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Abstracts

Systematic Review of the Literature

Introduction: Scientists have been predicting the severe impacts of climate change for decades, and today these threats have intensified, with climate events pushing temperatures, sea levels, and biodiversity loss to record extremes. This review examines the impact of climate change on mental health in vulnerable populations residing in Africa. **Methods:** Medline, Embase, Ovid, APA PsycINFO, Global Health were searched for studies published after 2007 researching the psychological impact of climate change on vulnerable African populations. Studies were screened according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and results were reviewed using a narrative synthesis approach. **Results:** Twenty-four articles, including 37,896 participants, were analysed. The results suggest that women, young people, farmers, migrants, people living in rural areas and survivors of climate-related traumatic experiences (such as extreme weather events) are all vulnerable to mental health impacts caused by the climate crisis. **Implications and Conclusions:** Future research is needed in African countries which have not yet been studied, including island nations. Further high-quality research is required to establish longitudinal impacts of the climate crisis and to explore the impacts on vulnerable groups which are, as yet, neglected in the research, including e.g. ethnic minorities, indigenous groups, LGBTQ+ communities.

Keywords*: climate crisis, ecological crisis, mental health, Africa, vulnerable populations, children, farmer*

Service Improvement Project

Introduction: There is emerging awareness of the mental health difficulties experienced by people living with homelessness, however more is known about men experiencing homelessness, as they have historically made up most of the population, meaning that support services have been designed around their experience. Women's experience of homelessness is often "hidden". This study explored differences between men and women who access the Homeless Oxfordshire service, including obstacles to access, which informed recommendations for Homeless Oxfordshire. **Methods**: Gender differences, in terms of referrals and outcome data, were explored through an audit. Individual interviews were conducted with female support staff with lived experience of homelessness and focus groups were facilitated, with male and female support staff. Thematic analysis was used to analyse interview and focus group data separately before identifying overarching themes. Staff attended a feedback and training event following the interviews. **Results**: Three times as many men accessed Homeless Oxfordshire between 2022 and 2023. Three themes were identified from the interviews and focus groups: "the relationship between support worker and service user", "shame for failing to enact society's stereotypical role for women" and "traumatic experiences and traumatised responses". Staff confidence in working with women increased following the feedback and training event provided. **Conclusions:** Recommendations are provided on how to improve support for women experiencing homelessness.

Keywords*: homeless, support workers, trauma-informed, homeless services, homeless women, lived experience, qualitative method*

Theoretically Driven Research Project

Objectives: People who hear voices commonly experience high levels of shame. This study builds on evolutionary theories by investigating how feelings of shame impact on the nature of the voice – person relationship. Researchers aim to understand whether increased feelings of external shame lead voice hearers to adopt a subordinating relationship to the voice(s), assigning a higher social rank to the voice. The research also explored whether voice content mediates this relationship. **Design:** The study implements a cross-sectional design, using an online survey. **Methods:** 58 voice-hearers completed a series of questionnaires related to voice-hearing, external shame and perceived social rank, along with additional control variables online or via the telephone. **Results:** After controlling for confounders, external shame was found to significantly predict perceived social rank, with higher levels of external shame corresponding to a lower perception of one's own social rank, compared with the voice. Results do not support the hypothesis that voice content mediates this relationship. **Conclusions:** findings align with evolutionary theories on shame in voice hearers and build on previous research by offering greater specificity in understanding the relationship between external shame and social rank. However, limitations in study design, measurement, and recruitment warrant cautious interpretation.

Keywords*: voice hearing, psychosis, shame, social rank, voice dialogue*

Practitioner Points:

- External shame appears to increase the likelihood that voice-hearers take on a subordinate role in the relationship with voices they hear. As such, shame may be a fundamental emotional experience to target in psychological interventions.
- Compassion-Focused Therapy is therefore a promising therapeutic model for this client group, as the approach can reduce threat-based emotions such as shame. In voice hearers, this approach could help to reduce submissive responses to voices.
- Reducing feelings of shame may also influence how voices are experienced, including tone and content, potentially lowering their malevolence.

Systematic Review of the Literature

The mental health impact of the climate and ecological crisis on vulnerable populations in Africa

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Introduction

Almost twenty years ago, scientists were predicting the global effects of climate change on extreme weather events (EwEs), water availability, food security and ecosystems, identifying at-risk continents, including Asia and Africa (IPCC, 2007). Two decades on, the climate crisis (CC) has become *the* global issue which threatens our livelihood, and ultimately humanity's existence, leading forty counties to declare a "climate emergency" (Climate Emergency Declaration, 2024).

Despite recognition of the crisis, action has been insufficient to mitigate the CC. The recent State of the Climate report indicated that 2023 marked a critical turning point, with climate trends reaching historic levels, including record temperatures, rising sea levels and biodiversity loss (Ripple et al., 2023). Climate change is expected to cause approximately 250 000 additional deaths per year between 2030 and 2050, from malnutrition, diarrhoea, malaria and heat stress (WHO, 2021).

The CC impacts both our physical and mental health, with populations who have contributed least to the problem disproportionately impacted (IPCC, 2023). Physical health impacts from the Lancet Countdown Report include: heat stress, exacerbations of cardiovascular and respiratory disease, exacerbation of respiratory symptoms from wildfire smoke and the spread of vector-borne and water-borne diseases following flooding or drought, malnutrition due to food insecurity, increased migration, mortality (Watts et al., 2021; Rocque et al., 2021). The United Nations Framework Convention on Climate Change provides examples of eco-based adaptation in vulnerable groups, such "Café de Costa Rica", implemented by Costa Rican farmers (Least Developed Countries Expert Group, 2018) and producing low-carbon coffee using agro-forestry to achieve carbon sequestration and climate adaptation (Namacafe, 2018).

Impact of the Climate Crisis on Mental Health

The psychological effects of climate change, as noted by Cianconi, Betrò & Janir (2020) and Lawrence et al. (2022), include direct and indirect impacts, ranging from Post-Traumatic Stress Disorder (PTSD) caused by EwEs (Zuñiga, Reyes, Murrieta & Villoria, 2019) to affective responses linked to climate awareness which researchers are only beginning to define and understand (Cianconi, Betrò & Janiri, 2020; Zuñiga et al., 2019; Leger-Goodes et al., 2022). Among these is **"**eco-anxiety"**,** defined as a chronic fear of environmental doom, characterised by feelings of uncertainty, unpredictability and uncontrollability. Eco-anxiety differs from generalised anxiety as fears are often existential in nature and can also occasionally present as a "practical anxiety", leading to the gathering of new information and behaviour change (Pihkala, 2020). "Solastalgia" is another recently coined term**,** referring to the existential distress or "homesickness when still at home," stemming from living amidst environmental degradation of one's familiar surroundings (du Preez, 2024). Psychosocial consequences also manifest at community and societal levels, including chronic stress from rising temperatures, forced migration, erosion of social cohesion, and climate-related conflicts (Doherty & Clayton, 2011; Berry et al., 2010).

Psychological interventions are in early developmental stages, for example Lindhe et al. (2023) successfully piloted a randomised controlled trial targetting climate-related mental health distress, addressing depressive symptoms, anxiety, stress, insomnia, and pro-environmental behaviour.

Populations living in tropical and subtropical climates are particularly vulnerable to temperature increases, with a 1˚C rise in temperature associated with a 1% increase in suicide

incidence (Gao et al., 2019) and significant increases in mood, organic, schizophrenic, neurotic and anxiety disorders (Liu et al., 2021).

Certain demographic groups are more vulnerable to climate-related mental health difficulties, including indigenous people, children, older adults, and climate migrants who were identified as most at-risk of solastalgia, suicidality, depression, anxiety/eco-anxiety, PTSD, substance use, insomnia, and behavioural disturbances (White at al., 2023). The impact on children and young people is consistently reported in the literature (Hickman et al., 2021; Sharpe et al., 2022; Burke, Sanson & Van Hoorn, 2018). However, world-wide research and surveys have historically overrepresented data collected from developed, wealthy, industrialised countries (e.g. Galway & Field, 2023; Hickman et al. 2021; White et al., 2023). Despite being the biggest carbon emitters, westernised countries are not yet directly experiencing the effects of the CC faced by developing nations in the Global South (IPCC, 2023).

Among regions in the Global South, Africa is uniquely and acutely affected by the CC due to high exposure to environmental hazards and low adaptive capacity (Serdeczny et al., 2017; IPCC, 2023). Despite this, African countries have received disproportionately little attention in climate and mental health research (Atwoli et al., 2021), making it a critical and under-addressed region for focused investigation. This review therefore concentrates on Africa to help redress this imbalance and highlight region-specific vulnerabilities and policy needs.

Mental Health Impact in Africa

Africa is under-researched in this field (Atwoli, Muhia & Merali, 2022; Deglon, Dalvie & Abrams, 2023) and the lack of longitudinal data makes it challenging to understand the

cumulative and long-term impact of direct and indirect effects of the CC. Predicted threats include: reduced precipitation leading to droughts, rising sea levels affecting coastal cities resulting in migration, increased food insecurity with an expected 18.6% reduction in agricultural produce (Serdeczny et al., 2017).

Preliminary mental health research indicate that flooding, drought, extreme heat and bushfires in Africa are linked to increases in mood disorders, PTSD, suicide, emotion regulation difficulties, disturbed sleep, alcohol use, stress, and anxiety (Deglon et al., 2023). The present review seeks to build on this research, by also assessing the slower more chronic impacts of the CC (e.g. temperature increases, sea-levels rising), as well as incidents of EwEs.

Certain African populations are at particular risk of mental health deterioration, including those dependent on stable environments for their livelihood, such as rural Ghanaian farmers who report poor mental health related to CC-induced livestock losses (Nuvey et al., 2020). Climate-related migration within Africa is a growing challenge, with internally displaced people at risk of malnutrition, mental health problems and gender-based violence (Lindvall, 2020).

The United Nations Framework Convention on Climate Change identified young, old, poor, remote and indigenous communities in developing countries as uniquely vulnerable (The Least Developed Countries Expert Group, 2018). Women, those directly impacted and people whose homes are damaged are at risk of developing PTSD following climate disasters, e.g. earthquakes, in developing countries (Zuñiga, Reyes, Murrieta & Villoria, 2019). For the purposes of this review, we define “vulnerable populations” as any group of people who

either a) have a livelihood or lifestyle which depends on a stable climate (e.g. farmers, pastoralists, nomadic people) or b) are at risk of experiencing mental health difficulties as a result of belonging to a certain demographic group (e.g. low-income families, children, pregnant women, older adults, people with long-term health conditions, people with pre-existing mental health difficulties, people belonging to LGBTQ+ communities). This definition was adopted and used in a similar systematic review (White et al., 2023). The authors acknowledge the controversial nature of using the term “vulnerable groups” in this context, with some arguing that this terminology risks characterising populations as passive victims rather than active communities with access to their own resilience, knowledge, and capacity to adapt to climate and mental health challenges (Okpara, Stringer & Dougill, 2016). The term is used in the hope that this language accurately conveys immediacy and seriousness**,** highlighting how the CC disproportionately impacts certain communities, thus making it a powerful tool in communication and mobilisation.

The aim of this review is to systematically examine the mental health impacts of the CC amongst vulnerable populations in Africa, including direct and immediate (e.g. natural disasters), direct and slower (e.g. rising heat) and indirect (e.g. observing biodiversity loss) effects. The purpose is to evaluate the extent and quality of the existing evidence base in this area, to identify how the CC is affecting specific vulnerable groups, and to inform policy change and intervention recommendations. The scope of the review encompasses peer-reviewed empirical studies conducted in African countries, focussing on populations considered socially, economically or geographically vulnerable, and reporting quantitative and/or qualitative data on mental health outcomes linked to climate-related exposures. The following objectives guide the review:

1. Objective 1: In vulnerable African populations, what are the mental health consequences of CC-related EwEs?
2. Objective 2: In these populations, what are the mental health impacts of non-disaster climate changes (e.g. temperature increases)?
3. Objective 3: What is the quality of the existing evidence identified in addressing objectives 1 and 2?

Methods

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria (Page et al., 2020). Using mixed methods scoping review methodology, both qualitative and quantitative research were reviewed (Siddaway, Wood & Hedges, 2019; Baumeister & Leary, 1997). The review was pre-registered on PROSPERO, registration number CRD42024445144.

Search Strategy

Papers were identified by searching Medline, Embase, Ovid, APA PsycINFO, Global Health. The search was conducted on 5th September 2024 and repeated on 10th February 2025 to check for any new publications. Search terms, developed via consultation with a research librarian, included key words such as ‘Africa’, ‘climate crisis’ and ‘mental disorder’. Automated filters limited results to papers written in English, published after 2007 (explanation in the inclusion criteria below). The full search strategy can be found in Appendix A. Reference lists of relevant reviews (Atwoli, Muhia & Merali, 2022; Deglon, Dalvie & Abrams, 2023; Sharpe & Davison, 2022), as well as included studies, were screened. A manual search of the 2023 volumes of: International Journal of Environmental

Research and Public Health, Global Environmental Change, Climatic Change, Journal of Environmental Psychology, Disaster Medicine and Public Health Preparedness, and Environmental Health yielded two additional papers.

Study Selection

A PRISMA flowchart (Page et al., 2020) describes the systematic process of study selection. Firstly, duplicates were removed. Then titles and abstracts were reviewed according to the inclusion and exclusion criteria (below), and a random sample of 20% of papers were double rated, with excellent agreement between the two reviewers, $k = 0.91$ (95% CI: 0.780 to 1.034), $p < 0.001$. Papers included by either reviewer advanced to the next stage. As shown in Figure 1, 53 papers were retained and included for full text screening. A random sample of 25% papers were double rated at the full text screening stage. There was substantial agreement between the two reviewers $k = 0.68$ (95% CI: 0.288 to 1.064), $p < 0.001$. Any disagreements about inclusion at the full text stage were discussed and supervisors were consulted about outstanding differences.

Inclusion Criteria:

i. The paper was written in English.
ii. The research was conducted in Africa, with African residents.
iii. The paper researched participants from a vulnerable population (definition below).
iv. The paper reported on the impact of climate disasters (e.g. fires, floods and droughts) and/or ecosystem changes (e.g. extreme temperatures, rising sea levels, biodiversity loss). See Appendix A for the full list of included climate impacts.
v. The paper reported on mental health-related outcomes, e.g. diagnoses, symptoms, suicide rates, subjective wellbeing.

vi. Empirical research (qualitative or quantitative) published in a peer-reviewed journal.
vii. The paper was published from 2007 onwards (IPCC's fourth assessment report (AR4) in 2007 acknowledged the impacts of climate change on human health. This approach was taken in another similar systematic review by Sharpe et al. (2022).).

Exclusion Criteria:

i. The paper reported on impacts of man-made crises, such as war/conflict.
ii. The paper did not report novel findings, e.g. narrative reviews, scoping reviews, systematic reviews, meta-analyses, commentaries, editorials, expert opinions, validation studies.

Data Extraction and Quality Assessment

A data extraction spreadsheet was developed and piloted to increase reliability. Data were extracted from each paper meeting inclusion criteria. Data included number of participants, participant characteristics (sex, age and vulnerability characteristics), climate exposure, mental health outcome measures, design and method of the study, and the results. 50% of included studies were independently checked for accuracy. Due to the heterogeneity of studies, a meta-analysis was not deemed appropriate, and data were instead reviewed using narrative synthesis (Baumeister & Leary, 1997). Data were synthesised according to the methodology used, i.e. quantitative or qualitative, and then further categorised according to vulnerable population group identity.

Methodological quality was assessed using the Standard Quality Assessment criteria (Kmet et al., 2004) to give an overall quality score, suitable for assessing both qualitative and quantitative research. Three quality appraisal tool items relevant only to intervention studies

were excluded for quantitative papers. The tool assesses how clearly the research aims and objectives are defined, the appropriateness of study design, sample size, analytic methods and conclusions drawn, and steps taken to account for confounding variables. For qualitative research, the tool also assesses descriptions of verification procedures for data analysis and whether an account of reflexivity is included. See appendix B for all quality appraisal items.

Each paper was individually marked against the checklist to assess risk of bias, and an overall quality score was given. Checklist items were rated on a 3-point scale (0 = no, 1 = partial, 2 = yes) with maximum scores of 22 (quantitative) and 20 (qualitative). For each item, a specific definition for what qualifies as "no", "partial", or "yes" is provided, with examples, by Kmet and colleagues (2004). Summary scores between 0 and 1 were calculated for each paper, as per scoring guidance (Kmet et al., 2004), with scores over 0.55 deemed acceptable for inclusion in reviews (Kmet et al., 2004). Fifty percent of papers were independently quality assessed by a second reviewer, with substantial agreement, $k = 0.77$ (95% CI: 0.661 to 0.88), $p < 0.001$. Disagreements were resolved in discussion with supervisors of the project. Studies were classified as low (score of <0.55), average (score of 0.55 to 0.77) and high (score of >0.77) quality.

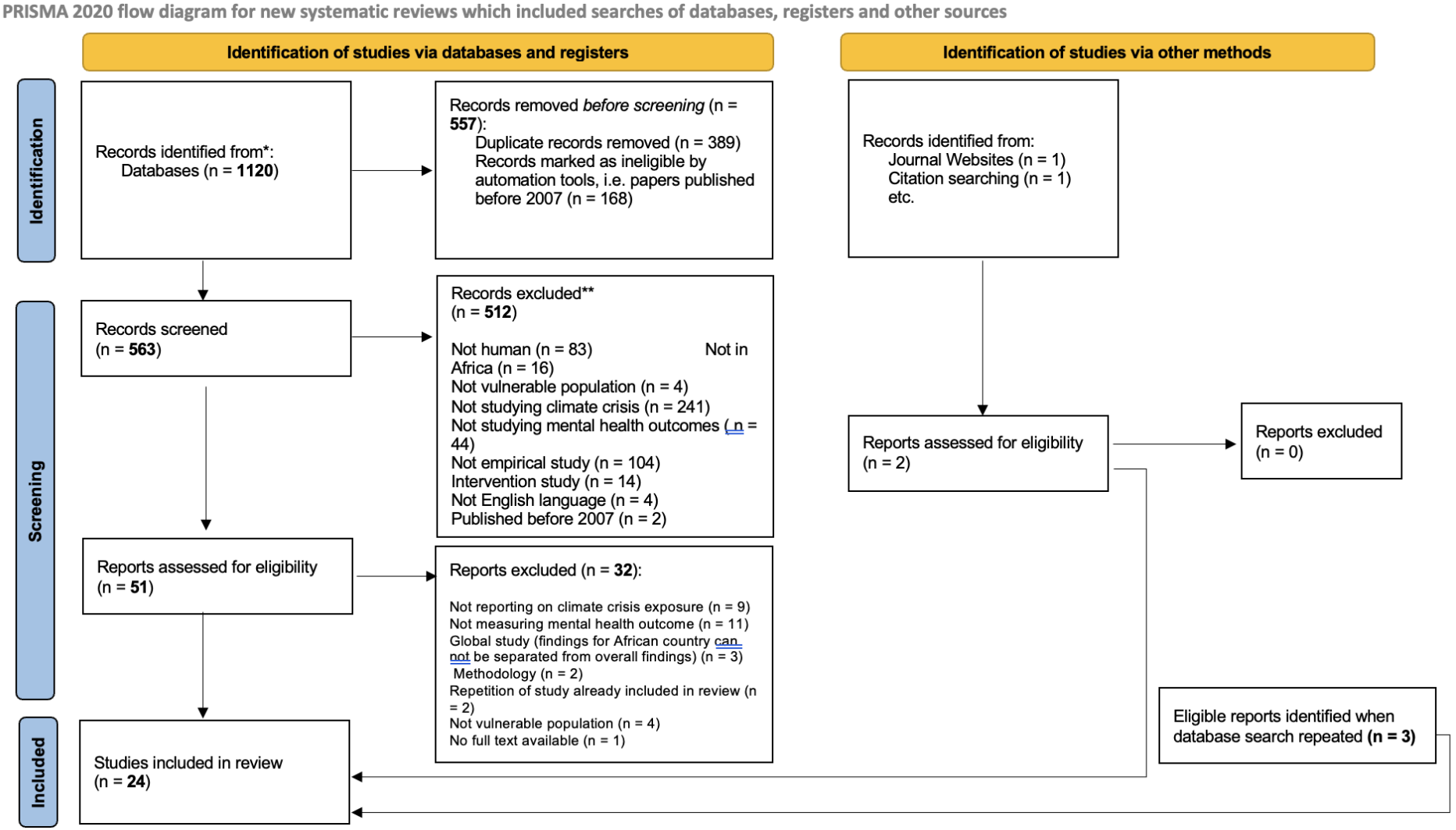
Results

Description of results

The database search initially yielded 1120 papers, 389 of which were duplicates (Figure 1). After screening by two reviewers, 21 studies met the inclusion criteria, including 36,425 participants (sample size range of 20 to 2652. *NB*: one included article had a total sample size of 10,000, however only 1,000 participants were African). The repeated search on 10th

February 2025, yielded three additional papers, with a total of 1,471 participants, giving a final total of 24 papers (Figure 1).

Figure 1.
PRISMA Flow Diagram of Study Selection Process



A total of 24 studies were included in this review, comprising 17 quantitative and 7 qualitative studies.

