contributions to the conception and design, or
55 data acquisition, data analysis and interpretation.
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58 EMR, IMLM and LPA have been involved in the main drafting of the manuscript and CAN
59 and GPA in its critical review for important intellectual content.
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5 relating to the accuracy or completeness of any part of the work are properly
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Effects of Climate Change in the Elderly's Health: A Scoping Review Protocol

ABSTRACT

Introduction: Climate change is a global problem that affects human health, especially the most vulnerable groups, including the elderly. However, no scope review includes the perspective of institutions specialized in climate change and health and whose reports are the basis for policies orientated on the environmental health. Therefore, this study aims to identify these effects on older people health. The results will allow health professionals to have valuable information enabling them to provide quality care in meeting the demand that this situation is producing.

Methods and analysis: A scoping review of the relevant literature will be performed from 2008 to 2021. The Joanna Briggs Institute (JBI) guidelines and the PRISMA-ScR checklist will be used. A peer-reviewed search will be conducted using the electronic databases Medline, Scopus, CINAHL, Cochrane, PsycInfo and Cuiden Plus between October and December 2021. Original quantitative studies and reports from official agencies on the effects of climate change on the elderly health in any health and geographical context will be included. Literature selection will be made by two reviewers. The table format used for data extraction will be reviewed by the review team and tested by two reviewers.

Ethics and dissemination: This study does not require approval by an ethics committee to be conducted. This article will result in the mapping of the direct and indirect effects of climate change on the health of the elderly. The results will be published in scientific journals to be accessible to health professionals in the creation of care plans for the elderly at climate risk.

Key words: Climate change, health, older people, elderly, nursing, scoping review, protocol.

ARTICLE SUMMARY

Strengths and limitations of this study

- The review will follow the JBI guidance and will be subjected to the PRISMA-ScR checklist.
- The review will include publications from 2008 to the present.
- A peer-reviewed search and paper selection will be conducted according to the inclusion criteria.
- The reports made by specialized organisms in climate change and health contributing in the elaboration of environmental policies will be included in the review.
- Quality analysis is not required in the studies included in the review.

INTRODUCTION

There is a great global concern about climate change and its effect on human health. In 1979, the First World Climate Conference was held in Geneva, where it became clear that climate change is a serious problem for our planet. The 1994 United Nations Framework Convention on Climate Change defined climate change as ‘a change of climate, which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods’.[1] Subsequently, several important facts were highlighted at the COP23 UN Conference in Bonn (Germany, 2017); indicators of long-term climate change (increasing carbon dioxide concentration, ocean acidification and rise in sea level) have increased significantly, as has the global average temperature (1.1°C higher than in industrial times).[2] Additionally, the latest IPCC (Intergovernmental Panel on Climate Change) report warns that there is a high risk of intense heat waves, among other impacts, if the 1.5°C increase in the Earth’s average temperature is exceeded, with corresponding impacts on human health.[3] Climate change, along with other exceeded planetary boundaries, has increased the risk to human well-being, requiring change and transformation to enable human societies to develop in a just and safe manner.[4]

Broadly speaking, climate change can influence human health by means of the following:[5]

- *Direct effects:* through changes in the normal temperature range (heat waves or intense cold), extreme weather events (floods, hurricanes, droughts or wildfires) or exposure to ultraviolet radiation.
- *Indirect effects:* through changes in air quality (air pollution, pollen and allergens), access to unsafe food and water and increased risk of transmission of certain vector-borne diseases.

Moreover, the ageing of the world’s population is an unprecedented phenomenon that has been accelerating in recent decades, especially in developed countries. The proportion of people over 60 years of age is expected to double in just 50 years, reaching 2 billion in 2050 (22% of the world’s population). Recently, people in this age group have outnumbered children under 5 years of age.[6]

Climate change is a problem that affects all human beings, but it will affect the most vulnerable population groups to a greater extent, including the elderly, defined as individuals over 65 years of age. The response of this population group to the effects of climate change is conditioned by the changes that occur in the body because of the physiological ageing process. Because their thermoregulatory system does not function properly, their response to heat waves and intense cold leads to increased mortality. Additionally, their reduced ability to eliminate pollutants from the body and decreased lung capacity lead to increased respiratory and heart disease due to air pollution, as well as decreased cognitive function. Despite extreme weather events, apart from the direct