Quantitative Studies

Seventeen studies used quantitative methods, mostly implementing cross sectional designs, with some cohort studies (n=4) and one using mixed methods. Studies were conducted in Kenya (n = 5), Uganda (n = 2), Ghana (n = 3), South Africa (n = 2), Nigeria (n = 2), Ethiopia (n = 1), Namibia (n = 1), and Tanzania (n = 1). Four articles studied farmers (Njeru et al., 2022, Abunyewah et al., 2024, Rosinger et al., 2024, Mohammed et al., 2024), four studied rural populations (Libey et al., 2022, Obaniyi et al., 2023, Goodman et al., 2023, Goodman et al., 2023), four studied young people (Clayton et al., 2023, Taukeni et al., 2016;, Prencipe et al., 2023, Ndetei et al., 2024), three studied survivors of climate-related disasters (Tomita et al. 2022, Kabunga et al. 2022, Abass et al., 2022), one studied women (Nothling et al., 2024), and migrants (Abu et al., 2024).

Climate-related exposures examined included: multiple impacts of climate change (n = 5; Njeru et al., 2022, Ndetei et al., 2024, Obaniyi et al., 2023, Prencipe et al., 2023, Clayton et al., 2023), drought (n = 2; Abunyewah et al., 2024, Rosinger et al., 2024), resource scarcity (n = 4; Libey et al., 2022, Goodman et al., 2023, Goodman et al., 2023, Mohammed et al., 2024), flooding (n = 3; Nothling et al., 2024, Taukeni et al., 2016, Abass et al., 2022), rising sea levels (n = 1; Abu et al., 2024), landslides (n = 1; Kabunga et al. 2022), and extreme weather disasters (n = 1; Tomita et al. 2022).

Mental health outcomes measured ranged from PTSD (Taukeni et al., 2016, Kabunga et al. 2022), depression (Prencipe et al., 2023; Rosinger et al., 2024, Njeru et al., 2022), psychological distress (Abass et al., 2022), intimate partner violence (Nothling et al., 2024),

alcohol consumption (Mohammed et al., 2024) to broader psychological phenomena such as climate-related worry, functional impact, emotions, safety, attachment to place, and anxiety (e.g. Abu et al., 2024) Several studies used idiosyncratic measures to assess constructs such as water-related distress (Libey et al., 2022, Ndetei et al., 2024), climate change–related health impacts, and social capital (e.g. Clayton et al., 2023, Abunyewah et al., 2024).

Qualitative Studies

Seven studies used qualitative approaches. These were conducted in Nigeria (n = 1), Ghana (n = 1), Zimbabwe (n = 1), Burkina Faso (n = 1), Ethiopia (n = 1), Kenya (n = 1), and Botswana (n = 1). Data collection methods included semi-structured interviews (n = 2), image-based methods combined with interviews (n = 2), and a combination of interviews and focus groups (n = 3). Thematic analysis was the most common analytic approach, with one study using Grounded Theory. Populations studied included farmers (n = 3; Beyeler et al., 2023, Cooper et al., 2019, Shoko Kori., 2023), young people (n = 2; Pinchoff et al., 2025 and Babugura et al., 2008), migrants (Adams et al., 2021), and women (Kadio et al., 2024). Climate exposures explored included water scarcity (Cooper et al., 2019), rising temperatures (Kadio et al., 2024), flooding (Adams et al., 2021), heat and drought (Pinchoff et al., 2025; Babugura et al., 2008), and multiple climate change impacts (Beyeler et al., 2023, Shoko Kori., 2023).

Across all included studies, seven examined farmers (4 quantitative, 3 qualitative), six examined young people (4 quantitative, 2 qualitative), four examined rural populations (all quantitative), three examined survivors of climate disasters (3 quantitative), two examined

women (1 quantitative, 1 qualitative), and two examined migrants (1 quantitative, 1 qualitative). Participant ages ranged from 8 to 80 years, though no studies focused specifically on older adults.

Quality assessment

The Standard Quality Assessment criteria (Kmet, 2004) was utilised (Appendix B), rating studies as low (<0.55), average (0.55–0.77), high (>0.77) quality. Scores ranged from 0.18 to 0.95, with a mean of 0.74 (Appendix C). One study scored considerably below the 0.55 level of acceptability, as suggested by Kmet et al., 2004 (Obaniyi et al., 2023).

Among quantitative studies, 12 papers were “high” quality, four were “average” and one was “low”. Average quality studies (Njeru et al., 2022; Ndetei et al., 2024; Abass et al., 2022; Abu et al., 2024) were investigating: multiple impacts of the CC on depression and anxiety rates in Kenyan farmers and depression, anxiety, behavioural difficulties and suicidal ideation in Kenyan high school children, the impact of flooding on psychological distress in Ghanaian and the impact on feelings of rising sea levels on feelings of safety, attachment and environmental connection in Ghanaian migrants. Methodological limitations identified in these studies include: poorly defined/described outcome measures, lack of controlling for confounding variables, insufficient detail in the results reporting and lack of variance estimates reported for main results. Obaniyi et al. (2023), investigating the impact of the CC on rural farming households in Nigeria, received a “low” overall quality rating. Compared to other papers, this paper provided limited descriptions or justifications for the study methodology, outcome measures used, subject characteristics or analysis methods used. They also did not report attempts to control for confounding variables.

Among qualitative studies, four papers were assessed as “high” quality overall and three were assessed as “average” quality (Babugura et al., 2008; Cooper et al., 2019; Shoko Kori., 2023). The studies assessed “average” in quality were investigating the impact of drought on children and adolescents in Botswana, the impact of water scarcity on farmers in Ethiopia, outcomes of multiple impacts of the CC on farmers in Zimbabwe. Lower quality qualitative studies lacked evidence of reflexivity, descriptions of verification procedures (e.g. a second researcher coding/analysing a portion of the data), or a clearly identified theoretical framework.

Table 1.

Study characteristics and baseline patient demographics

	Article	Sample Size	Country	Description of participants (e.g. sex, age range, occupation)	Reason for Vulnerability	Climate Crisis Exposure	Study Design
Quantitative	Njeru et al. (2022).	400	Kenya	Smallholder crop farmers in Embu and Meru counties. Age, sex not reported.	Farmers	Multiple Impacts of Climate Change	Cross-sectional survey
	Abunyewah et al. (2024).	507	Ghana	Farmers. Male (63.1%) and female. Age range: 18 - 63 and above.	Farmers	Drought	Cross-sectional survey
	Libey et al. (2022).	469	Ethiopia	Rural People. Mean age = 35 years. Both male and female.	Rural population	Water scarcity	Cross-sectional survey
	Ndetei et al. (2024).	2652	Kenya	High School Children. Male (66.6%) and female. Mean age = 16 years old, range: 13 - 23 years.	Children and Adolescents	Multiple Impacts of Climate Change	Cross-sectional survey
	Nothling et al. (2024).	69	South Africa	Women, low-income. Age range: 18–44 years. Mean age: 26.3	Women	Flood	Cohort design, two time points (pre and post flood)
	Obaniyi et al. (2023).	120	Nigeria	Rural Farming Households. Age, sex not reported.	Rural population	Multiple Impacts of Climate	Mixed methods: structured questionnaires and interview schedules

Table 1.

Study characteristics and baseline patient demographics

Article	Sample Size	Country	Description of participants (e.g. sex, age range, occupation)	Reason for Vulnerability	Climate Crisis Exposure	Study Design
Prencipe et al. (2023).	2053	Tanzania	Young people. Age range: 18-23 years old. Male (55%) and female.	Children and Adolescents	Change Multiple Impacts of Climate Change	Cross-sectional survey
Taukeni et al. (2016).	480	Namibia	Children (8-18 years old). Female (63%) and male.	Children and Adolescents	Flood	Cross-sectional survey
Goodman et al. (2023).	362	Kenya	Adults participating in a community-based empowerment program. . Mean age = 41.7 years old. Female (92%) and male.	Rural population	Resource scarcity	Cohort study (2 time points)
Goodman et al. (2023).	152	Kenya	Adults participating in a community-based empowerment program. Female (97.3%) and male. Mean age: 45 years old.	Rural population	Resource scarcity	Cohort study (2 time points)
Abass et al. (2022).	767	Ghana	Flood-prone community-dwelling households. Mean age: 47.3 years. Males (61.4%) and females.	Survivors of Climate Trauma	Flood	Cross-sectional

Table 1.

Study characteristics and baseline patient demographics

Article	Sample Size	Country	Description of participants (e.g. sex, age range, occupation)	Reason for Vulnerability	Climate Crisis Exposure	Study Design
Abu et al. (2024).	505	Ghana	Relocated and non-relocated individuals living in Volta Delta region. Age range: 18 - 60+. Females (58.9%) and males.	Migrants	Rising sea levels	Cross sectional survey
Clayton et al. (2023).	10,000	10 countries, 1000 participants per country: Australia, Brazil, Finland, France, India, *Nigeria*, Philippines, Portugal, the UK, and the USA.	Young people aged 16–25. Mean age: 20.82 years old. Male (51.4%) and female.	Children and Adolescents	Multiple Impacts of Climate Change	Cross-sectional survey
Kabunga et al. (2022).	276	Uganda	Landslide survivors in Bududa district. Female (67.3%) and male. Age range: 18 - 40+.	Survivors of Climate Trauma	Landslide	Cross-sectional study

Table 1.

Study characteristics and baseline patient demographics

	Article	Sample Size	Country	Description of participants (e.g. sex, age range, occupation)	Reason for Vulnerability	Climate Crisis Exposure	Study Design
	Tomita et al. (2022)	17,255	South Africa	Men and women (52.1%) living in South Africa, depression-free at baseline. Aged between 15 and 65+ years old.	Survivors of Climate Trauma	Extreme Weather Disasters	Prospective cohort study
	Rosinger et al. (2024)	175	Northern Kenya	Semi-nomadic pastoralists in Northern Kenya, across 7 communities	Farmers /Pastoralists	Drought (livestock wealth, water, food insecurity)	Cohort study (2 time points)
	Mohammed et al (2024)	1100	Uganda	Smallholder farmers, 52% male, 48% female, Mean age: 36-45 years old.	Smallholder farmers.	Food insecurity due to drought, high temperatures	Cross-sectional study.
Qualitative	Babugura et al. (2008).	30	Botswana	Rural young people (10 - 18 years). Female (60%) and male.	Children and Adolescents	Drought	Interviews, picture drawing and story telling.
	Beyeler et al. (2023).	40	Kenya	Farmers living with HIV. Age range: 23 and 58 years old. Male (50%) and female.	Farmers	Multiple Impacts of Climate Change	Semi-structured interviews
	Cooper et al. (2019).	64	Ethiopia	Pastoralists. Age range: 20–70 years old. Men and	Farmers	Water scarcity	Focus Groups and Semi-structured interviews

Table 1.

Study characteristics and baseline patient demographics

Article	Sample Size	Country	Description of participants (e.g. sex, age range, occupation)	Reason for Vulnerability	Climate Crisis Exposure	Study Design
			women.			
Kadio et al. (2024).	150	Burkina Faso	Pregnant/Post-Partum women, community representatives and healthcare professionals. Age range: 20 - 80 years old. Females (% not specified) and male spouses.	Women	Temperature increases	Focus Groups and Semi-structured interviews
Shoko Kori. (2023).	54	Zimbabwe	Farmers. Male (82%) and female. Age range: 31 - 80 years old.	Farmers	Multiple Impacts of Climate Change	Exploratory Decriptive Qualitative Research (Semi-structured interviews)
Adams et al. (2021).	20	Ghana	Adult residents of largest informal settlement in Accra (Ghana capital city). Age range: 18 - 55 years old. Male (75%) and female.	Migrants	Flood	PhotoVoice qualitative research methods (participants use photography and written narratives to represent their community's concerns).
Pinchoff et al. (2025)	196 (80 Nigeria-only)	Nigeria, Bangladesh and Guatemala	Young people, aged 12-25. 22 (27%) male and 57 female (71%)	Young people	Heat and Drought	Focus Group Interviews

The following section synthesizes findings from the reviewed articles, categorizing them by group identity: farmers and pastoralists, young people, rural communities, women, migrants, and survivors of climate-related trauma. This approach was taken as there was greater convergence in terms of group identity when compared with the mental health outcomes measured in the studies, which were heterogenous.

Farmers and Pastoralists

Table 2.

Main findings for studies on Farmers

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Abunyewah et al. (2024).	Aim: to investigate the effects of drought on the mental health - specifically, depression, anxiety, and stress - of farmers (pastoralist, crop grower, and agro-pastoral) in the Talensi district, Ghana.	Drought impact, Depression, anxiety, stress, social capital	1. Drought impact has a positive statistically significant relationship with depression ($\beta = 0.51$, $p < 0.001$), anxiety ($\beta = 0.24$, $p < 0.05$), and stress ($\beta = 0.36$, $p < 0.001$). 2. Personal social capital was found to be a moderator between drought impacts and mental health outcomes.	High
Mohammed et al (2024)	Aim: To assess the relationship between alcohol consumption and smallholder farmers' _experience of hunger.	Household Food Insecurity Access Scale (HFIAS), Alcohol Consumption (likert scale),	Alcohol consumption and food insecurity – associations between the two daily (OR = 3.81; p ≤ _0.001) and weekly/frequent (OR =2.32; p ≤ _0.001) consumption of alcohol was significantly associated with higher odds of household food insecurity compared to no consumption. The relationship between alcohol and food insecurity was bidirectional.	High

Table 2.

Main findings for studies on Farmers

	Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Quantitative	Njeru et al. (2022).	Aim: To investigate the effects of climate change on the mental health of smallholder crop farmers in the Embu and Meru Counties of Kenya	Self-Reporting Questionnaire 20-item (SRQ-20)	1. Prevalence of mental health issues (psychosomatic discomfort, anxiety, depression) among smallholder crop farmers in Embu and Meru is at 35.2%. 2. Strong positive correlation between climate change and increased mental disorders.	Average
	Rosinger et al. (2024)	Aims: 1) to examine how mobility ideation changed from before to during the drought, and whether livestock wealth, water insecurity, food insecurity, and depression/anxiety symptoms were associated with frequency of mobility ideation in 2022 in contrast	Livestock wealth, Household water insecurity (HWISE), Food insecurity (HFIAS), Depression/anxiety (PHQ-9), fingernail cortisol concentration (FCC)	1. Livestock wealth was protective against mobility ideation (OR =0.72; 95% = CI: 0.57–0.91; p=0.006), while each additional point in water insecurity (OR =1.40; 95% CI: 1.14–1.71; p =0.001), food insecurity (OR 1.43; 95% CI: 1.16–1.76; p <0.001), and depression/anxiety symptoms (OR =1.23; 95% CI: 1.14–1.32; p =0.001) were significantly associated with higher odds of moving into a category of greater mobility ideation. 2. Compared to adults who did not consider moving, those who considered moving rarely,	High

Table 2.

Main findings for studies on Farmers

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
	with actual mobility. 2) to test whether more frequent mobility ideation was associated with higher cortisol (finger cortisol concentration) during this extreme drought adjusting for resource insecurities and other factors that may affect stress.		sometimes, and often had cortisol levels 18.1% higher (95% CI, 1.01–1.38; p = 0.039), 19.4% higher (1.01–1.41; p = 0.040), and 32.3% higher (1.01–1.73; p = 0.039), respectively.	

Table 2.

Main findings for studies on Farmers

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Beyeler et al. (2023).	Aim: to identify potential social and economic pathways through which climate change impacts mental and emotional wellbeing, focusing on a vulnerable population of Kenyan smallholder farmers living with HIV.	Thematic analysis	1. High degrees of stress; fear and concern about the future; and sadness, worry, and anxiety from losing one's home, farm, occupation, or ability to support their family. 2. Climate-related economic insecurity is a main driver of emotional distress. 3. Widespread economic insecurity disrupts systems of communal and family support, which is an additional driver of worsening mental health.	High
Cooper et al. (2019).	Aim: to explore relations between emotion, wellbeing and water security among pastoralist communities in Afar, Ethiopia.	Thematic analysis	1. Participants associated water situation (drought) with negative emotional wellbeing, e.g. extreme worry and fatigue during dry season.	Average

Table 2.

Main findings for studies on Farmers

	Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Qualitative	Shoko Kori. (2023).	Aim: to establish the implications of the psychosocial impacts of climate change on sustainable development among smallholder farmers in Chirumanzu	Grounded Theory	Themes identified: 1. Threat of climate change, 2. Feeling humiliated/embarassed at having to ask for money/food from others, 3. Negative feelings, thoughts and emotions.	Average

Farmers and pastoralists were the most frequently studied group. The first quantitative study implemented an observational, cross-sectional design to research a Kenyan small-holder crop farming community, reporting a 35.2% prevalence of mental health difficulties (psychosomatic discomfort and symptoms of anxiety and depression were measured using the 20-item Self-Reporting Questionnaire, Andreou et al., 2011) (Njeru et al., 2022). Regression analyses in Njeru's study found a positive correlation between the poor mental health of smallholder farmers and climate changes (R = 0.126, p-value=<.005). Given the study's cross-sectional design and modest correlation coefficient, evidence here is suggestive but limited in strength and the lack of longitudinal data prevents ability to determine causality. A second, higher quality study explored the impact of drought on the mental health of farmers in Ghana through a cross-sectional survey design (Abunyewah et al., 2024). Through analysis of correlations, including structural modelling, Abunyewah and colleagues found that drought impact had a statistically significant, positive relationship with depression ($\beta = 0.51$, $p < 0.001$), anxiety (β _= 0.24, $p < 0.05$), and stress (β _= 0.36, $p < 0.001$), and that personal social capital appeared to moderate moderator the relationship between drought impacts and mental health outcomes. Use of structural modelling and controlling for confounders leads to increased confidence in this association. Recent research, using a longitudinal cohort study design, has linked drought-related water and food insecurity to increased anxiety, depression, and migration ideation in north Kenyan semi-nomadic pastoralists, with data collected before and after a significant drought in 2022 (Rosinger et al., 2024). Using biometric methodology (finger cortisol assessment), Rosinger et al. (2024) found that adults who considered migration rarely, sometimes, or often had cortisol levels 18.1% (95% CI: 1.01–1.38; p = 0.039), 19.4% (1.01–1.41; p = 0.040), and 32.3% (1.01–1.73; p = 0.039) higher, respectively, than those who did not consider moving. The longitudinal design and biomarker data used by Rosinger and colleagues strengthens their ability to suggest causal inferences and also

reduces biases in self-reporting methods, giving these findings greater weight in the present synthesis. Using a one-time cross-sectional survey design and controlled regression analyses, Mohammed et al. (2025) reported a bidirectional correlational relationship between alcohol use and food insecurity among Ghanaian farmers, concluding that alcohol misuse may both contribute to and result from food insecurity, particularly as a coping mechanism in the face of climate-related stress. Potential bidirectionality means conclusions about alcohol misuse as a coping strategy should be treated cautiously.

Three qualitative studies included in this review, exploring the views of farmers, took place in Kenya, Ethiopia and Zimbabwe. The highest quality study, used thematic analysis of semi-structured interviews to find that smallholder Kenyan farmers living with HIV report some level of CC impact on emotional health, including high degrees of stress; fear and concern about the future; and sadness, worry, and anxiety from losing one's home, farm, occupation, or ability (Beyeler et al., 2023). Using semi-structured interviews and grounded analysis with 54 participants, Shoko Kori (2023) corroborated these findings, reporting that Zimbabwe farmers felt humiliated and embarrassed having to ask for resources from others due to CC-caused resource scarcity. Similarly, during focus groups and individual interviews, Ethiopian farmers reported negative emotional wellbeing resulting from climate changes, such as feeling threatened by climate change, extreme worry and fatigue, especially during times of drought or the dry season (Cooper et al., 2019). Beyeler et al. (2023) is rated highest quality among these due to clear descriptions of their systematic data collections and analysis methods. Shoko Kori (2023) and Cooper et al (2019) provide corroborating but less methodologically robust evidence due to missing descriptions of data analytic verification procedures (e.g. double rating of transcripts) to ensure credibility.

Young People

Table 3.
Main findings for studies on Young People

Article	Research Aim/ Objective	Outcome Measure	Main Findings	Overall Quality Assessment
			[Findings on Nigeria only reported, main findings of the study are not applicable to this review].	
Clayton et al. (2023).	To examine differences in climate related emotions associated with gender and age (important predictors of vulnerability to the impacts of climate change).	Survey which included questions on: climate-related worry, climate-related functional impact, climate-related emotions (presence of 14 positive and negative key emotions about climate change), climate-related thoughts, experience of being ignored or dismissed when talking about climate change, beliefs about government response to climate change, emotional impact of government response to climate change (reassurance/betrayal).	1. *In India, the Philippines, and Nigeria, more than two-thirds reported functional impact; by contrast, US, UK, and Finland reported the least functional impact.* *2. Nigeria had among the lowest percentages of people reporting angry, guilty, ashamed, despair, and powerless.* *3. Participants were most likely to report being ignored or dismissed in India, Nigeria, Brazil, and the Philippines.*	High

Table 3.
Main findings for studies on Young People

Article	Research Aim/ Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Ndetei et al. (2024).	Aim: to determine the association of climate change with adolescent mental health and suicidality as reported by Kenyan high school students.	Climate-related worry/emotions; Strengths and Difficulties Questionnaire; Suicidality Questions (5 questions)	1. Girls were more worried and afraid of climate change than boys. 2. Direct positive relationship between the severity of climate change experiences and emotional symptoms (SDQ). 3. Climate change experiences were positively associated with suicidal thoughts, plans and attempts.	Average
Prencipe et al. (2023).	Aim: to measure self-perceived climate change distress among young people living in rural, low resource communities of Tanzania, and to identify	Depression (Centre for Epidemiological Studies Depression Scale); Cimate change knowledge (Gallup World Poll question: "How much do you know about global warming or climate change?"); Distress about changing weather patterns (1 idiosyncratic	1. Higher education, religiousity, being female, younger, and unmarried were linked to greater climate change awareness and climate distress. 2. Region and religiosity were key factors in predicting distress even after controlling for	High

Table 3.
Main findings for studies on Young People

Article	Research Aim/ Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Quanti	whether climate-sensitive risk factors and climate distress were associated with worse mental health.	question)	awareness. 3. Working in extreme temperatures, severe food and water insecurity were linked to higher depression.	
Taukeni et al. (2016).	Aim: to assess post-traumatic stress disorder (PTSD) in school children as a result of floods in Namibia.	PTSD (Child Trauma Screening Questionnaire)	1. 55% children aged 12 and below and 72.8% aged 13 and older reported re-experiencing symptoms of trauma, 2 years post-flooding event.	High
Babugura et al. (2008).	Aim: to explore vulnerabilities of children and youth during drought disasters.	Thematic analysis	1. Emotional distress 2. increased workload 3. vulnerability shaped by demographics	Average

Table 3.

Main findings for studies on Young People

	Article	Research Aim/ Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Qualitative	Pinchoff et al. (2025)	Aim: to understand how climate change is affecting young people's health across different settings, focusing on countries especially impacted by climate changes.	Thematic analysis	1. Extreme heat and drought shifting women into more traditionally male roles in agriculture and income-generating activities. 2. Increased household tensions and gender-based violence. 3. Anxiety about climate change, its effects on economic and food insecurity in communities and feeling hopeless, lacking agency and not feeling supported by local communities.	High

Young people were a vulnerable group commonly studied in the articles found in the present systematic review, with three high quality quantitative research articles (Prencipe et al., 2023; Taukeni et al., 2016; Clayton et al., 2023) and one average quality study (Ndetei et al., 2024). Two qualitative studies also explored the impact of climate change in this group (Babugura et al., 2008; Pinchoff et al., 2025).

A cross-sectional survey in Tanzania found that 46% of young people (18 – 23 years old) reported distress about climate change, with climate awareness, female gender, higher education, religiosity, older age, and working in extreme temperatures, identified as predictive factors through regression models (Prencipe et al., 2023). Depression, measured using the Centre for Epidemiological Studies Depression Scale (CES-D10), was also 23 percentage points (95% CI 17–28) higher among youth who had severe water or food insecurity. The study's large sample size, use of validated measures and adjustments for key confounders give its findings substantial weight. Though a lower quality study, Ndetei et al. (2024) found similar correlational results in Kenyan high school students, after using a cross-sectional survey in 10 schools in 3 regions of Kenya. Female students reported an increased risk of mental health difficulties related to the CC, including emotional symptoms and suicidal thoughts. Though sampling across three regions increased socioeconomic representativeness, the lack of control for other demographic variables may limit the ability to attribute effects to climate exposure alone, making these results supportive but less definitive than Prencipe et al's. The worldwide cross-sectional survey by Clayton and colleagues (2023) corresponds with these findings, with results from 1,000 participants indicating that more than two thirds of Nigerian youth feel a functional impact of the CC (i.e. where their feelings about climate change are negatively impacting their ability to carry out daily functions),

whereas young people from the US, UK and Finland were unlikely to report functional impact. Nigerian respondents, along with those from India, Brazil, and the Philippines, were most likely to report being ignored or dismissed when discussing the CC. However, as the survey was conducted at a single time point, without controlling for potential confounders (e.g. social media use or local political climate), some caution is warranted in interpreting these associations.

A high-quality study on the effects of EwEs on young Namibians found that two years after a flooding event, 55% of children aged 12 and under, and 72.8% of those aged 13 and older, reported re-experiencing symptoms consistent with PTSD (Taukeni et al., 2016). The observational cross-sectional design implemented limits causal inference, and findings should be interpreted with caution. However, purposive sampling improved representativeness and helped mitigate the impact of confounders. The study's overall high methodological quality, in part due to the use of standardised PTSD measures and clear analytical methods, increases reliability of findings.

A lower quality qualitative study, using interview and "participatory rural appraisal" (picture drawing and story-telling) techniques, described the impact of drought on Botswanan participants, aged 10 - 18 years old, with accounts of emotional distress from seeing wildlife dying during drought, increased workloads, anxiety about food insecurity, separation from loved ones and losing educational opportunities described (Babugura, 2008). A high-quality publication reported on themes identified from focus groups (analysed using thematic analysis), run with young people aged 12-25 years old from Nigeria, Bangladesh and Guatemala (Pinchoff et al., 2025). Nigerian young people reported anxiety about climate

change and its effects on economic and food insecurity, hopelessness, a lack of agency and unsupportiveness by local communities. Participants also reported increased household tensions, gender-based violence and a shift in women taking on more traditionally male roles in agriculture and income-generating activities (Pinchoff et al., 2025).

Rural Communities

Table 4.

Main findings for studies on Rural Communities

	Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Quantitative	Goodman et al. (2023).	To investigate temporal relationships between food insecurity, water insecurity, and generalized anxiety within rural Kenyans during a period of erratic rainfall.	Food insecurity (Household Food Insecurity Access Scale), Household water insecurity (Household Water Insecurity Access Scale); anxiety (GAD-7),	1. Food insecurity (T1) was more strongly predictive of water insecurity (T2) than water insecurity (T1) predicted food insecurity (T2). Baseline better food security may reduce the impact of future water instability. 2. generalized anxiety may reduce the capacity to adapt to future disruptions to water security.	High

Table 4.

Main findings for studies on Rural Communities

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Goodman et al. (2023).	To investigate the temporal relationships between food insecurity, anxiety, and depression among adult participants in a community-based empowerment program in Meru County, Kenya.	Food insecurity (Household Food Insecurity Access Scale), anxiety (GAD-7), depression (BDI-II).	1. Food insecurity predicted higher subsequent depression and anxiety at T2. 2. Anxiety at T1 predicted higher subsequent food insecurity.	High

Table 4.
Main findings for studies on Rural Communities

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Libey et al. (2022).	Aim: to test whether the installation of motorized boreholes in this context contribute to improved water security and emotional well-being.	Water service level (joint monitoring programme), household water security (12 questions), water-related emotional distress (choosing emotion words)	1. Emotional distress from a household's water situation is related to the frequency of activity interruptions from water deprivation experienced. 2. More than 6 hours of borehole useage is associated with greater household security and emotional wellbeing.	High
Obaniyi et al. (2023).	Aim: to examine the impacts of climate change on the health of rural farming households in Kwara State, Nigeria	Effect of climate change on human health; Adaption to climate and health challenges.	1. Major effects of climate change on the participants were heat stress, decrease in productivity, malaria, fever, depression, hunger, and death. 2. Adaptation strategies included personal hygiene and tree planting programme for soil protection and mitigation of climate change, practicing sanitation, prayer to god. 3. Age and educational level of the rural household influenced adaptation strategies to climate	Low

Table 4.

Main findings for studies on Rural Communities

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
___			change	

Four quantitative studies explored the impact of the CC on mental health in rural communities. A one-time, cross-sectional survey of 469 Ethiopian heads of households established that water insecurity was positively correlated with water-related emotional distress (0.57, $p<0.01$), and that lower income and being female appeared to increase this risk, however data were correlational in nature, so causal inferences were not possible (Libey et al., 2022). Similarly, high-quality cohort studies (taking measures at two time-points, 11-months apart) identified food and water insecurity as predictors for the onset of anxiety and depression in rural Kenyans with diagnoses of HIV (Goodman et al., 2023; Goodman et al., 2023). The cohort design, clear temporal ordering and control for relevant social and health factors substantially increase confidence in these findings, giving them more weight.

The lowest quality study included in the review investigated the impact of the CC on Nigerian people living rurally, belonging to farming households, using cross-sectional survey methodology, reporting descriptive statistics (Obaniyi et al., 2023). Nigerian participants reported heat stress, malaria, depression, hunger and death were common impacts of the climate crisis on health. Lack of clarity about outcome measures, analysis methods and controls for confounders substantially limit the strength of this evidence. Though results should be taken lightly, the study is still relevant in highlighting an overlap between vulnerabilities, given that many farmers also live in rural areas, facing compounded risk.

Women

Table 5.

Main findings for studies on Women

	Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Quantitative	Nothling et al. (2024).	Aim: to determine the extent of damage, loss, injury and death resulting from floods that occurred in and around the city of Durban, South Africa, in April 2022, and associated changes in mental health pre- to post-floods in a low-income setting.	Kessler Psychological Distress Scale; Centre for Epidemiologic Studies Depression Scale (CES-D); Generalised Anxiety Disorder 7; Harvard Trauma Questionnaire (HTQ); Household Hunger Scale (HHS); Childhood Trauma Questionnaire – Short Form (CTQ-SF); Intimate Partner Violence (IPV) and Non-Partner Sexual Violence (NPSV); Composite Trauma Load Score; Flood Impact Questionnaire	1. Loss of infrastructure (lacked access to drinking water, electricity, fresh food, could not travel to work, had to stay in a shelter and could not get hold of friends or family) was a predictor of post-flood change in levels of emotional distress and anxiety. 2. Higher levels of prior trauma exposure were associated with higher post-flood levels of emotional distress. 3. Higher pre-flood food insecurity was also associated with higher post-flood anxiety.	High

Table 5.

Main findings for studies on Women

	Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Qualitative	Kadio et al. (2024).	Aim: to investigate how women perceive the impacts of heat on their physical and mental health, in addition to their social relationships and economic activities.	Thematic analysis	1. Extreme heat affects women's functionality and well-being. 2. Heat undermines a woman's ability to care for themselves and their child and interferes negatively with breast feeding. 3. Heat negatively affects ability to work and to maintain relationships. 4. Cultural practices such as a taboo on taking the baby outside before the 40th day exacerbates the negative consequences of heat.	High

Two studies included in the review reported on the impact of the CC on women specifically.

Qualitative research conducted in Burkina Faso, with focus group and interview data analysed using thematic analysis, describes the specific impacts of extreme heat in pregnant women: participants reported feeling irritable, sad and anxious during pregnancy (Kadio et al., 2023). Women additionally reported relationship difficulties, difficulties in self-care and caring for their child, e.g. breastfeeding. The study's large sample size, clear data analytic process, transparent reporting and evidence of data saturation support a high-quality rating, giving these findings considerable weight. Moreover, one high quality longitudinal study found that, in the wake of EwEs such as flooding in South Africa, 38.2% women belonging to low socio-economic groups were found to experience above clinical levels of PTSD symptoms, which is an increase of 19.1% from rates prior to flooding within the same group (Nothling et al., 2024). Women affected by poverty, food insecurity and a history of trauma were at greater risk to the additive adverse mental health effects of floods, including PTSD, depression and anxiety. The longitudinal design and control for social risk factors strengthen ability to make causal inferences, giving this evidence substantial weight in the synthesis.

Migrants

Table 6.

Main findings for studies on Migrants

	Article	Research Aim/ Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Quantitative	Abu et al. (2024).	Aim: To explore the outcomes of planned relocation on well-being in the Volta Delta region of Ghana.	Idiosyncratic survey with items measuring the following concepts: Social identity, Attachment to place and home, Community-based self-efficacy, Safety, Well-being, anxiety.	1. Individuals who experienced planned relocation as a result of sea-level rising had worse well-being, anxiety and lower perceptions of safety when compared to a community that is equally exposed but has not moved. 2. Relocated community members reported significantly lower levels of attachment to the local area and home, significantly lower levels of community-based self-efficacy, and significantly lower levels of overall community-based identity.	Average

Table 6.

Main findings for studies on Migrants

Article	Research Aim/ Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Qualitative				
Adams et al. (2021).	Aim: to examine how recurrent flooding interacts with gendered vulnerability, social differentiation, and place-related historical and structural processes to produce unequal physical and mental health outcomes.	Thematic analysis	1. Five forms of fear were particularly worrying to residents: unpredictable timing of rains, fear of death from drowning or electrocution, fear of property destruction or theft, fear of sicknesses, and fear of fire outbreaks; differentiated and gendered vulnerabilities; and structural and socio-political concerns about place. 2. Women and children are disproportionately more vulnerable to flooding and its consequent health effects. As well, social markers such as housing type, class and wealth, family size, and social relations shape vulnerability. 3. Structural and socio-political concerns about place, specifically community helplessness, feeling neglect by authorities, and threatened sense of place and identity.	High

Migration is an indirect social impact of the CC. Abu et al., (2024) investigated the mental health impact of migrating on Ghanaian coastal communities exposed to extreme sea-level rising and coastal erosion, using a one-time cross-sectional design. Relocated individuals reported significantly lower levels of overall wellbeing, higher levels of anxiety, and lower perceptions of safety, compared to non-relocated community members, despite both groups being exposed to the same climate changes. The authors interpreted these findings as being related to the disruption of community connection, identities, and feelings of efficacy. Longitudinal follow-up research is needed to enable more certain conclusions about causality.

Adams et al. (2021) conducted a qualitative study in Ghana using photovoice methods (where 20 participants took photos of flooding events and were interviewed about the photos), exploring the impact of flooding, which received the highest quality rating of all included studies in this review. Findings from a large informal settlement, made up of displaced individuals, indicate that residents fear: unpredictable timing of rains, fear of death from drowning or electrocution, fear of property destruction or theft, fear of sicknesses, and fear of fire outbreaks. Women and children are disproportionately more vulnerable to flooding and its consequent health effects. Housing type, class and wealth, family size, and social relations shape vulnerability. Finally, respondents reported structural and socio-political concerns about place, specifically community helplessness, feeling neglect by authorities, and threatened sense of place and identity. The methodological transparency, reflexivity and rigorous data analytic methods give these findings considerable interpretive weight.

Survivors of climate-related trauma

Table 7.

Main findings for studies on Survivors of Trauma

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Abass et al. (2022).	Aim: to examine associations of flood exposure with Psychological Distress among flood survivors in a representative sample in Ghana and to evaluate whether age and sex differences modify this association.	Psychological distress, measured using the Kessler Psychological Distress Scale (K−10).	1. Strong association between exposure to floods and psychological distress: the prevalence of PD increased with increasing levels of flood exposure. 2. Loss of economic assets and life support systems, disruption to household businesses, damage to personal properties, injuries, and health problems occasioned by flood events increased distress. 3. Females and younger participants were more vulnerable to psychological distress when exposed to flood.	Average
Kabunga et al. (2022).	Aim: To assess the prevalence and correlates of post-traumatic stress disorder among Bududa landslide survivors.	PTSD measured using the checklist–civilian version (PCL-C-5)	1. 46.8% of participants had PTSD symptoms. 2. Male gender, widowhood, lack of counseling and lesser duration since the landslide were associated with an increased likelihood of screening for PTSD in landslide survivors.	High

Table 7.

Main findings for studies on Survivors of Trauma

	Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Quantitativ	Tomita et al. (2022)	Aim: To assess the impact of natural disaster incidents on the onset of depression.	Center for Epidemiologic Studies Depression Scale (CES-D)	1. Exposure to a disaster was associated with significant depressive symptoms. 2. Women, black african, lower educational attainment and lower income groups were more likely to experience depression.	High

The final vulnerable community researched in the studies identified was survivors of disasters caused by the CC. Following repeated landslides in the Bududa district of Uganda, killing close to 1000 people, 46.8% of survivors surveyed in a cross-sectional study reported symptoms of PTSD, even at least two years after the most recent event (Kabunga et al., 2022). Female gender, widowhood, lack of counselling, low social support, and duration since the landslide were significantly associated with PTSD. While these findings underscore the persistence of trauma, the cross-sectional design, reliance on self-report and absence of diagnostic interviews limit the certainty of conclusions.

In Ghanaian adults, exposure to urban flooding was significantly and positively associated with psychological distress ($\beta=0.030$; $p < .005$), among male participants ($\beta=0.019$; $p < .05$) and female participants ($\beta=0.048$; $p < .001$), this was significant in young adults more so than in older adults, according to research implementing a cross-sectional survey design (Abass et al., 2022). These findings remained true after controlling for socio-demographic factors within the regression model, including age, gender, education level, employment status, income level.

Finally, a high-quality piece of South African research implemented a prospective longitudinal cohort study design to follow-up participants who were healthy at baseline, finding that cumulative exposure to natural disasters was significantly associated with the onset of depression (Tomita et al., 2022). Symptoms of depression were particularly common in those exposed to natural disasters who were also female, black African, of lower educational attainment and on a lower income. The prospective cohort design implemented in this research strengthens the study's ability to draw temporal and potentially causal inferences between disaster exposure and the emergence of depressive symptoms.

Discussion

This review aimed to build on the existing understanding of how the CC is impacting mental health, specifically examining African populations. The review provided updated evidence in a rapidly evolving research domain, while also focussing on vulnerable populations, which has not been previous focussed on (such as in Atwoli et al., 2022). A total of 24 papers of low to high methodological quality were identified and included in this review, including a total of 37,896 participants.

The studies included in this review were conducted in 11 of Africa's 54 countries: Kenya, Ghana, Ethiopia, Nigeria, South Africa, Tanzania, Namibia, Uganda, Botswana, Burkina Faso, and Zimbabwe. Findings are therefore not representative of the entire continent and do not encompass the diversity of experiences across Africa's nations. Notably, no studies were identified from island nations, such as Madagascar, who are especially vulnerable to the adverse impacts of the CC.

This review's findings align with Lawrence et al.'s (2022) framework, which conceptualises climate change as a risk amplifier for mental health difficulties, whereby climate changes disrupt multiple interacting layers of mental health determinants, from broad socioeconomic, cultural, and environmental conditions to material living and working conditions, social networks, to individual and biological factors, often creating compounding vulnerabilities for already disadvantaged groups. Climate impacts affect mental health through three interconnected pathways: direct acute events causing immediate harm (e.g., PTSD from floods), longer-term direct pathways, via disruptions to social and economic determinants

(e.g., anxiety from livelihood loss, food insecurity), and indirect pathways, where distress arises from awareness of escalating climate threats, witnessing environmental degradation, or perceived inaction from leaders. Evidence from this review spans all three pathways, frequently intersecting within communities, for example, farmers facing chronic drought experience both direct and indirect mental health impacts, highlighting climate change's role as a multiplier of mental health risks, especially for women, young people, ethnic minorities, and socioeconomically vulnerable populations in Africa.

Mental Health Outcomes

Sharpe et al. (2022) reviewed research from Lower- and Middle-Income Countries and identified PTSD and depression as the most commonly measured outcomes, whereas this review found anxiety and depression to be the most frequent. Sharpe et al. (2022) similarly found that outcome measurements used in included studies were heterogenous. Interestingly, eco-anxiety was not explicitly measured in any identified study, reflecting a research gap consistent with a recent review which found that most eco-anxiety research comes from western countries (Coffey et al., 2021), despite young people, indigenous people and those connected to the natural world being identified as vulnerable to experiencing it (groups commonly represented in many African contexts).

Depression and Anxiety

The review identifies consistent evidence via several high-quality longitudinal and cohort studies (e.g., Goodman et al., 2023; Tomita et al., 2022, Nothling et al., 2024), that both acute climate shocks (EwEs, i.e. a direct pathway) and chronic stressors (e.g., drought, rising temperatures, i.e. longer-term direct pathways) are linked with increased depressive

symptoms. These studies provide a relatively high level of confidence in this association, particularly for women, Black African groups, and socioeconomically disadvantaged populations. However, numerous cross-sectional studies with weaker designs temper certainty about causality in some contexts, highlighting the need for further longitudinal research. General and climate-specific anxieties (food and water stress) appear frequently across studies involving farmers, young people, and communities facing resource scarcity. Yet, the evidence here is more mixed in quality: while some studies employed validated measures and robust samples (Rosinger et al., 2024), many relied on smaller samples or idiosyncratic, novel measures without full psychometric validation (Ndetei et al., 2024). Again, research designs were predominantly cross-sectional limiting ability to draw causal links. Therefore, findings about anxiety should be interpreted cautiously, signalling an important but tentative domain of climate-related mental health effects.

PTSD

High prevalence of PTSD symptoms post-extreme weather events (EwEs) is consistently reported, with high-quality Ugandan research (Kabunga et al., 2022) evidencing the persistence of symptoms years after disasters and prospective longitudinal research from South Africa demonstrating the cumulative effect of exposure to EwEs (Tomita et al., 2022). Consistent with the Lawrence et al. framework, the body of evidence identified in this review justifies strong confidence in PTSD as a key outcome of EwEs, hypothetically via both direct pathways (e.g. immediate physical and psychological injury) and longer-term direct pathways (e.g. displacement, economic loss, erosion of social cohesion), although some lower-quality studies with less rigorous assessment methods (Taukeni et al., 2016) call for careful interpretation when generalising beyond studied populations.

Suicide and Substance Use

The evidence linking climate stressors to suicidal behaviours and substance abuse is emerging but remains limited in scope and methodological rigour, with cross-sectional research dominating. Notably, high-quality Ugandan research (Mohammed et al., 2023) strengthens the association between climate impacts and increased alcohol misuse in farmers, offering greater confidence in this link. Findings on suicidality are preliminary and drawn primarily from a cross-sectional study, requiring further longitudinal investigation and larger samples for firm conclusions.