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3 effects of disasters, there is also the interruption or difficulty of access to health care, as
4 well as depression or post-traumatic shock.[7]In addition to physiological
5 characteristics, repeated exposure to these effects also plays a key role, leading to a
6 cumulative effect.[8] Socio-economic factors such as poverty, low educational level,
7 scarcity or absence of family and social networks may also increase the vulnerability of
8 this population group to climate change.[9]
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13 **Background**

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15 Nursing is witnessing this climate change and its consequences on the health of
16 individuals over the age of 65. Healthcare professionals are unprepared and only half-
17 task on environmental measures as few understand why extreme weather events are
18 related to climate change and how they affect the health of older adults.[10]Because of
19 this, they are unaware of strategies or interventions to lessen the impact on this
20 population.[11]Organisations such as ICN (International Council of Nurses), ANA
21 (American Nurse Association) and CNA (Canadian Nurses Association) have called on
22 nursing professionals to contribute to preventing the effects of climate change on the
23 most vulnerable groups, including the elderly.[12]
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28 Following the IPCC recommendations, nursing professionals should use both mitigation
29 and adaptation strategies: educate themselves on the health effects of climate change
30 and be able to address the deterioration of health in this population group;[13]promote
31 healthy lifestyles;[14]and work with communities to build resilience to the
32 consequences of climate change according to the context and resulting
33 needs.[15]Ultimately, it is up to nursing to make significant changes in order to improve
34 society's response to climate change and drive the transformation needed to achieve a
35 healthy future.[13]Significant advances in mitigation and adaptation are achieved when
36 health professionals are engaged in climate change, by demonstrating their central role
37 in understanding and maximising the health benefits of any intervention and
38 communicating the need for rapid response.[16]
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43 Thus, nursing professionals must have the competencies (knowledge, skills and
44 attitudes) necessary to do the following, for instance:[17]
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- 47 • Be able to identify health problems related to climate change.
- 48 • Adjust the care and monitoring plan according to the increased climatic risk of the
49 exposed elderly (increased hydration, modification of their diet, etc.).
- 50 • Be informed of early warnings of weather events and the prediction of weather-
51 related disease outbreaks (epidemiological surveillance).
- 52 • Identify individuals with the greatest exposure or sensitivity to the effects of climate
53 change.
- 54 • Conduct educational interventions with the elderly on measures to prevent the
55 effects of climate change on health.
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3 For all of the above reasons, it was decided to carry out a scoping review as it is the most
4 suitable design to address this topic, considering the breadth of the subject to be
5 studied.[18]The authors' intention is to provide an overview and to synthesise the
6 existing evidence on the effects of climate change and its consequences on the health
7 of the over-65 population. Additionally, in order to get a complete picture of the subject,
8 the aim is to take into account not only the results of primary research but also the
9 perspective of bodies and organisations specialising in climate change and health that
10 produce their own reports, some of which are used by governments for decision-making
11 on health policy issues.
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15 Before starting this review protocol, a preliminary search was conducted in March 2021
16 in the databases JBI Evidence Synthesis, Cochrane Library, Cumulative Index to Nursing
17 and Allied Health Literature (CINAHL) and Medline to locate the possible existence of
18 systematic or scoping reviews previously published or in process that dealt with the
19 same topic. No scoping review was found with the terms sought, although it is worth
20 noting the integrative review carried out by Leyva et al. (2017) that includes both
21 quantitative and qualitative studies to further explore the resilience of this population
22 group when faced with climate change.[19]This future review will provide an updated
23 and in-depth analysis of the available evidence on the influence of environmental factors
24 related to climate change on the health of the older population, including reports from
25 agencies and institutions specialising in climate change and health. A recent scoping
26 review of the effects of climate change focusing on children[20] highlights the need to
27 also review the effects of climate change on older people, as another group vulnerable
28 to such effects.
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32 The authors of this future scoping review believe that it is essential to have the results
33 of research and reports available on the websites of relevant institutions and
34 organisations in the field such as WHO (World Health Organization), the
35 Intergovernmental Panel on Climate Change (IPCC), the European Environment Agency
36 (EEA) and the Lancet, as they have been used as a basis or guide for political decision-
37 making on health issues and highlight the particularities of the most vulnerable
38 population groups, including the elderly. It is, therefore, advisable to carry out a review
39 that incorporates the point of view of these organisations.
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48 **Objective and Scoping review guiding questions**