Vulnerable Population Groups

The vulnerable populations identified in this review mirror those referenced in a South African-based review, where women, fishing communities, farmers and people living in informal settlements were identified (Chersich et al., 2018). This review also identifies young people, rural communities and climate disaster survivors. Lawrence et al. (2022) propose that the CC compounds existing stressors experienced by individuals and communities, particularly for disadvantaged or minoritised groups.

Farmers

Farmers consistently exhibit poorer mental health outcomes following drought, crop failure, and land degradation. According to the Lawrence et al. model, loss of livelihood disrupts material security, social identity, and access to resources, creating cascading effects across mental health determinant layers. This is supported in the present review by several moderate-to-high quality studies with careful sampling approaches and validated measures, providing a strong basis for concluding farmers' vulnerability. This aligns with previous research identifying farmers as a vulnerable community to the effects of CC, with literature

describing how farmers in Kenya, Somalia, and Tanzania often have to leave their land and livelihoods, leading to mental distress, feelings of hopelessness, and increased alcohol and substance abuse (Atwoli et al., Sheriff et al., 2022). Australian longitudinal research indicates that farmers have worse mental health and lower help-seeking than non-farm workers (Brew et al., 2016). However, the scarcity of longitudinal African studies exploring symptom trajectories, adaptation behaviours, and help-seeking limits understanding of long-term impacts and recovery processes, highlighting an important avenue for future research.

Women

Women's vulnerability to climate impacts is well supported by relatively high-quality studies indicating associations with increased PTSD, relationship difficulties, parenting stress, and even suicide attempts. The consistency and rigour of these findings allow for a high level of confidence in gender-specific mental health risks from CC, paralleling global literature where women, especially those in marginalised or low-income communities, are found to be disproportionately affected by the socioeconomic impacts of the CC, leading to heightened eco-anxiety and negative effects on parenting and child development (Rothschild & Hasse, 2022). Nonetheless, some evidence remains preliminary, such as the link between temperature rises and female suicide rates, which has yet to be published beyond conference abstracts (Tfifha et al., 2021), so caution in drawing conclusions is warranted.

Young people

The vulnerability of young people has been previously established globally (Lawrence, 2024), with social media engagement compounding distress. Indirect effects of the CC through observing the inaction of leaders may lead to hopelessness in young people who generally have less power or agency to make environmental or policy changes (Lawrence et

al., 2022). Young people studied in this review show elevated depression, PTSD, and suicidal ideation related to climate exposures and CC awareness, however studies vary from average to high quality. Heterogeneity in study designs, use of unvalidated outcome measures and cross-sectional approaches suggest moderate confidence in these findings. A notable gap is the unexamined role of social media in young people living in Africa, which may mediate or moderate mental health impacts, representing a critical area for future research.

Migrants and climate disaster survivors

Although fewer in number, studies of migrants and displaced persons indicate elevated psychological distress linked to cumulative climate and social stressors. Given the limitations in sample sizes and study designs, these findings remain tentative but signal an urgent need for more rigorous research in these highly vulnerable groups.

Climate Exposure Types

Extreme weather events (EwEs)

Robust evidence from high-quality longitudinal and cohort studies demonstrates that EwEs, including floods, droughts, and landslides, have substantial adverse effects on depression and PTSD in affected populations. These consistent findings across settings support strong confidence in the mental health burden of EwEs. Evidence on anxiety, suicide, and substance misuse following EwEs is emerging but less conclusive, largely due to reliance on cross-sectional or smaller studies, warranting cautious interpretation. The present review provides partial support for findings from another African review on the mental health impacts of EwEs, which observed increases in mood disorders, trauma symptoms, suicide rates, and alcohol use (Deglon et al., 2023). However, our review did not identify research measuring

disturbed sleep or difficulties in emotion regulation, areas examined in Deglon and colleagues' review. This discrepancy likely reflects a lack of research on these outcomes within vulnerable populations, highlighting an important gap for future investigation.

Chronic climate stressors

Gradual stressors such as rising temperatures, water scarcity, and land degradation are linked to increased symptoms of depression, anxiety, and substance use. However, most of this evidence derives from cross-sectional designs or studies of lower quality, which limits confidence in causality and generalisability. Thus, these findings should be treated as preliminary, highlighting the need for higher-quality prospective research for the slower, less direct/visible impacts of the CC.

Qualitative insights

The qualitative research included in the review, though limited in quantity, offer valuable insights into the lived experiences and potential mechanisms underpinning CC/mental health links. Themes of community disintegration, loss of livelihood identity, anticipatory grief, lack of agency and gender-specific challenges emerged strongly across studies. These findings illuminate dimensions of psychological distress not easily captured by quantitative measures and emphasize the importance of culturally grounded, holistic interventions that address both material hardship and existential loss. Given the moderate methodological quality of some qualitative studies, these insights should be integrated cautiously but are nonetheless critical for nuanced understanding and effective policy responses.

Limitations

Limitations of this review need to be considered when interpreting results. First, there is large variation in mental health outcomes reported and how studies reported these outcomes. In papers where outcomes were similar in concept (e.g. depression in Goodman et al., 2023 and Nothling et al., 2024), different measures were used (Beck's Depression Inventory vs Centre for Epidemiologic Studies Depression Scale), making meta-analysis impossible and in-depth comparisons of outcomes difficult.

The term "vulnerable communities" is difficult to define. Though we use a previously adopted definition (White et al., 2023), it remained challenging to determine whether certain groups met inclusion criteria. The researchers opted for inclusivity, meaning that, for example, studies with rural populations were included as their vulnerability to the CC was assumed, even if their specific vulnerability was not identified in the publication. Studies with stakeholders or professionals as participants were excluded, as the inclusion criteria stipulated that participants should be African residents from vulnerable populations. This means that some potentially relevant studies were excluded (e.g. Lindvall et al., 2020 and Sorgho et al., 2021).

The impact of the CC is also difficult to determine. For example, studies investigating the impact of conflict were excluded, though some may argue that war can be understood as a symptom of climate change (Koubi, 2019). Migration also wasn't included as a specific search term, despite the recognised link between the CC and migration (Trummer et al., 2023), so studies where migration is studied as a climate change impact were only included if the authors themselves linked migration to climate change (e.g. using terms such as "climate change" in the manuscript). Therefore, some relevant papers may not have been included.

Similarly, resource scarcity was only included as a climate change exposure variable when authors linked it causally to the CC.

Finally, this review focusses on the adverse impacts of climate change on mental health in Africa and negates research into coping and adaption. Research with indigenous African communities reveals that coping strategies including weather-forecasting systems based on changes in animal behaviour, livestock and crop diversification, cattle stress-management techniques and division of labour (to allow for acclimatisation to drought challenges) are effective practices in use (Leal et al., 2021).

Finally, the authors acknowledge a broader critique: much of the framing of mental health research in African contexts is conducted through a western lens (including the present review), which risks pathologising responses to fundamental human hardship. Applying Western diagnostic constructs to distress caused by threats to basic needs may fail to recognise that responses such as grief, anxiety or despair may be appropriate indicators of material and existential threat rather than mental disorder. Maslow's Hierarchy of Needs suggests that when physiological and safety needs (water, shelter, security) are removed, distress is a rational and expected response, not necessarily psychopathology (Dugassa, 2024). This critique aligns with broader calls to decolonise mental health frameworks, encouraging recognition of culturally grounded modes of suffering and resilience rather than imposing deficit-based, western-centric interpretations.

Future Research Directions

Though many papers included in this review were deemed to be of a high quality, much research was of average to low quality. Higher quality research in this field is required and the use of longitudinal methodologies, rather than cross-sectional surveys, is recommended to enable greater understanding of the long-term impact of climate changes and temporal relationships between mental health factors.

No research studies were found in our search investigating the mental health impact of climate change in the following vulnerable groups within Africa: those with pre-existing health conditions, historically marginalised or persecuted communities, e.g. ethnic minorities, indigenous groups, LGBTQ+ communities. Future research should work with these vulnerable groups to understand their unique experiences.

Finally, the studies included in this review occurred in a total of eleven African countries, with the majority taking place in Ghana and Kenya. Given the size of the African continent, and the differing impacts of the CC across the various eco-systems within it, it is vital that future research studies the unique impacts of the CC on mental health in other African countries, especially in island communities who are particularly exposed to climate changes. Currently, there is a significant bias in the CC psychological literature, with research predominantly taking place in the Global North. This imbalance needs to be addressed via funding and research attention from within the African content. Additionally, research could investigate resilience factors in these nations to better understand personal or community resources which enable island populations to withstand unstable climate changes.

Finally, future pilot intervention-based studies should work with farmers and people living in rural areas in Africa. Farmers and people living in rural communities were consistently

identified as particularly vulnerable to the impacts of the climate crisis in this review. The impact of improved mental healthcare access in rural areas should be measured following small-scale pilots. Mental health interventions may include a focus on resilience, strengthening community and activism. Mental health interventions could be implemented alongside farming-based adaptions which focus on modifications to farming methods which maintain production stability despite unstable climate changes.

Policy Recommendations

This review used a dual definition of CC vulnerability, identifying groups as vulnerable either because their lives and livelihoods depended on environmental stability, or because they belonged to demographic or identity groups that are at increased risk of mental health difficulties. This framing underscores the urgent need for national policies that address both climate impacts and mental health outcomes in an integrated, holistic way. Despite this, a lack of integration of mental health interventions was identified in CC national "Adaption, Preparedness, and Response Plans" for Ethiopia, Kenya or South Africa (Shibesh & Nagabhatla, 2025).

Mental health should be recognised as a key component of climate adaptation efforts, particularly for populations facing layered vulnerabilities. As Ajator et al. (2021) argue, sustainable adaptation strategies in Africa must embed mental health support alongside broader efforts to build local resilience and social cohesion. Shibesh and Nagabhatla (2025) similarly call for disaster preparedness policies that include psychosocial care, especially for migrants and displaced people. Policies that enhance green space access, create job opportunities through community-led sustainability projects, and strengthen mental health

services in vulnerable regions can reduce the psychological burden of the CC while promoting long-term environmental resilience.

Findings from the present review suggest that policies that promote psychological wellbeing while mitigating the CC should prioritise vulnerable groups: women, young people, farmers, migrants and climate disaster survivors. Finally, Shibesh and colleagues (2025) advocate for grounding policy interventions in indigenous knowledge held within African communities (such as knowledge of animal behaviour-based weather forecasting or crop diversification in response to climate changes). Although this review did not specifically examine protective factors, the authors endorse the principle of building upon existing community strengths to enhance autonomy and psychological resilience.

Conclusion

This review reported on articles that investigated the mental health impact of the CC in vulnerable populations in Africa. Findings indicate that the CC, both in terms of EwEs and more gradual impacts (e.g. sea level and temperature rises), are severely impacting the mental health of farmers, young people, women, migrants and people who have survived climate-related traumatic events. The most consistent findings were in relation to symptoms and rates of depression, anxiety and PTSD. Future high-quality research is needed to establish longitudinal impacts of the CC and to explore outcomes in vulnerable groups which are currently neglected in the research, including ethnic minorities, indigenous groups, LGBTQ+ communities.

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Service Improvement Project

Perspectives from Third Sector Support Workers on the Barriers and Facilitators to Engaging Effectively with Women Experiencing Homelessness

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Introduction

A significant proportion of people experiencing homelessness have a diagnosed mental health disorder (Hossain et al., 2020). This population are more likely to have experienced interpersonal trauma, such as physical, sexual and emotional abuse (Weinrich et al., 2016; Song et al., 2018), with 87.7% thought to have experienced childhood maltreatment (Song et al., 2018). People experiencing homelessness are at high risk of dying by suicide, despite many decedents being known to mental health services (Bickley et al., 2006). Women experiencing homelessness (WeH) are particularly vulnerable to clinically significant mental distress, including anxiety, depression, PTSD and substance misuse (Duke and Searby, 2019).

Additionally, homelessness is inherently traumatising and likely to exacerbate distress (Gilmoor et al., 2020; Pope, Buchino & Ascienzo, 2020). Food insecurity, for example, is both a risk factor for and consequence of mental health difficulties (Loftus et al., 2019). Research highlights barriers to accessing primary health care (and mental health care) for people experiencing homelessness in the UK, including being denied GP registration or discharged onto the streets without follow-up care (Gunner et al., 2019).

Women and homelessness

Women are a minority group within the homelessness population, comprising approximately 14% of rough sleepers across England (Bretherton & Pleace, 2018), although this figure is increasing (Duke and Searby, 2019), with women now making up 46% of the young (<25) homeless population (Homeless Link, 2015). Current estimates likely underestimate homelessness in women as women are more likely to seek informal solutions to homelessness, such as 'sofa-surfing' (Bretherton, 2020; Bretherton & Pleace, 2018). Women often employ safety strategies such as sleeping in sites hidden from public view (Reeve, 2018) and may avoid street homelessness due to dangers including gender-based violence, sexual assault (Price and Glorney, 2022) abuse and stigmatisation (Breatherton & Pleace, 2018; Groundswell Report 2020).

Women often seek social or healthcare services only after exhausting all informal options (Bretherton, 2017). Possibly due to longer journeys into homelessness, psychological distress (including anxiety, PTSD, substance use) among women is particularly high (Chambers et al., 2014). Moreover, WeH are more likely to endure additional traumatising experiences, such as having children taken into care or losing custody (Crawford et al., 2011), sexual assault (Hutchinson et al., 2017, St Mungo's Report) and intimate partner violence or police violence while sex working (Elmes et al., 2022).

Effectively assisting this minority group when they seek support from services is vital, given that the trajectory is likely more treacherous, compared with their male counterparts. Currently, UK homelessness services are designed for, and informed by, the male rough sleeping experience (Young & Hodges, 2022). Gender tailored approaches are required to meet women's needs.

Local Service Context

Homeless Oxfordshire (HO) provides supported accommodation for homeless individuals, aiming to support people towards a more stable life. The charity runs multiple accommodation projects tailored to different client needs.

Charity staff at all levels have identified difficulties in supporting women, who are less likely to attend meetings, engage with support workers or groups and often abscond from supported accommodation. In line with current national guidelines, HO now provides a woman-only supported housing project (Homeless Link, 2017). This project aims to understand barriers to supporting WeH and develop gender-tailored guidance for staff.

Aims

The project has two overall aims:

- Aim 1: To compare outcomes for men and women accessing HO.
- Aim 2: To develop gender-tailored recommendations to improve practice across HO.

Objectives

1. To audit HO records from April 2022-April 2023 to compare:
    - The number of men and women accessing the service.
    - Differences in engagement patterns (appointments attended, missed or declined) between men and women
    - Accommodation outcomes for men and women leaving HO supported housing ("move on" status).

2. To conduct thematic analysis of staff focus groups to explore perspectives on gender differences in client outcomes and what inconsistencies in practice might be influencing outcome disparity.

3. To conduct thematic analysis of one-to-one interviews with female staff with lived experience of homelessness, to gain deeper insight into gender-specific barriers to accessing services.

4. To synthesise themes across datasets to identify service needs and generate staff-informed recommendations for improving support at HO for WeH.

Methods

Based on an assessment by the University of Oxford Clinical Psychology course, this project met criteria for clinical audit, service evaluation and quality improvement (approval letter contained in Appendix F). This mixed-methods service evaluation comprised of three parts: a quantitative audit of service data, qualitative interviews and focus groups, and staff training, including the dissemination of findings.

Quantitative Audit

An audit was conducted by extracting demographic and outcome ("move on") data of clients entering HO between April 2022 and April 2023. Data were extracted from the service's internal database (Inform) by the primary researcher's supervisor. Information stored on Inform includes demographic information, allocated supported accommodation, and "move on" information (once the client has successfully obtained or applied for long-term accommodation). Identifiable data were removed, before being sent to AL (lead researcher),

who cleaned the dataset prior to analysis. Although one of the project aims was to evaluate gender differences in engagement with HO, this was not possible due to limitations with Inform. Specifically, engagement metrics (e.g. number of appointments offered, attended and missed) are not routinely recorded by the service and were therefore unavailable.

Qualitative Focus Groups and Interviews

Design and Participants

Semi-structured interviews were conducted with female staff with lived experience of homelessness and focus groups were conducted with professionals who support WeH. Purposive sampling was implemented. Support workers were invited to participate via email. Participants were included if they had worked with WeH, or if they had personally experienced homelessness as a woman. Three women took part in the interviews and eight staff members participated in the focus groups. There were two male-only focus groups, with three attendees in each, and one female-only focus group, with two attendees.

Procedure

All interviewees provided verbal informed consent after reviewing an information sheet. Interviews and focus groups lasted 30-70 minutes. Questions were asked from the topic guides designed by the researchers based on the research questions and feedback from a focus group of women with lived experience of homelessness. The 1:1 interview guide explored women's lived experiences of homelessness, including accessing support services, and their views on improving support, while the focus group guide examined staff perspectives, the influence of their own gender on working with women, challenges and ideas for service

improvement (see Appendix G for both topic guides). Follow-up questions were also asked based on information shared. All interviews were audio-recorded and transcribed.

Thematic Analysis

Six transcripts were analysed, three from one-to-one interviews and three from focus groups. The analysis process followed recommendations made by Braun and Clarke (2013 and 2006) and an inductive approach was used, informed by social constructionist ideologies (Chamberlain, 2015). Further detail on the theoretical assumptions underpinning the analysis is outlined in Appendix H.

Audio recordings were transcribed verbatim as part of the familiarisation phase of data analysis. AL first analysed the interview and focus group data separately to identify initial codes specific to each source. These initial codes were developed using NVivo software and grouped into source-specific subthemes. In the final stage of analysis, codes from both sources were compared and synthesised into overarching themes that reflected common perspectives which were used to inform practical service recommendations. Mind-mapping supported visualisation of patterns within and across the datasets. Analysis was a recursive and iterative process, involving revisiting, adjusting and refining earlier work based on ideas generated in later stages (Braun & Clarke, 2021). A bracketing interview took place between AL and FS (researcher) to help enhance self-reflexivity (details in Appendix I).

FS independently reviewed the transcripts and themes identified were compared. The researchers discussed similarities and differences, informing analysis and interpretations.

Dissemination and Training

Results from the project were fed back to the service via a meeting with HO management as well as at a feedback and training event hosted by AL. Training was designed around the service needs identified by staff in the focus groups and interviews. Ten support workers attended this event, and pre- and post-training outcome measures were collected to assess the perceived usefulness and impact of the training.

Results

Study 1: Audit Findings

Results of the audit are outlined in tables below. Table 8 contains client demographic information. Clients accessing the service were mostly white males, between the ages of 25 and 54. A non-parametric chi-square goodness-of-fit test indicated a significant gender difference in referrals, $\chi^2(1, N = 69) = 17.75$, $p < .001$. A considerable amount of missing data was identified, particularly regarding religious belief, sexual orientation, relationship and parental status.

Table 8

Demographic information for clients who entered HO between April 2022 and April 2023

Total		**76**	
		n	%
Gender			
	Male	52	68
	Female	17	22
	Missing	7	9
Age Range			

Under 25	2	3
25 - 34	21	28
35 - 44	24	32
45 - 54	19	25
55 - 56	8	11
65 and Over	1	1
Missing Data	1	1
Ethnicity		
White British	53	70
White Other	3	4
Asian/Asian British	4	5
Black/Black British	1	1
Mixed Other	1	1
Missing Data	14	18
Religion		
Atheist	1	1
Christian	6	8
Muslim	1	1
Not Sure / No Religion	7	9
Missing Data	61	80
Nationality		
English	61	80
Irish	1	1
Polish	1	1
Spanish	1	1
Czech Republican	1	1
Afghanistan	1	1
Missing Data	10	13
Immigration Status		
Resident	75	99
Indefinite Leave to Remain (ILR)	1	1
Sexual Orientation		
Heterosexual	26	34
Missing Data	50	66
Relationship Status		
Single	12	16
Civil Partnership	2	3

	Cohabiting	1	1
	Separated	2	3
	Married	2	3
	Widowed	1	1
	Missing Data	56	73
Has children			
	Yes	22	29
	No	7	9
	Missing Data	47	62

Information regarding reasons for “move on”s and where clients moved to can be found in tables 2 and 3. 125 HO clients left the service between April 2022 and 2023. Most male clients left following a planned move, though 35% of men experienced unplanned moves, including eviction from accommodation. In contrast, just 5% of women were moved in an unplanned way. Most male clients moved into their own accommodation outside of HO services, whereas women mostly moved to another homeless support pathway or service.

Table 9

Information regarding the reason for clients leaving Homeless Oxfordshire

	Men (N = 104)		Women (N = 21)	
	n	%	*n*	%
Planned Move On	68	65	20	95
Unplanned Move On	36	35	1	5
Abandoned Accommodation	*6*	*6*	*1*	*5*
Evicted	*22*	*21*		
Data Missing	*8*	*8*		

Table 10

Information regarding the destination for clients leaving Homeless Oxfordshire

	Men (N = 104)		Women (N = 21)	
	n	%	*n*	%
Outside the Pathway	41	39	6	29
Independent Living Accommodation	26	25	3	14
Temporary Housing (e.g. "sofa surfing")	22	21	1	5
Oxford Adult Homeless Pathway	15	14	11	52

Study 2: Qualitative Findings

Demographic information for study participants can be found in Table 11. The table includes participants of both interviews and focus groups, presented together to protect anonymity given the small sample of individual interviewees.

Table 11

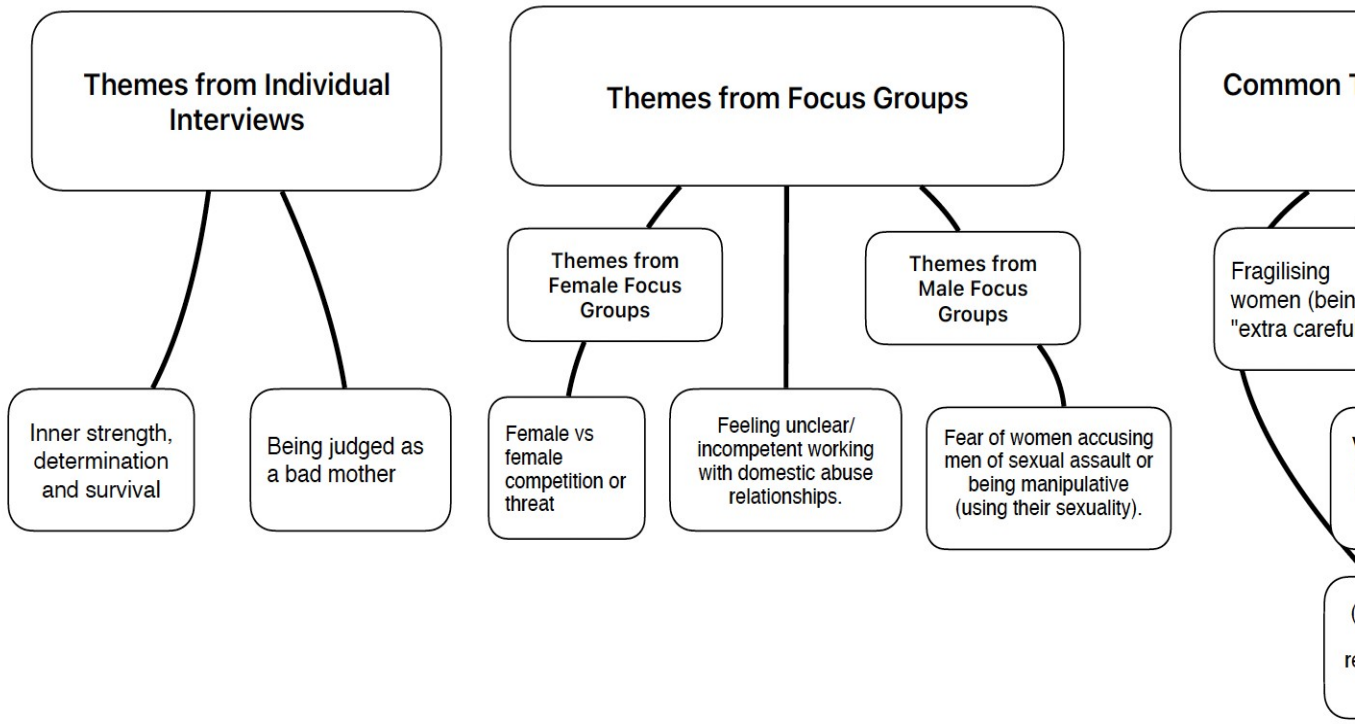
Characteristics of the sample

	Total Participants (n=11)	
Average age (M)	45 years	
Age Range	29 - 60 years	
	n	%
Gender		
Male	6	55
Female	5	45
Ethnicity		

White	10	91
Minoritised Ethnicity	1	9
Sexuality		
Heterosexual	10	91
Other	1	9
Long-term health conditions		
Yes	3	27
No	8	73

A graphic representation of themes and subthemes are shown in Figure 2, followed by a narrative explanation of analysis where subthemes are indicated in bold text. More examples of quotes for each theme are detailed in Appendix J.

Figure 2: Initial Codes from Different Qualitative Data Sources



Initial thematic coding was conducted separately across three qualitative data sources: male focus groups, the female focus group, and the individual interviews with Experts by Experience (EbEs). A graphic representation of initial codes is shown in Figure 2. Below, initial codes (sub-themes) are described and organised by source. Codes from the three sources were then grouped into three higher order themes: a) the relationship between client and support worker; b) shame for not enacting the stereotyped role of women in society; c) traumatic experiences and responses. These themes highlight key development needs for HO and were used to develop clinical and practical recommendations given to HO. Further quotes for each theme are in Appendix J.

Sub-Themes Identified in Male Focus Groups

Many male support workers described discomfort and caution when working with women, reflecting concerns about boundaries and perceived risks. A **fear of working with women,** describing them as "*quite manipulative*" (P2), was consistently mentioned: "*Sometimes I do worry that they see me like they see other men […],someone they can get something from if they do certain things*" (P1). Male participants described being more careful with women, perceiving their temperaments are more **fragile or volatile**: *"I'm a lot more careful in my work when I'm working with a female client. I'm cautious and wary of everything I do."* (P5).

Sub-Themes Identified in the Female Focus Group

Female support workers reflected on how their gender identity influenced relational dynamics with female clients. They described examples where they believed clients viewed them as **competition or threatening**: *"I watch what I wear because they might think that I'm some posh bird that doesn't have any clue. Some women struggle with another woman supporting them, especially if they've relied on men a lot. It's hard to trust women."* (P7)

Sub-Themes Across Focus Groups

Sub-themes consistent across male and female focus groups included recognition of shame felt by women who **lost custody of children:** *(male worker) "I find it difficult when you walk into a woman's room and they've got pictures of their children in school uniform"* and *(female worker)* "*Women who have had their children taken from them… it's like there's nothing else to fight for. It sends them into a spiral of awfulness. Some women whose children were in care or fostered find it difficult to attend meetings or turn up for visitations…or they'll be late because of chaos in their lives. That's tough to watch."* (P7).

Male and female support workers across focus groups described taking on a parental role with female clients, often experiencing tension between autonomy and protection, leading to the "**parentified support workers**" sub-theme: *(male worker)* "*It's really hard, because you want to treat them like adults – like they are – but also in giving them that freedom they make [unsafe] decisions."* (P3).

Low confidence working with female clients experiencing domestic abuse was expressed by both male and female staff: *(female worker)* "*It's something I need to know more about cause I've learnt it on the job and I don't have enough specialist knowledge*" (P8).

Behavioural responses common in PTSD were described, such as the "flight response", conceptualised as "**escape**": *(female worker) "Many women don't stay at their accommodations because they don't feel safe. They'll end up in relationships or staying on someone's sofa and you have to be a lot more flexible. Men tend to stay in the same place"* (P7)*; (male worker) "Women get so easily lost in the system. They might enter and leave quickly or just disappear."* (P4). Appendix J includes relevant quotes from individual interviews for this sub-theme.

Staying in romantic relationships with men for protection, or to access drugs, even when those relationships are characterised by domestic violence, was another coping strategy described by both male and female staff: *(male worker) "I think women are in these relationships to keep themselves safe or to get what they need, to feed their addiction" (P5).*

Sub-Themes Identified in Individual Interviews

Women with lived experience (EbEs), now working as support workers for HO, described the psychological impact of homelessness from a first-person perspective. All interviewees described a sense of **constant threat and fear** experienced on the streets and in supported accommodation: *"It was terrifying. People were offering things and that was really frightening: drugs, asking for sex, and so on. As a young woman, you're more vulnerable. What I soon learned was that any kind of kindness is the wrong kind of kindness. There was always a threat."* (P9). **Extensive and continuous violence**, including **sexual violence**, by trusted men (partners, police) was a consistent sub-theme throughout interviews (also identified in focus groups): "*I was so vulnerable, being used and thrown around by men all the time. But I didn't feel that at the time. I was just numb to it.*" (P10).

Interviewees spoke movingly about how they felt about their **physical appearance** while living on the streets: "*When you're on the streets, you feel sh** about yourself. How you look on the outside is just a reflection of what's going on inside. Like holding up a mirror to how you feel."* (P10). EbEs also described feeling **"judged as a bad mother":** *"There was a lot of stigma around being homeless and a young mum and that put me off accessing support, for fear that I would lose my children or that I would be judged"* (P9)

Some interviewees described developing **inner strength** or experiencing "**post-traumatic growth"** as a response to protracted and horrific violence: "*the fear kept me going, kept me motivated to push forwards and get my own place*" (P9).

Finally, EbEs described the challenge of navigating the **transition from being homeless** to occupying a professional role, particularly when working with clients who knew them when

they were homeless: *"She couldn't trust me, maybe because I'm a younger woman, who's well-dressed and who has cleaned herself up."* (P10).

Overarching Themes

The following higher order themes synthesise the sub-themes from across data sources, highlighting areas for clinical development and service improvement:

Relationship Between Client and Support Worker

The relational nature of support work was described as more important, and also precarious, when working with women, than with men. Support workers described heightened caution and blurred boundaries when working with women. Female clients were perceived as more emotionally reactive, and felt unprepared to respond to trauma histories. EbEs described challenges in trust and perceived judgement from others, impacting relationship building with professionals. Shifting roles from peer to professional was a described relational challenge.

Shame for Failing to Enact Society's Stereotypical Role for Women

Focus group attendees and EbEs highlighted that shame, especially around losing custody of children and body image, can be a powerful engagement barrier. Participants recognised that societal expectations (to be physically attractive and good mothers) compound the distress of homelessness, leading to avoidance of services and a sense of unworthiness.

Traumatic Experiences and Traumatised Responses

All data sources pointed to the extensive trauma women experiencing homelessness endure, particularly gender-based violence. These experiences informed coping mechanisms that are common in those with PTSD. The strategies employed appeared to be misunderstood by staff as non-compliance (e.g. “absconding”, staying in abusive relationships). Support workers acknowledged the need for trauma-informed care and a deeper awareness of how these responses function as survival strategies.

Suggestions for Service Improvement

Participants identified several areas where HO could improve. A recurring theme was the need for more specialist training, particularly around working with clients affected by domestic abuse. Staff wanted deeper insight into the complexities of such relationships, including why people may remain in them, to move away from a “black-and-white” view that leaving is always straightforward - *“We don’t think enough about the romantic relationships women get into. I think it’s just black and white, like “they’re in an unhealthy relationship, they should get out of it”. (P9 – Female Focus Group).*

Staff also wanted guidance on how to discuss difficult or sensitive topics, such as child loss, abortion, or sex work, without “triggering” distress in women. While some workers avoided these conversations altogether, others felt the service should encourage them, so that these issues are addressed rather than treated as taboo. Many participants felt that avoiding conversations about these topics meant that ongoing abuse became normalised and they felt desensitised to what women were going through. Similarly, participants wanted training on

how to explore clients' histories of trauma in a way that avoids re-traumatisation, noting that *"we miss people's history of abuse quite a lot. We ask about that on the first day but we don't really ask again. Training on how we can talk to people about their traumas, so we can get them the right help and work through that." – P5 (Male Focus Group)*

A lack of open discussion about gender within the service was noted: *"In general, Homeless Oxfordshire don't really speak about gender much" (P8, Female Focus Group)*. Some staff described how female clients were automatically assigned female keyworkers without explanation client choice, calling for more deliberate conversations about how gender impacts on client needs.

These needs mirrored gold-standard service delivery principles recommended by Homeless Link (Homeless Link, 2017) and trauma-informed care models, highlighting that the service's aspirations align with best practice. Insights from staff, combined with existing recommendations, directly informed the recommendations listed towards the end of this paper. fThe one-off training session delivered during the project also attempted to address some of these training needs, though ongoing training was thought to be beneficial by staff who attended.

Study 3: Dissemination and Training

Results and initial recommendations were presented to HO support staff, as well as managers and clinical leads, during a feedback and training day. In addition to results and recommendations, training about attachment theory (Bowlby, 1969; Ainsworth, 1971) and Trauma Informed Care was provided. Discussions and roleplays focused on talking to female

clients about domestic violence were facilitated. Finally, a trauma-informed, attachment-focussed team formulation of a current HO female client was facilitated.

The aim of the feedback and training event was to draw attention to barriers preventing support staff from providing gender-tailored care, to increase confidence in providing gender-tailored care and to start conversations about supporting WeH which staff have previously been hesitant to have. These aims are based on the findings previously described, where staff expressed a lack of confidence in supporting women. Ten staff members attended the feedback and training event. Staff were asked to complete an anonymous, self-report idiosyncratic pre-training outcome measure (Appendix K), which asked staff to rate their confidence (0-100): talking to female service users about gender-specific issues, including losing custody of children; in understanding the choice to stay in abusive relationships; in understanding why women are more likely to abscond from their supported accommodation; and more. The outcome measure also asked staff to read a vignette describing a female service user experiencing domestic abuse and to report how they would respond.

Results from the training and feedback event can be found in Table 12, qualitative feedback regarding the training is summarised below.

Table 12

Pre- and Post-Training Outcomes, based on responses from N=10 staff

	Average Response (0-100)	
	Pre-Training	Post-Training

Q1) I feel confident talking to female service users about gender specific issues, such as losing custody of their children, abortions and menstruation	61.0	78.9
Q2) I understand some of the reasons that may help to explain why women are accessing homelessness services are more likely to abscond from their accommodation	68.0	82.9
Q3) I have a good understanding of why the women I work with are often in abusive relationships.	75.5	87.3
Q4) I know how to work with women in abusive relationships.	59.5	79.4

When asked to identify what was helpful about the feedback and training event, staff responded: “scenarios and discussions”, “learning about attachment styles”, “learning methods of person-centred approach”, “all of the training”. There were no responses to the question on what staff found less helpful about the event. The pre-training outcome measure also asked staff to respond to a vignette describing a woman disclosing domestic abuse. In the pre-training measure, staff responses to the vignette included “telling the woman that she has done the right thing by telling me”, “phoning the police”, “raising the issue with safeguarding”. In the post-training measure, staff were asked what they might do differently/ additionally, given what they learned during training. Staff added that they: “would express concern and communicate that they are worried for the woman’s safety”, “would explain why they were going to share the information with other agencies, rather than just doing it”, “would continue to check in about ongoing abuse” and “would be more consistent in showing concern (even if she denies further abuse initially)”.

Discussion

This project aimed to investigate differences between men and women accessing HO support, in terms of engagement and outcomes and to understand unique barriers to accessing support faced by WeH. The project also aimed to use perspectives of staff, including women with lived experience of homelessness, to develop recommendations to help HO better serve WeH.

The audit found that over three times as many men accessed the service between 2022 and 2023. A higher proportion of men were also moved into their own independent accommodation, compared with women during the same period. Three overarching themes were identified from thematic analyses of interviews and focus group datasets: “Relationship Between Client and Support Worker”, “Shame for Failing to Enact Society’s Stereotypical Role for Women” and “Traumatic Experiences and Traumatised Responses”.

Audit

Women represented 22% of HO clients, which is slightly less than the 28% reported nationally (Homeless Link, 2016). The number of WeH has likely increased since the time of this research, as women represent the fastest growing segment of the homeless population (Phipps et al., 2019), suggesting that there is a growing disparity between the proportion of women accessing HO compared with the number of WeH nationally. WeH face greater mental health concerns; more suicidal thoughts and attempts; and higher rates of adverse childhood trauma, when compared with their male counterparts (Milaney et al., 2020).

Support services must ensure that their interventions are adapted to ensure that women are identified earlier, their safety is protected, and their unique needs addressed.

Audit results showed a discrepancy between men and women in their housing outcomes, with 95% of women having “planned move ons” to independent accommodation or to other HO supported accommodation. In contrast, 65% of men were recorded as having “planned move ons”, meaning 35% absconded from their accommodation or were evicted. Staff found this finding surprising and reportedly expected higher eviction rates for women. The discrepancy could be due to inaccurate data recording, or perhaps staff hold misconceptions about female accommodation outcomes. The service may benefit from continuing to monitor differences in housing outcomes.

There was a noticeable amount of missing data, particularly in relation to whether service users had children. Nationally, over half of WeH are mothers, and 79% of them have had children taken into care (St Mungo’s Rebuilding Shattered Lives Report, 2017). Being separated from one’s own children is often highly traumatic and WeH may need legal and practical support. Failing to ask women about children risks reinforcing feelings of shame they may hold. PTSD is common in homeless mothers and predicts depression (Phipps, 2019). HO staff are encouraged to be more consistent in information gathering from the outset so they can tailor support.

Summary of Thematic Analysis

Thematic analysis was conducted separately on the interview and focus group data before identifying overarching themes across both sources. This approach allowed source-specific

perspectives, particularly those of EbEs, and male and female support workers, to be preserved and recognised before synthesising findings to inform practical recommendations.

Across the focus groups, male support workers described feeling fearful and cautious when working with women, experiencing them as more fragile, volatile, or "manipulative." Female support workers described concerns that they might be viewed by clients as a threat or competition. These subthemes were echoed in the individual interviews, where EbEs reflected on the challenges of trust in relationships with support staff. Research into women's mental health, particularly among those given "personality disorder" diagnoses, highlights how harmful the term "manipulative" can be when used by healthcare workers to describe self-destructive behaviour (Byrne, 2000). These terms tend to be used more when staff lack a formulation-based framework for understanding presenting difficulties (Stroud et al., 2013). When such a framework is provided, grounded in developmental and trauma-informed models, staff demonstrate greater compassion and curiosity (Stroud et al., 2013). Incorporating trauma-informed and formulation-based frameworks into team meetings at HO could encourage empathy and relational care among support workers.

The second theme was the shame experienced by women, relating to motherhood and physical appearance. Focus group participants discussed the profound shame they observed in female clients who lost custody of children, and this was also articulated by the EbEs in individual interviews. Societal expectations around motherhood remain unforgiving, particularly in relation to women who are homeless or using substances, reinforcing internalised stigma and self-judgment (Henderson et al., 2016). Mothers continue to be held to a higher standard of parenting in our society compared with fathers, whereby mothers are vilified in society for less than perfect mothering, such as maternal abandonment or ruptures

between mother and infant (Silverio et al., 2021). The recently proposed Criminal Justice Bill, which aims to criminalise rough sleeping, is likely to exacerbate this shame among an already marginalised group (Crisis, 2024). HO could work on reducing shame experienced in the women who access the service, by talking about their children and normalising the experience of having children taken into custody during difficult times.

The final theme identified was relating to trauma and trauma responses. It is well established that WeH are highly likely to have experienced traumatic events, often interpersonal in nature, including childhood and adulthood sexual, physical and emotional abuse (Vaughn, 2017; Racette et al., 2021; Guillén et al., 2023). Experiencing traumatic events also increases likelihood of further abuse, and experiencing homelessness in itself is thought to be highly traumatic (Guillén, 2023). Despite a shared understanding of the high prevalence of traumatic experiences, most women are not asked about these experiences or offered any services to assist in coping with the effects of these events (Phipps et al., 2019).

Support workers, including those with lived experience, discussed various coping methods employed by WeH to deal with the impacts of experiencing extensive trauma, including escape, relying on relationships for safety and developing personal resilience. These coping methods were described behaviourally, though not explicitly viewed as behaviours as a response to trauma by the support workers interviewed. HO may benefit from understanding these behaviours as trauma responses, rather than behaviours in isolation.

Romantic and sexual relationships with men were discussed frequently during the interviews and focus groups, with an emphasis on the transactional nature of these relationships, for example women staying in relationships with men who have access to drugs which could be

used to self-medicate. Indeed, drug dependency, paying rent, buying food, repaying debts, and securing temporary accommodation have all been cited as common reasons for entering sex work by homeless women (Reeve et al., 2009). However, this understanding of sexual relationships in WeH may be an over-simplification. Ryan and colleagues (2009) found more nuance in the reasons why WeH entered sexual relationships. The women interviewed in Ryan's study described a high level of emotional attachment towards their paying sexual partners, and a range of reasons for why they stayed in these sexual relationships, ranging from "acquiring drugs, resources or shelter" to "for intimacy or emotional closeness". HO could work to understand individual sexual relationships in a more idiosyncratic way, asking female clients what they are gaining from relationships, as well as what might be harmful about relationships.

Overall, the findings corroborate a recent report on women's homelessness ("Exploring Women's Homelessness", Homeless Link 2024), which named separation from a child, experiences of violence and abuse, and sexual or romantic relationships as key gender-specific elements of women's experiences of homelessness.

Limitations

The audit component was limited by the small number of women accessing Homeless Oxfordshire. It is difficult to draw conclusions about the differences between the two groups as the few women included in the sample may not be representative of WeH in the UK. The quantity of missing data in the audit could also be biasing results of the audit. Finally, there is some ambiguity in the category options on the platform used by Homeless Oxfordshire to

record outcomes. For example, “outside the pathway”, “temporary accommodation” or “planned move on” are undefined options on the system which could be understood subjectively by support workers, leading to discrepancies in outcome recording.

While the research team worked closely to try to ensure that the codes and themes closely matched the interview transcripts so that no aspects of the data were overlooked (Terry et al., 2017), the findings should be considered with the positions of the researchers in mind. The team was made up of a trainee, research assistant and two clinical psychologists and therefore their interpretation of the results could have been influenced by the lens through which they were looking (Braun & Clarke, 2013). Though EbEs were consulted with when designing the research, they were not involved in data analysis which is a limitation of the study.

Finally, the study would have benefited from interviews with women currently experiencing homelessness. This would have provided a direct insight into the experience of being homeless as a woman. The support workers with lived experience of homelessness who were interviewed are now living more stable lives, living in their own independent accommodations. It is possible that their experiences no longer represent the current experience of being homeless as a woman.