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50 The aim of this scoping review is to map the existing literature in order to identify and
51 conduct a description of the effects of climate change on the health of people over 65
52 years of age. The purpose is to provide nursing professionals with an overview of the
53 issues to enable them to plan and implement appropriate care plans for the older
54 population at risk from the effects of climate change.
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57 Therefore, this review will be guided by the following research questions:

- 58 • What effects does climate change have on the health of older people?
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- Which climate change factors pose the greatest threat to older people?

METHODS AND ANALYSIS

Design

This study will use the scoping review methodology. It will follow the Joanna Briggs Institute (JBI) guidance[21] developed by a working group of experts in scoping review methodology.[22]

The review will be subjected to the PRISMA Scoping Review Extension (PRISMA-ScR) checklist[23] to confirm that it has the necessary reporting elements for this type of review and thus complies with reporting standards.[22]

Inclusion criteria

Population:

The participants of interest for this review are older people, defined as individuals over 65 years of age.[24]

Concept:

The direct and indirect effects of climate change (such as temperature, extreme weather events and air pollution) and their consequences on the health of older people will be identified, both physically, in terms of mortality and morbidity, and in terms of their impact on mental health. Its impact on cognitive decline and its influence on the possible acceleration of cognitive decline will also be explored.

Context:

All studies conducted in any geographical area will be taken into account, since climate change is a problem that affects the entire planet and all countries are affected to a greater or lesser extent by its consequences.

In addition, we will consider studies that are carried out at any level of health care, from primary care to hospitalisations and care in emergency departments.

Sources:

Quantitative and epidemiological primary study designs will be considered. As grey literature, conference reports and abstracts published on climate change and ageing on websites of specialised organisations, such as the Intergovernmental Panel on Climate Change (IPCC), the U.S. Environmental Protection Agency (EPA), the European Environment Agency (EEA), and the Stockholm Environment Institute (SEI), will be considered. Qualitative studies, integrative reviews, narrative reviews, systematic

reviews, commentaries, editorials, letters, case series and opinion pieces will not be included as they do not provide original data on the effects of climate change on the health of older people.

Search strategy

The principal investigator will perform three steps:[18, 22]

1. *Initial search of* Medline and CINAHL databases to identify key terms and words in the title and abstract of potential articles to be included in the review. Because of this initial search, the following keywords were identified: climate change, global warming, aged and health as MeSH terms; effect, problem, impact, issue, hazard, elder, elderly, older people and older adult as free terms.

2. *Second search* using the terms identified above to form the appropriate search chains used in the databases as outlined in table 1. The search will be conducted between October and December 2021. After eliminating duplicates, a peer-reviewed search will be conducted according to the inclusion criteria, reviewing title and abstract. Grey literature will be obtained through the official websites of the most relevant specialised bodies identified during the reading of documents for the pre-documentation phase. Papers published in English and Spanish from 2008 to the present will be reviewed.

Table 1. Search chains for different databases

Database	Search Chain
PubMed	(climate change) AND (health AND (effect* OR problem* OR impact* OR issue OR hazard*)) AND (elder* OR aged OR (older AND (people OR adult*)))
Scopus	(climate change) AND (health AND (effect* OR problem* OR impact* OR issue OR hazard*)) AND (elder* OR aged OR (older AND (people OR adult*)))
CINAHL	(Climate change OR global warming) AND (health AND (effect* OR impact* OR problem* OR issue OR hazard*)) AND (elderly or aged or older or elder or geriatric or elderly people or old people or old people or senior)
Cochrane	(Climate change) AND health AND (elderly OR (older people))
PsycInfo	(climate change) AND (health AND (effect* OR problem* OR impact* OR issue OR hazard*)) AND (elder* OR aged OR (older AND (people OR adult*)))
Cuiden plus	Cambio climático AND ancianos

The number of references returned by the search in the different databases will be detailed in a table containing the following information:

- Databases
- Search chains
- Filters
- Number of references/articles retrieved

3. *Search for additional studies* in the reference list of articles and reports selected for inclusion in this review.