Recommendations for Homeless Oxfordshire

- To work towards more consistent gathering of information about whether clients have children from the initial assessment. This information can be used to better understand their clients and tailor care and support accordingly.

- To introduce trauma screening using PCL-5 (Weathers et al., 2013) during initial meetings with clients.
- To ask female clients if they would like to talk about gender-specific difficulties they may be experiencing, such as child loss or abortion, rather than avoiding such topics for fear of "triggering" distress.
- To introduce a regular reflective space to specifically talk about gender-specific issues so it feels more comfortable for staff.
- To formulate and understand behaviours, such as absconding from accommodation, getting into dangerous or harmful sexual relationships and being "manipulative" from a trauma-informed and attachment-focused lens.

Conclusion

This project highlighted differences between men and women in terms of their outcomes while being supported by Homeless Oxfordshire, as well female-specific barriers to accessing support. Difficulties in supporting WeH were characterised by three themes: the relationship between support worker and client, feelings of shame experienced by women, trauma and ways of coping. Recommendations for the service are made and have been fed back to the service via a feedback and training event.

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Theoretically Driven Research Project

Exploring the Relationship Between External Shame and Perceived Social Rank in People Who Hear Voices

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Proposed Journal: This project is intended for submission in the British Journal of Clinical Psychology. This journal was chosen as it has previously published on similar topics and has an emphasis on high-quality psychological research with real-world clinical application.

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Introduction

Voice Hearing in Society

The experience of hearing voices is common in the general population, with an estimated lifetime prevalence of 9.6%, meaning almost one in ten individuals will encounter voice hearing or "auditory hallucinations" (Maijer et al., 2018). The experience varies greatly, with some finding voices comforting, nurturing, instructive or supportive (Parry & Varese; 2021; Fenekou & Georgaca, 2010), while others report voices facilitating personal growth or connected them to their spiritual beliefs (Valavanis, Thompson & Murray, 2019). Conversely, many people experience anxiety, fear and distress when hearing voices (Woods et al., 2015; Daalman et al., 2011; Farrugia & Grech, 2023).

Despite the high prevalence of voice hearing within the general public, a greater understanding of the phenomenon through research and the recognition that voice hearing can be positive, societal stigma remains pervasive (Phalen et al., 2018). Non-clinical populations continue to perceive voice-hearers as dangerous (Phalen et al., 2019), which perpetuates stigma, potentially contributing to heightened feelings of shame which may discourage help-seeking.

The Role of Shame in Mental Distress

Shame is a transdiagnostic emotional factor that contributes to the maintenance of various mental health disorders. Higher levels of shame are observed in individuals with depression (Kim, Thibodeau, & Jorgensen, 2011), PTSD (Harman & Lee, 2010), and eating disorders (Troop, Allan, Serpell, & Treasure, 2008), compared to healthy controls.

Shame is a self-conscious emotion, heightening awareness of others' evaluations of the self. Evolutionary theorists suggest shame evolved from the innate human need to be seen as attractive within social groups, given that survival chances increase when humans coexist within social groups (Gilbert, 2003). Experiences of disgrace, devaluation, or ostracization can trigger shame, leading to self-perceptions of being flawed or inferior. Shame has been described as a social threat detection system (Gilbert, 1997), alerting individuals to negative appraisals from others and potential social punishment or harm. Unlike guilt, which motivates reparative actions, shame typically prompts withdrawal and self-protection (Gilbert, 2019; Gilbert, 2003; Landers, 2022).

Shame is a complex emotion, better understood delineated into two subtypes: internal and external, each serving different functions. External shame involves the perception of being negatively evaluated by others, prompting individuals to monitor others' reactions or imagine criticism, rejection, or exclusion (Heriot-Maitland et al., 2019). External shame is associated with low social rank (Gilbert, 2000; Gilbert et al., 2001): where a person's evaluation of themselves (their value, power, status) is inferior in comparison with others, which leads to self-criticism (Brand et al., 2023). Internal shame is a pervasive self-belief that one is worthless, inadequate and isolated and is less dependent on social rank (Kim, Thibodeau, Jorgensen, 2011).

Shame in Voice Hearers

It is well established that people who hear voices have high levels of shame (Woods et al., 2015; Bortolon & Raffard, 2019). Shame has been identified as a potential mediator in the association between childhood trauma and hallucination proneness, along with trauma-

related intrusions (Bortolon et al., 2022; McCarthy-Jones, 2017). Other research suggests it results from the voice-hearing experience itself (Woods et al., 2015). While most studies correlational, limiting clarity on causal direction, experimental findings suggest that hearing a voice (neutral or critical) triggers heightened shame (Bortolon et al., 2022). The role of shame in the experience of hearing voices is further implicated by cases and research which demonstrate the success of Compassion Focussed Therapy (CFT), a therapy centred around shame reduction, for people who hear voices (Fleming & Heriot-Maitland, 2023). Those with high external shame may adopt a subordinate relationship with the voice as a way of coping with the perceived power imbalance (or difference in "social rank") between the voice and the voice hearer, mirroring evolutionary strategies for self-protection when facing a perceived power imbalance (Birchwood et al., 2000).

Hearing voices is an inherently social experience, with the voice to voice-hearer relationship sharing features of interpersonal relationships (Bell, 2013; Woods, 2017). Just as in interpersonal relationships, the nature of dialogue in the voice-hearer relationship can shape how individuals feel about themselves and behave. Persistent critical or punishing content is likely to reinforce feelings of inferiority and prompt submissive coping. Voice content may mediate the relationship between shame and perceived low social rank, with the thematic content of voices often reflecting shame-based, traumatic memories (McCarthy-Jones, 2017), and 94% of voice-hearers reporting content related to early adverse events associated with feelings shame, guilt, low self-worth (Corstens & Longden, 2013). Dominant voice content (or "dialogue") has been associated with submissive behaviours, such as avoidance, which is closely linked to the concept of social rank (Perona-Garcelán et al., 2015). Taken together, these findings support the theoretical rationale for positioning voice content as a mediating

mechanism through which external shame may influence the way voice-hearers perceive and relate to their voices.

While the present study is guided by theory suggesting that external shame may shape the nature of the voice hearer relationship (by increasing subordination to voices), it is also plausible that distressing voice content or perceived low social rank could increase feelings of shame (see experimental evidence from Brand et al., 2022). Given the cross-sectional nature of the design, the directionality of these associations cannot be established definitively, and the authors acknowledge that bidirectional or reciprocal influences may exist.

Study Aims and Hypotheses

This study builds on previous research by examining how feelings of shame relate to the voice – person relationship. Researchers aimed to explore whether heightened external shame is associated with greater tendency to adopt a subordinate role and assign higher social rank to voices. Given the social nature of voice-hearing, our research also aimed to explore whether degrading or critical voice content may potentially mediate the relationship between external shame and perceived social rank. Two hypotheses were proposed:

> *H1:* Higher levels of external shame will be associated with a greater likelihood of assuming a lower social rank compared with one's voice(s), attributing their voice(s) a higher rank.

H2 (Exploratory Hypothesis): Nature of voice – person dialogue will mediate the association between external shame and subordination within the relationship between voice and hearer, i.e. authoritative, critical or dominating dialogue will appear to strengthen the association between external shame and perceived higher rank for the voice(s).

Given the cross-sectional nature of the study, all hypotheses are examined in terms of associations rather than causal effects.

Methods

Design

This cross-sectional observational study used quantitative methods to evaluate differences between variables at one point in time. Trait external shame, measured using the External and Internal Shame Scale (EISS), is the predictor variable. Voice social rank, measured using the adapted Social Comparison Scale (SCS; Birchwood et al., 2000), is the primary outcome variable. Four covariates, consistently linked to both external shame and perceived social rank, were included: age, duration of voice hearing, anxiety, and low mood. Low mood and anxiety are closely associated with external shame and submissive behaviours and can affect how individuals appraise and engage with voices, often increasing the likelihood that voices are experienced as dominant or threatening (Connor & Birchwood, 2013; Birchwood et al., 2007). Longer-term voice-hearing experiences may entrench certain relational schemas or coping styles relevant to power dynamics (Corstens & Longden, 2013). Finally, age of voice hearing onset is included given the potential impact that developmental or life-stage context on shame and the internalisation of hierarchies (Maijer et al., 2018; Parry, Loren & Varese,

2021). The study was approved by the Oxford Health NHS Foundation Trust Research Ethics Committee (ref: PID17740).

Participants

An a priori power calculation using G*power (Faul et al., 2009) established the minimum sample size to test the hypotheses while minimising the risk of type one or two errors. For a regression model with one predictor variable, one outcome variable, and four co-variates, 55 participants are required to achieve 80% power at an alpha level of 0.05.

Participants were recruited to the study via social media, Hearing Voices Groups and through the Oxford Health NHS Foundation Trust Early Intervention for Psychosis (EIP) Service. Recruitment overlapped with another study targeting the same population. Both studies used a combined information sheet, consent form, and Qualtrics platform for questionnaires. An expert by experience piloted the survey and feedback was used to adapt participant-facing materials. Recruitment began in July 2024 with poster advertisements on Facebook, Twitter, Instagram and Reddit. The study was also presented online at Hearing Voices Groups and local EIP service meetings.

Participants could complete the study online or by telephone. 56 individuals completed the study online and two by phone.

Inclusion criteria included: a) English speaking, b) UK resident, c) capacity to consent, d) experienced hearing a voice that others have not, which they found mildly distressing. Following feedback from Hearing Voices Groups, the original criterion requiring voice

hearing within the past week was removed for inclusivity. This substantial amendment was approved in October 2024.

Measures

Psychotic Symptom Rating Scales (PSYRATS) (Haddock et al., 1999) – Item 1 from the auditory hallucination subscale assessed frequency of voice hearing (0 = "Never" to 5 = "Continually"). Eligible participants scored 1 ("Voices not currently present or present less that once a week") or above. Item 8 was assessed distress ("0 = No problem" to "4 = maximum severity"). Participants scoring 1 ("minimal or occasional distress") or above were eligible to participate. The PSYRATS has good inter-rater and retest reliability and validity, as assessed by internal consistency, sensitivity to change, and in relation to the PANSS (Drake et al., 2007).

Social Comparison Scale (SCS) (Allan & Gilbert 1995). Adapted to measure perceived social rank relative to the dominant voice, by adjusting the opening sentence ('in relation to my voice I feel ...'), as seen in research by Birchwood et al. (2000). This is referred to as the 'voice rank' scale. Internal reliability of this scale was 0.80 (N =59) and re-test reliability 0.77 (N=25). The present research used the voice rank subscale only, excluding subscales measuring other social comparison concepts. Responses were rated on a scale from 1-10 measuring agreement with each statement.

External and Internal Shame Scale (EISS) (Ferreira et al., 2022). The eight items within this measure assessing external shame are included presently, for example "Other people see me as inferior to them", rated on a five-point Likert scale, from "never" to "always". Good

reliability, (α = .89), and high discriminant and concurrent validity have been established (Ferreira et al., 2022).

DAIMON-EV (Perona-Garcelán et al., 2015). The 28-item measure evaluates the dialogical aspects of the relationship of person to voice, voice to person, the emotional salience of this relationship, and the experience of the relationship between voice(s). The 6-item subscale (exploring the dialogue of the voice to person, e.g. “the voice(s) gives me orders about what I can or cannot do”) is used in the present study (see Appendix O). The measure has been validated in English (Rosen et al., 2020) and has an internal consistency of varying between 0.80 to 0.84 and acceptable concurrent validity, showing a significant association with the VAY, BAVQ and PSYRATS subscales (Perona-Garcelán, 2015).

Generalised Anxiety Disorder (GAD-7) (Spitzer et al., 2006). A brief measure of anxiety with good internal consistency (α = 0.89) and validity when compared with other measures of similar constructs (Lowe et al., 2008).

Patient Health Questionnaire (PHQ). The PHQ-8 is a commonly used screening measure for depression, frequently used in primary care settings. The measure has established good convergent and discriminant validity as well as good internal consistency (α=.87) when examined within a large sample (Beard et al., 2016).

Assessing Confidence. The present study is exploring whether external shame, as a stable personality trait, significantly increases the likelihood of assuming low social rank in relationship with voice(s). The researchers therefore included a one-item measure to assess confidence in the stability of psychological experiences for participants who last heard a

voice over one week ago: “thinking about when you last experienced voice hearing, how confident are you that your answers at that time would be similar to the answers provided above? (0= not at all confident, and 100= very confident).”

Procedure

Participants were presented with study information, including the purpose of the study, use of data collected, and the researchers’ contact details. The information was read out loud for participants who took part over the phone. Informed consent was obtained via an online consent form from participants wishing to proceed. All participants were screened based on inclusion criteria to determine eligibility.

Participants provided demographic data, before completing questionnaires on external shame, perceived social rank, voice-to-person dialogue, depression and anxiety. As this study was conducted in conjunction with another study, participants were randomly assigned to complete one set of questionnaires first. Following completion of the initial set, participants were given the option to discontinue the survey or proceed with the second set, participating in both studies. All participants chose to complete both questionnaire sets. Consequently, some participants completed measures assessing traumatic experiences and dissociative experiences before those specific to the current study. No participants were incentivised for their participation. Following survey completion, participants read debriefing information, including a list of supportive organisations.

Statistical Analysis Plan

Data were entered into IBM SPSS Statistics (Version 29). To ensure accuracy, data checks were performed, including manual review of survey completion times and examination of response patterns. No inaccurate responses were identified, so all data were retained for statistical analysis. Statistical assumptions were also checked. All assumptions were met (details in Appendix P).

To investigate whether people with higher levels of external shame were more likely to assume a lower social rank compared with their voice, a hierarchical multiple linear regression was run. The following covariates were entered into the first block in the regression: low mood, anxiety, duration of voice hearing and age. External shame, being the primary predictor variable, was entered into the second block. The regression was structured in this way to determine if the addition of external shame improved the prediction of perceived social rank over and above age, duration of voice hearing, anxiety and low mood alone. As the sample included participants who had not heard voices recently, secondary a priori sensitivity analyses was performed to establish whether responses from participants who had not heard voices over the past twelve months were biasing results. A Spearman's rank-order correlation was run for participants not currently hearing voices, to assess the relationship between confidence in answers given and levels of external shame. Additionally, the hierarchical regression for the primary hypothesis was run for a second time, after removing all participants who had not heard voices over the past twelve months.

To investigate whether person dialogue acts as a mediator in the relationship between external shame and subordination within the relationship between voice and voice hearer, a mediation analysis was performed using the PROCESS macro for SPSS (Hayes, 2022). This secondary data analysis is exploratory in nature, given that the study is powered to support

the primary hypothesis only. The authors acknowledge that the study is not appropriately powered to support a mediation hypothesis, meaning that causality should not be inferred and the possibility of a type two error is likely. Though relationships are not required to be significant to run mediation, the predictor variables must be related to the mediator and the mediator must be related to the outcome variable (Hayes, 2017). Confidence intervals for the indirect effects were produced based on 5000 bootstrapped samples (Preacher & Hayes, 2004). Mediation can be concluded where confidence intervals do not include the value of 0.

Results

In total, 56 individuals accessed the study online, and two people via phone. See Table 13 for a summary of participant demographics.

Table 13

Participant Characteristics

Demographics	
Age (Mean, SD)	39 (14.6)
Age of Voice Hearing Onset (N, %)	
< 18	31 (53.4%)
18-25	16 (27.6%)
26-34	5 (8.6%)
35-44	2 (3.4%)
45-54	3 (5.2%)
55-64	1 (1.7%)
Gender (N, %)	
Male	9 (15.5%)
Female	39 (67.3%)
Non-Binary	7 (12.1%)
Prefer to Self-Describe	1 (1.7%)
Prefer not to say	2 (3.4%)
Ethnicity (N, %)	
White	55 (94.9%)

Black	0 (0%)
Asian	1 (1.7%)
Mixed (White/Indian)	1 (1.7%)
Other (Traveller)	1 (1.7%)
Educational Attainment (N, %)	
Primary School or Lower	2 (3.4%)
Secondary School (i.e. GCSEs or equivalent)	7 (12.1%)
College or Sixth Form (i.e. A-Levels of equivalent)	16 (27.6%)
University (i.e. Undergraduate Degree)	22 (37.9%)
Post Graduate University (i.e. Masters Degree, PhD)	10 (17.2%)
Prefer Not To Say	1 (1.7%)

Table 14
Overview of Clinical Characteristics

Outcomes Measured	Range	Mean	Standard Deviation
External Shame*	11 - 40	24.95	8.19
Perceived Social Rank**	1 - 87	38.95	18.62
Duration of Voice Hearing (in years)	2 - 57	20.34	14.90
Low Mood***	1 - 24	12.34	6.93
Anxiety†	1 - 20	10.67	6.15
Voice Content††	1 - 24	7.53	5.76

*External Shame Sub-Scale has a total possible score of 40 (higher scores indicating greater shame).
**Social Comparison Scale has a possible total score of 110 (higher scores indicate higher perceived social rank, compared with voice).
***PHQ-8 has a total possible score of 24 (higher scores indicate more severe low mood)
†GAD-7 has a total possible score of 21 (higher scores indicate more severe anxiety)
†† DAIMON voice-to-person sub-scale has a total possible score of 24 (higher score indicating more frequent subordinating voice content).

Hypothesis One: Hierarchical Regression

The partial model (Model 1), without the inclusion of external shame, was not significant meaning these factors did not significantly predict perceived social rank, $R^2 = .065$, $F(4, 53) = .921$ $p < .459$. The full model of age, duration of voice hearing, anxiety, low mood and external shame to predict perceived social rank (Model 2) was statistically significant, $R^2 = .384$, $F(1, 52) = 26.87$, $p < .001$. The addition of external shame to the prediction of social rank (Model 2) led to a statistically significant increase in R^2 of .319,

indicating that adding external shame increased the model's predictive capacity by 31.9%. See Table 16 for full details on each regression model.

Sensitivity Analyses

Twenty-Three participants who participated in the study had not heard voices over the past twelve months and 12 of these reported a less than 75% confidence that the answers they provided would have been the same as during the time of voice hearing. Preliminary analysis from the Spearman's rank-order correlation showed the relationship to be non-linear, as assessed by visual inspection of a scatterplot. There was no statistically significant correlation between confidence in answers given and levels of external shame, r_s = -.096., n = 23, p = .662.

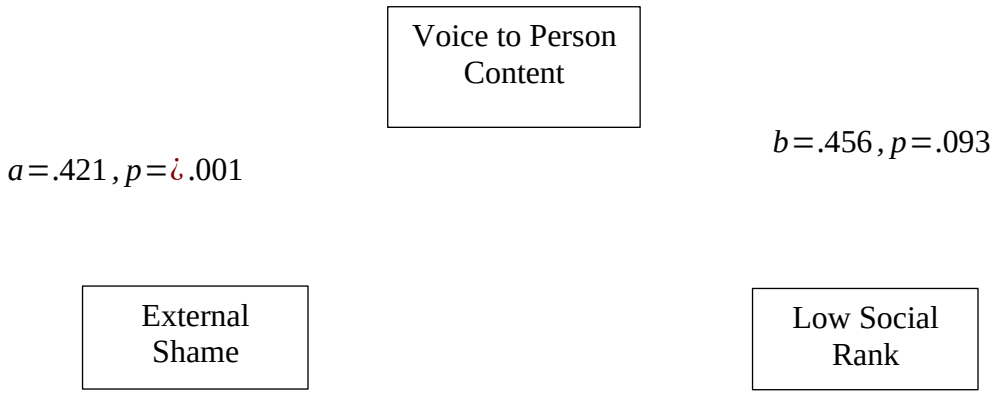
Results from the second regression analysis, where responses from participants who had not heard voices over the past twelve months were removed , appear to reveal similar results to the original regression analysis with all participants included. The partial model (Model 1), without the inclusion of external shame, remained insignificant R^2 = .050, F(4, 30) = .392 p < .813. The full model of age, duration of voice hearing, anxiety, low mood and external shame to predict perceived social rank (Model 2) remained statistically significant, R^2 = .350, F(1, 29) = 13.42, p < .001, and comparable to the full model with all participants included.

Hypothesis Two: Mediation Analysis

The outcomes of mediation analyses are shown in Table 17, with a path diagram for the model shown in Figure 3. Contrary to prediction, support was not found for the hypothesis that voice to person content mediates the relationship between external shame and low social rank.

Figure 3

Mediation Analysis Path Diagram



As can be seen in Figure 3 and Table 16, external shame was statistically significantly associated with voice-to-person content (a = .421, p < .001), however voice-to-person content was not associated with social rank to a significant degree (b = .456, p = .093). A bootstrap confidence interval for the indirect effect included zero (b=.192, 95% CI: -.016 to .570), meaning that the mediation analysis failed to provide support for the hypothesis that voice content mediates the relationship between external shame and social rank. This remained the case even after removing answers to items 3 and 4 on the DAIMON which assessed neutral voice content ("the voice(s) asks me questions about myself, or about the

things that happen to me during the day" and "the voice(s) gives me information about the things that happen in my life or in my environment"): b = .129, 95% CI [-.0765, .432].

Table 15

Pearson's correlations between predictor, outcome variable and co-variates

	1	2	3	4	5	6
1. Social Rank	-	.016	-.088	-.159	-.222	-.604**
2. Age		-	.664**	-.129	-.097	-.176
3. Duration of Voice Hearing			-	-.101	-.041	-.002
4. Anxiety				-	.737**	.421**
5. Low Mood					-	.454**
6. External Shame						-

*Significant at the .05 level
**Significant at the .01 level

Table 16

Regression Models

				95% CI					
		Unstandardised Beta	**SE**	**LL**	**UL**	**ß**	***p***	**R^2**	**ΔR^2**
Model 1 (Without External Shame)							.459	.065	-.006
	Low mood	-.585	.529	-1.647	.477	-.218	.274		
	Anxiety	-.004	.599	-1.205	1.198	-.001	.995		
	Duration Voice Hearing	-.209	.223	-.655	.237	-.167	.352		
	Age	.135	.227	-.320	.590	.106	.555		
Model 2 (Including External Shame)							<.001	.384	.324
	Low mood	-.055	.446	-.950	.839	-.021	.902		
	Anxiety	.366	.496	-.630	1.362	.121	.464		
	Duration	-.046	.185	-.418	.325	-.037	.804		

Voice Hearing Age	-.078	.191	-.461	.304	-.061	.683
External Shame	-1.492	.288	-2.069	-.914	-.656	<.001

*Note. SE = standard error; CI = confidence interval; LL = lower limit; UL = upper limit; β = standardised beta R^2 = variance in Social Rank explained by predictor variables in model; ΔR^2 = the change in R^2 between models
** $p < .05$
** p <.001

Table 17

Mediation Analyses

		M (Voice Content)					Y (Social Rank)			
		B	**SE**	**p**	**ß**		**B**	**SE**	**p**	**ß**
External Shame	*a*	0.421	0.119	<0.001	0.427	*c*	-1.565	0.263	<0.001	-0.688
Voice Content						*b*	0.456	0.267	0.093	0.198
		R^2 = .182 F (1, 56) = 12.458 , p = <0.001					R^2 = .396 F (2, 55) = 18.063, p < 0.001			

Discussion

This study aimed to examine the role of external shame on perceived social rank in voice-hearers. A secondary aim was to explore whether voice content mediated this relationship. Consistent with previous studies, high levels of external shame were associated with assuming a lower social rank relative to the dominant voice (Birchwood et al., 2000). Results

did not support the hypothesis that pejorative or commanding voice content mediates this relationship.

H1: High levels of external shame in voice-hearers will predict the likelihood of taking on a lower social rank than the dominant voice

External shame was significantly associated with participants' perception of their own low social rank compared with the dominant voice, even after controlling for age, duration of voice hearing, anxiety, and low mood. External shame is considered a trait variable, rather than a transient state, in the present study. As such, sensitivity analyses were conducted, removing responses from participants who had not heard voices in the past twelve months before repeating the regression. The predictive value of external shame was maintained, suggesting that results were not biased by unreliable self-reporting.

The present results are consistent with the evolutionary hypothesis of shame in those who hear voices, which suggests that external shame acts an evolved response to social threat, prompting protective defences, including adopting a subordinate role (Gilbert et al., 2001). Such responses may be more easily activated in those with histories of childhood adversity and attachment disruptions (Heriot-Maitland et al., 2022). Present findings are in line with a systematic review proposing shame may contribute to the onset of voice hearing (Volpato et al., 2022), as voice hearing may act a mechanism to encourage submissive and self-protective behaviours (i.e. avoiding situations that could be socially threatening).

Our findings have clinical implications that align with previous research. Paulik et al. (2012) suggest that voice hearers may develop a more balanced relationship with their voice by improving their social rank relative to others in their social network through interventions targeting assertiveness, self-esteem, and social skills. Our findings suggest that reducing external shame through these interventions could potentially help narrow the social rank gap between voice and voice-hearer, which may reduce distress. This implication is significant given evidence that social rank predicts compliance with harm-focused commands (e.g., instructions to harm oneself or others) issued by the voice (Fox et al., 2004).

H2: Voice-to-person dialogue will mediate the relationship between external shame and voice-hearer subordination (low social rank)

Our findings did not support this hypothesis, as voice-to-person dialogue did not mediate the relationship between external shame and low social rank of the voice-hearer. However, within the mediation, external shame was statistically associated with voice content. This suggests that individuals with heightened shame are more likely to perceive themselves as subordinate to their voice, irrespective of voice content.

These results differ from studies linking malevolent voice content to depression and suicidal behaviour (Alderson-Day et al., 2021; Upthegrove et al., 2014) but align with experimental research using non-clinical samples, showing high levels of shame in response to voices regardless of content or social context (Bortolon et al., 2022). Similarly, in individuals with schizophrenia or schizoaffective disorder, beliefs about voices which relate to social rank (particularly perceptions of omnipotence) were best predicted by negative self-schemas (e.g.,

"I am vulnerable," "Other people are devious") even after controlling for negative voice content (Thomas, Farhall & Shawyer, 2015).

Furthermore, the finding that external shame significantly predicted voice content is consistent with previous research (Connor & Birchwood, 2013) and with aetiological frameworks proposing that adverse life events contribute to negative voice content via mechanisms such as shame, dissociation, hypervigilance, and altered emotional processing (Larøi et al., 2019). Notably, this framework positions low social rank as a predictor of negative voice content, not a consequence, which contrasts with the mediation model tested here.

Clinical Implications

The association between external shame and perceived low social rank relative to dominant voices suggests that shame may be a relevant therapeutic target. Interventions aimed at reducing external shame, such as Compassion-Focused Therapy, which emphasises self-compassion and the regulation of threat-based emotions, may help voice-hearers re-evaluate their social positioning and reduce submissive responses to voices. This is important given the established link between low perceived social rank and increased compliance with harmful voice commands. Although voice content did not mediate the relationship between shame and social rank, the finding that shame significantly predicts voice content suggests reducing shame may indirectly influence how voices are experienced, although this cannot be determined from the current cross-sectional data. Reducing shame early in therapy could help shape the tone and content of voices, potentially reducing their malevolence and overall distress.

Limitations and directions for future research

The assumption that external shame is best conceptualized as a stable personality trait rather than a transient state is a key limitation. The cross-sectional design, with data collected at one time point, limits the ability to test this assumption. To control for this limitation, a one-item measure of participant confidence in the stability of their responses on the external shame measure was included. However, this measure is inherently subjective and lacks reliability. Additionally, the cross-sectional design limits the extent to which inferences can be made about directionality, causality and specifically, whether the proposed mechanism; whereby individuals assign themselves a lower social rank relative to their voice as a response to feelings of external shame - can be extrapolated across the lifespan in voice hearers.

Voice content measurement, using the DAIMON-EV sub-scale (Perona-Garcelán et al., 2015), may not have accurately measured the construct the authors were aiming to. While most items assess pejorative, commanding or subordinating voice content (e.g. “the voice(s) forbids me to do things”), some are more neutral (e.g. “the voice(s) asks me questions about myself…”) (Appendix O). A sub-analysis was conducted with the neutral items removed; however, these findings should be interpreted with caution given that the sub-scale was validated as a whole, and removing items may have compromised its validity. Research within this field has utilised measures which gather rich data on voice content and tone. For example, Alderson-Day et al. (2021) and Upthegrove et al. (2014) used semi-structured interviews to understand participants’ voice hearing experiences. It is possible that our findings differ from previous research because the DAIMON-EV subscale may not have captured the full complexity of voice content. This construct is inherently nuanced and multifaceted, and the use of a brief self-report measure, completed via an online survey, may

have limited our ability to accurately assess the range and subtleties of participants' voice-hearing experiences.

A further limitation relates to the recruitment methods. As participation was fully anonymous, data on how participants accessed the study were not collected. However, it is likely most were recruited via social media and Voice Hearing Groups, given surges in participation following online promotion and confirmed engagement through Hearing Voices groups. Although NHS referrals were possible, uptake from clinical services was limited. While many studies recruit clinical samples outside of healthcare settings due to recruitment challenges, this approach relies on self-reported experiences, which may introduce inaccuracies.

The studies our results seem to contradict recruited predominantly from NHS services (Thomas et al., 2015; Alderson-Day et al., 2021; Upthegrove et al., 2014). Different recruitment strategies may have contributed to the discrepancies with existing literature. Additionally, the self-selecting sample led to demographic biases, with over two-thirds identifying as female and 95% white, limiting generalisability.

A recent systematic review of research into shame and psychosis highlighted need for future longitudinal research to establish temporality and directionality (Carden et al., 2020). Future studies could expand on our research by measuring external shame and social rank across multiple time points. Developing a measure co-designed with EbEs to more accurately and specifically assess pejorative, commanding or subordinating voice content is also a logical next step. Finally, intervention studies, including case reports or pilot studies, focused on shame reduction and its impact on social rank, would stregnthen the evidence base.

Conclusion

External shame was associated with perceiving oneself as lower in rank than the dominant voice, even after controlling for age, voice hearing duration, anxiety, and low mood. Voice content did not mediate the association between shame and social rank. Findings align with evolutionary theories on shame in voice hearers and offering greater specificity in understanding this relationship, though methodological limitations warrant cautious interpretation. Future research should collaborate with EbEs to refine measurement tools. Additionally, clinical case studies on shame-reducing interventions in voice hearers would expand the existing evidence base.

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Connecting Reflective Narrative

The projects within this portfolio are linked by a common theme: improving support for marginalised groups overlooked, under-researched, or ineffectively supported by care systems. My SRL focused on vulnerable populations in African countries. While research into the psychological impact of the climate crisis is growing, African communities remain underrepresented. My SIP explored barriers faced by women experiencing homelessness. As a minority within the homeless population, women have historically been underserved by care providers designed with men in mind. My TDRP examined the experience of voice hearing, a stigmatised psychological phenomenon. Reflecting on my projects, my motivation to help unrepresented groups, which led me to pursue a career in clinical psychology many years ago, continues to shape my career choices.

Systematic Review of the Literature

In choosing a research question for my SRL, I was torn between selecting a topic which reflected my clinical (e.g. psychosis and forensics) and using the opportunity afforded by the doctorate of exploring a new interest. Personally, the CC concerns me deeply, and I am intrigued and horrified by societal reactions ranging from denial to activism.

I found identifying a research question that was within the appropriate scope challenging. Through reflective discussions with my supervisor, we identified an aim to use this research project as an opportunity for research activism. We anticipated limited research on the climate crisis's mental health impact in Africa and sought to highlight this gap.

Reading the papers identified in the review was challenging, as I felt detached from the populations researched in the papers who are feeling the direct impacts of the CC in a way that I cannot comprehend while living in the UK. I struggled with guilt over the privilege of living in a country contributing to, and simultaneously largely shielded from, climate-related harms.

Service Improvement Project

The SIP research question emerged naturally during my first placement, working in a local homelessness charity. Conversations with staff revealed differences in supporting men and women experiencing homelessness. Working with women was described as more emotionally taxing. Initially, I felt challenged by the apparent binary nature of staff perspectives and wondered whether this reductive gendered view might be unhelpful. However, through conversations with staff and my supervisor, I began to understand that the perceived differences in supporting men and women experiencing homelessness may reflect structural problems within homelessness services, which have been designed for men experiencing homelessness, given that men are most likely to seek support from the services.

Hearing staff's experiences, both professionally and lived experiences of homelessness, was an deeply emotional experience for me. I found a new sense of admiration for people who have suffered so much adversity in life and are able to use their experiences to support others.

I feel proud of my SIP and particularly how collaborative I feel the project was. I used experts by experience throughout the project and that helps me to have belief that the project was meaningful. I hope to pursue publication and also aspire to use the skills I developed in co-production in future clinical and research roles I hold.

Theoretically Driven Research Project

I was particularly inspired by the eight-week reflective stream I participated in during first year on Compassion Focussed Therapy (CFT). This opportunity to learn about the principles of CFT and practice some of the methods ourselves inspired me to learn more about the impact of shame on people's lived experience. This informed the development of my TDRP, focusing on how shame impacts the relationship one has with the voices they hear.

Conducting the TDRP has given me the opportunity to develop a whole range of research skills. In particular, first-hand experience of applying for NHS ethical approval, presenting at Hearing Voices support groups as part of recruitment and statistical analysis are all formative experiences which will make me more confident leading research projects in my future work.

I found recruiting participants particularly challenging and managing uncertainty was difficult to tolerate, however, collaborating with another trainee helped me to cope. I learned from this that working collaboratively with people with shared motivations is crucial for my own wellbeing and motivation.

Studying voice hearing; a comparatively well-researched area, reinforced just how complex the human experience is. Despite decades of research trying to better understand voice hearing, there is still so much to learn. I feel hopeful that my project could be one small piece of the puzzle contributing to our growing understanding of this psychological phenomena. I am encouraged that the findings have clinical implications that I hope, through dissemination, will positively impact people lives.

Conclusions

Having the opportunity to conduct these three projects, has allowed me to develop some fundamental research skills, many of which are applicable in clinical work. Reflecting on their common thread has reaffirmed my motivation: as a qualified psychologist I hope to dedicate the rest of my career to giving voice to marginalised groups in society through both my clinical and research work.

Executive summary

Background

According to evolutionary models, shame can be understood as an adaptive emotion that developed to act as a social threat detection system (Gilbert, 1997), functioning by alerting individuals to negative appraisals from others and potential for ostracization from the group. Shame can be delineated into two subtypes: internal and external. External shame involves the perception of being negatively evaluated by others and may lead people to assume a low "social rank" (Gilbert, 2000).

People who hear voices often feel high levels of shame and while some authors believe that this is explained by the fact that the experience of hearing voices itself is shaming (Woods et al., 2015), others believe that predisposing high levels of shame may increase the likelihood of voice hearing in those who have experienced childhood trauma (Bortolon et al., 2022; McCarthy-Jones, 2017).

Given that voice hearing is a social experience, largely reflecting person-to-person relationships (Bell, 2013; Woods, 2017), our study aimed to understand whether heightened external shame leads voice hearers to adopt a subordinate role, assigning their voices higher social rank. Secondly, our research aimed to explore whether critical voice content mediates the relationship between external shame and perceived social rank.

Methods

Participants with experience of voice-hearing were recruited via social media and NHS services. They were asked to complete online questionnaires related to their experience of hearing voices, feelings of external shame and perceptions of themselves and the dominant

voice heard in terms of social rank or positioning. Demographic information and control variables were also measured.

Results

58 participants took part in the study. High levels of external shame were predictive of participants perceiving themselves to have low social rank compared with the dominant voice heard. This was the case even when controlling for other variables which may have explained perceived low social rank, including age, duration of voice hearing, anxiety and low mood.

Contrary to the second hypothesis, the content of the voices heard did not appear to mediate the relationship between feelings of external shame and a perceived low social rank, relative to the voice.

Research Implications

Further research implementing longitudinal designs is required to establish temporality and directionality. Future studies could expand on this study by measuring external shame and social rank in voice hearers across multiple time points. Furthermore, a measure designed with experts by experience to more accurately assess voice content could be a logical next step for research in this field. Finally, intervention studies, such as case reports or pilot studies, focusing on shame reduction and its impact on social rank, would contribute meaningfully and necessarily to the evidence base.

Clinical Implications

Results from this study suggest that reducing shame in therapy, using models such as Compassion Focused Therapy, may be an effective way to improve the ways in which patients view themselves socially, relative to the voice(s) they hear and also to others in society. Patients may also feel more able to resist commands given by the voice(s). Though voice content was not found to play a mediating role, it was significantly associated with feelings external shame. It is possible, therefore, that focusing on shame reduction early in therapy may have an impact on the tone and content of voices. Voice content should be assessed and measured throughout therapy to evaluate whether this is the case.

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Appendices

Appendix A: SRL – Search Terms

African Countries AND	Subject heading term: "**Africa" (explode)** Specific Terms: "North Africa" or Egypt* or Libya* or Libia* or Tunisia* or Algeria* or Morocco* or "West Africa" or Benin or "Burkina Faso" or Cameroon or "Cape Verde" or Chad or "Canary Island" or "Cote d Ivoire" or "Ivory Coast" or Gambia* or Ghana* or Guinea* or Guinea-Bissau or Jamahiriya or Liberia* or Mali or Mauritania* or Niger* or Nigeria* or Benin* or Senegal* or "Sierra Leone" or Togo or "Central African Republic" or Congo* or "Democratic Republic of Congo" or Zaire or "Equatorial Guinea" or Gabon* or "Sao Tome and Principe" or "East Africa" or Eritrea* or Ethiopia* or Somalia* or Djibouti* or Sudan* or "South Sudan" or Uganda* or Kenya* or Tanzania* or Rwanda* or Burundi* or "The Comoros" or Mauritius or Seychelles or Madagasca* or "South Africa" or "St Helena" or Angola* or Botswana* or Lesotho* or Malawi* or Mozambique* or Namibia* or Swaziland or Zambia* or Zimbabwe* or "cabo verde" or eswatini* or Liberia or "sub-saharan".ti,ab.
Changes in the climate AND	Subject heading term: "**climate change" and related terms** Specific terms: "Climate change" or climate* or "climate crisis" or "natural disasters" or avalanche* or "cyclonic storm" or drought* or flood* or landslide* or tornado* or wildfire* disaster* or weather* or "extreme weather*" or humidit* or "rain fall" or "change in temperature" or "temperature change" or

	lightning* or ice or "greenhouse effect" or "greenhouse gas" or "global warming" or biodiverse* or "particulate matter" or "air pollution" or "air pollutants" or "water quality" or "water pollutant" or "soil pollutant" or "weather events" or "climatic variability" or "ecological change" or "heat wave" or "land use" or "extreme temperature" or "cold wave" or snowstorm* or frost* or freez* or fog* or storm* or derecho* or hail* or thunderstorm* or rockfall* or mudflow* or "wave action" or "rogue wave" or "glacial lake outburst" or "forest fire" or "land fire" or "brush fire" or "bush fire" or "pasture fire" or "habitat loss" or "resource scarcity".ti,ab.
Mental Health Difficulties	Subject heading term: **mental illness and related terms**
	Specific terms: "mental health" or "mental illness" or "mental disorder" or "mental distress" or "psychological disorder" or "psychiatric disorder" or psychopatholog* or anxiet* or depress* or "post-traumatic stress" or OCD or "obsessive compulsive disorder" or "posttraumatic stress" or PTSD or suicide* or "self harm" or "self injury" or "self injuries" or "substance use" or "substance abuse" or "alcohol use" or “alcohol misuse” or "alcohol abuse" or "drug abuse" or "drug misuse" or "mood disorder" or depression* or anxiet* or psychos* or schizophreni* or bipolar* or "bipolar disorder".ti,ab.

Appendix B: SRL - Standard Quality Assessment Criteria Checklist (Kmet et al., 2004)

Checklist for assessing the quality of quantitative studies

Criteria		Yes	Partial	No	N/A
1	Question/objective sufficiently described?				
2	Study design evident and appropriate?				
3	Method of subject/comparison group selection or source of information/input variables described and appropriate?				
4	Subject (and comparison group, if applicable) characteristics sufficiently described?				
5	If interventional and random allocation was possible, was it described?				
6	If interventional and blinding of investigators was possible, was it reported?				
7	If interventional and blinding of subjects was possible, was it reported?				
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?				
9	Sample size appropriate?				
10	Analytic methods described/justified and appropriate?				
11	Some estimate of variance is reported for the main results?				
12	Controlled for confounding?				
13	Results reported in sufficient detail?				
14	Conclusions supported by the results?				

Checklist for assessing the quality of qualitative studies

Criteria		Yes	Partial	No	N/A
1	Question / objective sufficiently described?				
2	Study design evident and appropriate?				
3	Context for the study clear?				
4	Connection to a theoretical framework / wider body of knowledge?				
5	Sampling strategy described, relevant and justified?				
6	Data collection methods clearly described and systematic?				
7	Data analysis clearly described and systematic?				
8	Use of verification procedure(s) to establish credibility?				
9	Conclusions supported by the results?				
10	Reflexivity of the account?				