Analysis

The software used for managing the results will be Refworks ProQuest, where the references returned by the databases will be exported and duplicates will be eliminated.

The selection of articles and papers to be finally included in the review will be guided by the inclusion criteria. The degree of agreement between the two reviewers must be equal to or greater than 75% for the selection to continue. If the two reviewers have major disagreements about the inclusion of an article and cannot agree, a third reviewer will analyse the source and determine its eligibility.[22]

The PRISMA flowchart will be used along with a narrative description to report the number of studies and reports initially identified in the search, as well as the review decision process, the number of duplicate citations removed, study selection, full-text article retrieval and additional reference list searching.[18]

Separate appendices will be prepared to detail the articles included and a brief mention of those excluded with reasons for their deletion.

As this is a scoping review, the JBI guidance indicates that it is not necessary to analyse the quality of the included studies, as such reviews provide an overview of the existing evidence regardless of the methodological quality,[21] unless there is a specific requirement in relation to the objective of the review.[25]

Extraction and presentation of data

The results will be categorised according to the effects of climate change that have negative consequences on health, e.g., extreme temperatures (category), heat waves (subcategory). This will result in as many categories and subcategories as effects identified during the review of the selected studies. In addition, the results will be presented by geographical area depending on the country conducting the research to be able to assess which climate change effect might affect that region the most, determined by the number of studies addressed on each effect. In any case, these and other results that should be taken into account, for the information they yield will be presented in the form of a table or diagram for better understanding.

The format of the table will be reviewed and pre-tested by another researcher to corroborate the adequacy of the data collection in relation to the guiding research question. One author will analyse the full text of the selected articles and perform the

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3 relevant data extraction; in addition, another author will review the adequacy of the
4 data extraction and analysis.
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6 The most relevant information contained in the selected articles and reports will be
7 extracted in the form of a table created by the research team and which will contain the
8 items detailed below:
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- 10 • Author and date
- 11 • Title of the study
- 12 • Study location
- 13 • Target population
- 14 • Aim of the study
- 15 • Type of design
- 16 • Results
- 17 • Conclusions/Key findings

18 Additionally, a narrative description of the results will be provided in relation to the
19 research objective and research questions.
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21 The researchers will contact the authors of the original articles if additional data of
22 particular relevance to the research are required.
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24 **Patient and Public Involvement**

25 No patient involved.
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27 **ETHICS AND DISSEMINATION**

28 The present study is a secondary research using findings from primary researches.
29 Therefore, it does not involve any person as a patient and does not require approval by
30 an ethics committee for its conduct.
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32 The results of this study will provide nursing professionals with relevant and updated
33 information that will help them to evaluate the environmental health of the elderly.
34 Simultaneously, they will be able to conduct health promotion activities and education
35 on environmental health, as well as care plans adapted to the climatic risk to which this
36 population is exposed. To this end, it is intended to disseminate the results of this
37 research through publication in peer-reviewed scientific journals and communications
38 in congresses whose subject matter is climate change, health and the elderly.
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40 **AUTHOR CONTRIBUTIONS**

41 All authors have conducted substantial contributions to the conception and design, or
42 data acquisition, data analysis and interpretation.
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3 EMR, IMLM and LPA have been involved in the main drafting of the manuscript and CAN
4 and GPA in its critical review for important intellectual content.
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6 EMR, IMLM, LPA, CAN and GPA have given final approval of the version to be published.
7 All five authors agree to be responsible for all aspects of the work to ensure that issues
8 relating to the accuracy or completeness of any part of the work are properly
9 investigated and resolved.
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18 **COMPETING INTEREST**

19 None declared.
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