Appendix C: SRL - Quality Appraisal Table

	Quality appraisal item scores													
	Article	1	2	3	4	5	6	7	8	9	10	11	Total	**Summary Score**	**Quality Rating Category**
Quantitative	Njeru et al. (2022).	2	1	1	2	0	1	2	1	0	2	2	14	0.64	Average
	Abunyewah et al. (2024).	2	2	2	1	2	2	2	2	0	2	2	19	0.86	High
	Libey et al. (2022).	2	2	1	1	2	2	2	2	1	1	2	18	0.82	High
	Ndetei et al. (2024).	2	2	1	1	1	1	2	0	0	1	2	13	0.59	Average
	Nothling et al. (2024).	2	2	1	2	2	1	1	2	2	0	2	17	0.77	High
	Obaniyi et al. (2023).	1	0	1	0	0	0	0	1	0	0	1	4	0.18	Low
	Prencipe et al. (2023).	2	2	1	2	1	2	2	2	2	1	2	19	0.86	High
	Taukeni et al. (2016).	2	2	2	1	2	2	2	1	0	2	2	18	0.82	High
	Goodman et al. (2023).	2	2	2	1	2	1	2	2	2	0	2	18	0.82	High
	Goodman et al. (2023).	2	2	2	2	2	1	2	1	1	2	2	19	0.86	High
	Abass et al. (2022).	1	2	1	1	1	1	1	2	2	0	2	14	0.64	Average
	Abu et al.	1	1	1	2	1	1	2	1	0	2	2	14	0.64	Average

	(2024).														
	Clayton et al. (2023).	2	2	1	1	2	1	2	2	0	2	2	17	0.77	High
	Kabunga et al. (2022).	2	2	2	2	1	2	1	2	0	2	2	18	0.82	High
	Tomita et al. (2021).	2	2	2	2	1	1	2	2	1	1	2	18	0.82	High
	Rosinger et al. (2024)	2	2	2	2	2	1	2	2	2	2	2	21	0.95	High
	Mohammed et al., (2025)	1	2	2	2	1	2	2	2	1	2	2	19	0.86	High
Qualitative	Babugura et al. (2008).	2	2	2	1	1	2	1	1	2	0	N/A	14	0.7	Average
	Beyeler et al. (2023).	2	2	2	1	1	2	2	2	2	0	N/A	16	0.8	High
	Cooper et al. (2019).	2	2	2	2	2	1	1	0	2	0	N/A	14	0.7	Average
	Kadio et al. (2024).	2	2	2	1	2	2	2	2	2	0	N/A	17	0.85	High
	Shoko Kori. (2023).	2	2	2	1	2	2	2	0	2	0	N/A	15	0.75	Average
	Adams et al. (2021).	2	2	2	2	1	2	2	2	2	2	N/A	19	0.95	High
	Pinchoff et al. (2025)	2	2	2	1	1	2	2	2	2	0	N/A	16	0.8	High

Quality Appraisal Item Key: 1: Question / objective sufficiently described?; 2: Study design evident and appropriate?; 3: (qual) Context for the study clear? / (quant) Method of subject/comparison group selection or source of information/input variables described and appropriate?; 4: (qual) Connection to a theoretical framework / wider body of knowledge?; (quant) Subject (and comparison group, if applicable) characteristics sufficiently described?; 5: (qual) Sampling strategy described, relevant and justified?/ (quant) Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?; 6: (qual) Data collection methods clearly described and systematic?/ (quant) Sample size appropriate? 7: (qual) Data analysis clearly described and systematic? / (quant) Analytic methods described/justified and appropriate?; 8: (qual) Use of

verification procedure(s) to establish credibility? / (quant) Some estimate of variance is reported for the main results?; 9: (qual) Conclusions supported by the results? / (quant) Controlled for confounding?; 10: (qual) Reflexivity of the account? / (quant) Results reported in sufficient detail?; 11: (quant only) Conclusions supported by the results?

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1) *Question or objective sufficiently described?*

   Yes (2): Is easily identified in the introductory section (or first paragraph of methods section). Specifies (where applicable, depending on study design) all of the following: purpose, subjects/target population, and the specific intervention(s) /association(s)/descriptive parameter(s) under investigation. A study purpose that only becomes apparent after studying other parts of the paper is not considered sufficiently described.

   Partial (1): Vaguely/incompletely reported (e.g. "describe the effect of" or "examine the role of" or "assess opinion on many issues" or "explore the general attitudes"); or some information has to be gathered from parts of the paper other than the introduction/background/objective section.

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Appendix D: SRL - Author Guidelines for Cogent Mental Health

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- Should contain an unstructured abstract of 200 words.
- Should contain between 5 and 7 **keywords**. Read making your article more discoverable, including information on choosing a title and search engine optimization.

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Appendix E: SRL – Published Manuscript

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REVIEW ARTICLE

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The mental health impact of the climate and ecological crisis on vulnerable populations in Africa

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ABSTRACT

Scientists have been predicting the severe impacts of climate change for decades, and today these threats have intensified, with climate events pushing temperatures, sea levels and biodiversity loss to record extremes. This review examines the impact of climate change on mental health in vulnerable populations residing in Africa. Medline, Embase, Ovid, APA PsycINFO, Global Health were searched for studies published after 2007 researching the psychological impact of climate change on vulnerable African populations. Studies were screened according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and results were reviewed using a narrative synthesis approach. Twenty-one articles, including 36,425 participants, were analysed. The results suggest that women, young people, farmers, migrants, people living in rural areas and survivors of climate-related traumatic experiences (such as extreme weather events) are all vulnerable to mental health impacts caused by the climate crisis. Future research is needed in African countries which have not yet been studied, including island nations. Further high-quality research is required to establish longitudinal impacts of the climate crisis and to explore the impacts on vulnerable groups which are, as yet, neglected in the research, including, e.g., ethnic minorities, indigenous groups and LGBTQ+ communities.

KEYWORDS Climate crisis; ecological crisis; mental health; Africa; vulnerable populations; children; farmers

Introduction

Almost 20 years ago, scientists were predicting the global effects of climate change on extreme weather events, water availability, food security and ecosystems, identifying particularly vulnerable continents, including Asia and Africa (IPCC Climate Change, I, 2007). Now, nearly two decades on, the climate crisis has become the global issue which threatens our livelihood, and

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ultimately humanity's existence, leading 40 counties to declare a "climate emergency" (Climate Emergency Declaration, 2024).

Despite global recognition of the crisis, action has not been sufficient to mitigate or slow the effects of climate change. The most recent State of the Climate Report indicated that 2023 marked a critical turning point for the planet, with climate trends reaching levels never recorded before in history, including record global temperatures and rising sea levels (Ripple et al., 2023). Climate change is also interrelated to the ongoing 'ecological crisis'. Across the world, climate changes are accelerating biodiversity loss, species decline and rising rates of infectious diseases (Pfenning-Butterworth et al., 2024). According to our current trajectory, climate change is expected to cause approximately 250 000 additional deaths per year between 2030 and 2050, from malnutrition, diarrhoea, malaria and heat stress alone (WHO, 2021).

Research indicates that climate change impacts both our physical and mental health, with known effects disproportionately impacting countries who have contributed least to the problem (IPCC Climate Change., I, 2023). Physical health impacts from the Lancet Countdown Report include heat stress and heat stroke, exacerbation of cardiovascular and respiratory disease, exacerbation of respiratory symptoms from wildfire smoke and the spread of vector-borne and water-borne diseases following a flood or drought, malnutrition due to food insecurity, increased migration, mortality (Rocque et al., 2021; Watts et al., 2021). The United Nations Framework Convention on Climate Change provides examples of eco-based adaptation strategies in vulnerable groups, such as those implemented by coffee farmers in Costa Rica (Least Developed Countries Expert Group, 2018): "Café de Costa Rica" produces low-carbon coffee as part of Costa Rica's Nationally Appropriate Mitigation Action (NAMA), using agro-forestry to achieve carbon sequestration and climate adaptation (Namacafe, 2018).

Impact of the climate crisis on mental health

The psychological effects of climate change, as noted by Cianconi et al. (2020), include both direct and indirect impacts, ranging from Post-Traumatic Stress Disorder (PTSD) caused by extreme weather events (Zuñiga et al., 2019) to persistent mental health conditions, such as Depression and Generalised Anxiety (Lawrance et al., 2022). The widely accepted aetiological link between the climate crisis and poor mental health has led to the conceptualisation of "eco-emotions", including eco-anxiety, eco-guilt and solastalgia. These terms are used to describe instances in which increased awareness about the global environmental crisis of climate change and its consequences have brought upon distressing emotions such as guilt, sadness and anger (Pihkala, 2020). While some authors debate the usefulness of such terms, arguing that

the development of these descriptors unnecessarily pathologizes understandable emotional reactions to the climate crisis, which poses global existential threat (Bhullar et al., 2022), others claim that giving these psychological experiences labels is important as it recognises these emotional experiences as unique phenomena, enabling further research and better understanding (Schipper et al., 2024). For the purposes of this review, eco-emotions were not included in the search terms, meaning that papers included in the review measured universally agreed upon diagnoses and conditions, behaviours commonly associated with mental health conditions, e.g. self-harm, and subjective wellbeing outcome measures.

Psychological interventions are in the initial stages of development, for example Lindhe et al. (2023) successfully piloted a randomized controlled trial (RCT) that aimed to improve climate-related mental health distress, addressing depressive symptoms, anxiety, stress, insomnia and pro-environmental behaviour.

Populations living in tropical and subtropical climates are particularly vulnerable to temperature increases. Temperatures rising appears to have a dose–response relationship with mental health difficulties, with a 1°C temperature rise reportedly associated with a 1% increase in the incidence of suicide (Gao et al., 2019) and a significant increase in mood disorders, organic mental disorders, schizophrenia, neurotic and anxiety disorders (Liu et al., 2021).

Global research into the mental health impacts of climate change has identified that groups of people belonging to certain demographics are more vulnerable to developing mental health difficulties than others. For example, White et al. (2023) found that indigenous people, children, older adults and climate migrants were among the most vulnerable populations to expressing solastalgia, suicidality, depression, anxiety/eco-anxiety, PTSD, substance use, insomnia and behavioural disturbances. Indeed, the significant negative impact of the climate crisis on children and young people is consistently reported in the literature (Burke et al., 2018; Hickman et al., 2021; Sharpe & Davison, 2022).

However, worldwide research, such as surveys measuring climate-related mental health difficulties, has historically been biased in reporting data collected mostly from developed, wealthy or industrialized countries (e.g. Galway & Field, 2023; Hickman et al., 2021; White et al., 2023). Despite being the biggest carbon emitters, developed and westernised countries are not yet directly experiencing the effects of the climate crisis in the way that developing countries in the Global South are (IPCC Climate Change, I, 2023).

Mental health impact in Africa

Africa is a particularly under-researched continent in this field (Atwoli et al., 2022; Deglon et al., 2023). In particular, the lack of longitudinal data collected in African countries makes it challenging to understand the cumulative and long-term impact of direct and indirect effects of the climate crisis.

This is problematic, because changes in the climate pose a significant threat to the African population. Specific predicted threats include a reduction in precipitation which will result in droughts, rising sea levels which will impact coastal cities resulting in migration, increased food insecurity with an expected 18.6% reduction in agricultural produce (Serdeczny et al., 2017).

Preliminary research into mental health impact in Africa indicates that flooding, drought, extreme heat and bushfires are all related to increases in mood disorders, trauma- and stressor-related disorders, suicide, emotion regulation difficulties, disturbed sleep, alcohol use, stress and anxiety (Deglon et al., 2023). The present review seeks to build on this research, by focussing more widely on slower and indirect impacts of the climate crisis (e.g. temperature increases, sea-levels rising) as well as incidents of extreme weather events.

There is some suggestion that certain vulnerable populations within Africa are at significant risk of developing mental health difficulties, including those who depend on a stable environment for their livelihood, such as farmers and pastoralists in rural Ghana who report poor mental health related to livestock losses, linked to the climate crisis (Nuvey et al., 2020). Climate-related migration within the African continent is a likely impact of the climate crisis. People living in Africa who are internally displaced, due to droughts or flooding, are likely to experience malnutrition, mental health problems and gender-based violence (Lindvall et al., 2020).

The United Nations Framework Convention on Climate Change further identified young, old poor remote and indigenous communities in developing countries as uniquely vulnerable to the impact of climate change (The Least Developed Countries Expert Group, 2018). Moreover, women, people living in the direct area and people who experience damage to their homes are also at risk of developing PTSD following natural disasters in developing countries, such as earthquakes (Zuñiga et al., 2019). For the purposes of this review, we use the term "vulnerable group" to refer to any population whose lifestyle is threatened by changes in the climate or who is at risk of developing mental health difficulties due to identity or demographic factors, such as age, pregnancy, socio-economic status and LGBTQ+ identity. The authors acknowledge the potentially controversial nature of the use of the term "vulnerable groups" in this context, with some arguing that this terminology risks characterising these populations as passive victims rather than active communities with access to their own resilience, knowledge and capacity to

adapt to climate challenges and mental health challenges (Okpara et al., 2016). The authors have chosen to use the term "vulnerable groups" in the hope that this language accurately conveys immediacy and seriousness, highlighting how the climate crisis disproportionately impacts certain communities, thus making it a powerful tool in communication and mobilization.

The aim of this review is to systematically examine the mental health impacts of the climate crisis among vulnerable populations in Africa, including studies exploring direct climate crisis impacts, such as natural disasters, and slower or more indirect impacts, such as increasing heat levels.

Materials and methods

This systematic review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria (Page et al., 2021). We used a mixed methods scoping review methodology, reviewing both qualitative and quantitative research papers (Baumeister & Leary, 1997; Siddaway et al., 2019). This review methodology was chosen to ensure maximum inclusivity, given the limited research available on this topic in this region. Synthesising both quantitative and qualitative research findings allows for more complete, concrete and nuanced answers to research questions (Heyvaert et al., 2013). The review was registered in advance on PROSPERO, registration number CRD42024445144.

Patient consent statement

This article is a systematic review, meaning that participants were not recruited for the research and therefore consent was not requested. All studies included in the review took informed consent from participants.

Clinical trial details

This review is not a clinical trial and therefore has no associated clinical trial registration number.

Inclusion criteria

(i) The paper was written in English.
(ii) The paper reported on research conducted in Africa, with African residents.
(iii) The paper reported on research with participants belonging to a vulnerable population (see definition below).
(iv) The paper reported on the impact of climate disasters (including fires, floods and droughts) and/or climate crisis-related changes in the

ecosystem (including extreme temperatures, rising sea levels, biodiversity loss). See Appendix A1 for the full list of included climate impacts.

(v) The paper reported on mental health-related outcomes, e.g. changes in diagnoses, symptoms, suicide rates and subjective wellbeing. Search terms were designed to encompass both universally recognized and medicalized mental health indicators (e.g., clinical diagnoses) and behaviours linked to mental health difficulties (e.g., suicide attempts, substance misuse), as well as broader subjective terms such as "mental distress". See Appendix A1 for full details of search terms designed with the assistance of a librarian.

(vi) The paper reported on a piece of empirical research (qualitative or quantitative) published in a scientific journal.

(vii) The paper was published from 2007 onwards (IPCC's fourth assessment report (AR4), published in 2007, acknowledged the impacts of climate change on human health. This approach was taken in another similar systematic review by Sharpe et al. (2022).

Exclusion criteria

(i) The paper reported on the impact of man-made crises, such as war or conflict.

(ii) The paper did not report novel findings, e.g. narrative reviews, scoping reviews, systematic reviews, meta-analyses, commentaries, editorials, expert opinions, validation studies.

Definition of "vulnerable population"

"Vulnerable populations" is a complex and broad term, which applies to different groups depending on the context. For the purpose of this review, we define "Vulnerable populations" as any group of people who either a) have a livelihood or lifestyle which depends on a stable climate (e.g. farmers, pastoralists, nomadic people) or b) are at risk of experiencing mental health difficulties (e.g. low-income families, children, pregnant women, older adults, people with long-term health conditions, people with pre-existing mental health difficulties, people belonging to LGBTQ+ communities). This definition was adopted and used in a similar systematic review (White et al., 2023).

Search strategies

Papers were identified by searching on the following databases: Medline, Embase, Ovid, APA PsycINFO and Global Health. The search was conducted on 5 September 2024. Search terms, developed via consultation with a

research librarian, included keywords such as "Africa", "climate crisis" and "mental disorder". Specific mental health diagnoses were selected for inclusion in the search terms based on their frequency of occurrence during the initial scoping searches. Despite their potential relevance, neurodevelopmental conditions such as autism and ADHD were excluded, in order to maintain the focus of the review on mental health presentations. The full search strategy can be found in Appendix A1. Reference lists of previous relevant reviews (Atwoli et al., 2022; Deglon et al., 2023; Sharpe & Davison, 2022), as well as all included studies, were checked to ensure papers were not missed. A manual search was also performed of the 2023 volumes of International Journal of Environmental Research and Public Health, Global Environmental Change, Climatic Change, Journal of Environmental Psychology, Disaster Medicine and Public Health Preparedness, and Environmental Health. Two additional papers meeting the inclusion criteria were identified through manual searching.

Study selection

A PRISMA flowchart (Page et al., 2021) describes the systematic process of study selection. First, all duplicates were removed from the search. All titles and abstracts were reviewed according to the inclusion and exclusion criteria, and a random sample of 20% of papers were double rated. There was excellent agreement between the two reviewers, $k = 0.91$ (95% CI: 0.780 to 1.034), $p < 0.001$. Any paper included by either reviewer advanced to the next stage. Manual screening of relevant journals and reference lists took place following this. As shown in Figure 1, 53 papers were retained and included for full-text screening. A random sample of 25% papers was double rated at the full-text screening stage. There was substantial agreement between the two reviewers $k = 0.68$ (95% CI: 0.288 to 1.064), $p < 0.001$. Any disagreements about inclusion at the full-text stage were discussed by both reviewers and supervisors for the systematic review were consulted for outstanding differences. For example, Reviewer 2 believed that a paper exploring health perceptions and health-seeking behaviour in climate-driven migrants in Tanzania (Heaney & Winter, 2016) was relevant and should be included. While Reviewer 1 recognised the relevance of the paper, they believed that the paper was not exploring mental health-specific outcomes. After discussion as a team, the reviewers and supervisors agreed that this paper did not fit the inclusion criteria.

Data extraction and quality assessment

A data extraction spreadsheet was developed and piloted to increase reliability. Data were extracted from each paper meeting inclusion criteria. During

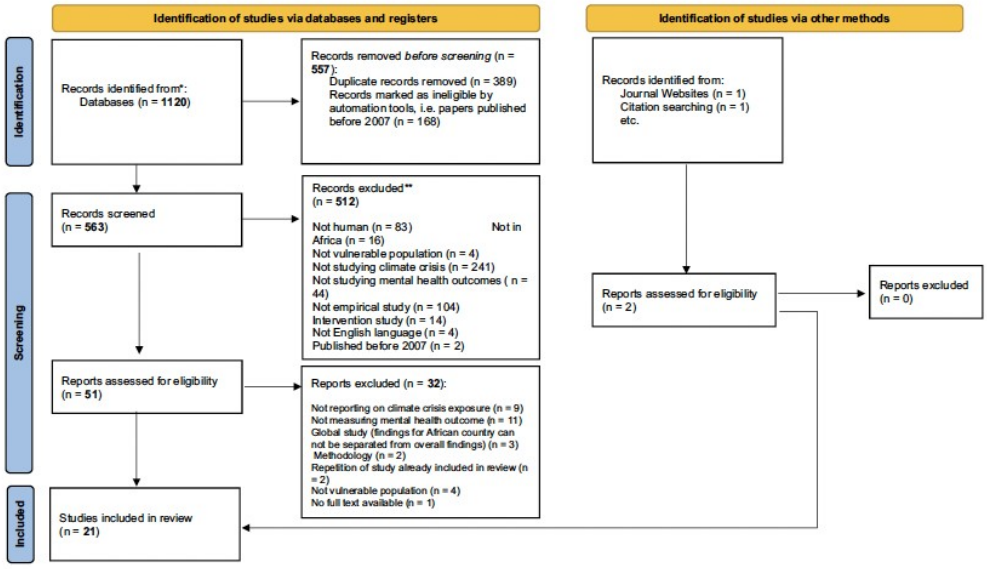

Figure 1. PRISMA flow diagram of study selection process. *Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers). **If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools. Source: Page MJ, et al. BMJ 2021;372:n71. doi: 10. 1136/bmj.n71. This work is licensed under CC BY 4.0. To view a copy of this license, visit

the pilot, the reviewers practiced using the table by populating it with data from a small subset of papers (n = 5). Table headings were then refined and clarified based on inconsistencies between the reviewers, enabling greater reliability between reviewers during the data extraction process. Data included number of participants, participant characteristics (sex, age and vulnerability characteristics), climate exposure, mental health outcome measures, design and method of the study, and the results. Fifty percent of the studies extracted were independently checked for accuracy. Due to the heterogeneity of the studies, a meta-analysis was not deemed appropriate, and data were instead reviewed using narrative synthesis (Baumeister & Leary, 1997). Narrative synthesis was chosen for this review to accommodate the diversity of study designs, methodologies and outcome measures present in the existing literature. Additionally, this method facilitates the inclusion of both qualitative and quantitative data, providing a more comprehensive and contextually rich understanding of the topic. Data were synthesised according to the methodology used, i.e. quantitative or qualitative, and then further categorised according to the mental health outcome investigated.

The studies' methodological quality was assessed using the Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a

Variety of Fields, otherwise known as the "Kmet criteria" (Kmet, 2004) to give an overall quality score (see Table 3). This assessment tool was chosen because it is appropriate for assessing both qualitative and quantitative research. Three items on the quality appraisal tool were excluded for quantitative studies as they applied to intervention research (e.g., items assessing random allocation and blinding). See Appendix A2 for the full list of criteria used to assess paper quality. Each paper was individually marked against the checklist to assess risk of bias, and an overall quality score was given. Items on the checklist were rated on a 3-point scale (0 = no, 1 = partial, 2 = yes) with a maximum score of 22 for quantitative and 20 for qualitative. A summary score between 0 and 1 was calculated for each paper by summing the total score obtained across relevant items and dividing by the total possible score, in line with scoring guidance (Kmet, 2004). Kmet (2004) suggests that scores over 0.55 are acceptable for inclusion in systematic reviews. Fifty percent of papers were independently quality assessed by a second reviewer. There was substantial agreement between the two reviewers, $k = 0.77$ (95% CI: 0.661 to 0.88), $p < 0.001$. Disagreements were resolved in discussion with the supervisors of the project. Studies were divided into three separate groups based on the quality summary score: (a) low, score of below 0.55; (b) average, score of 0.55 to 0.77; and (c) high, score of 0.77 and above.

Results

Description of results

The database search initially yielded 1120 papers, 389 of which were duplicates (Figure 1). As seen in Tables 1 and 2, after screening via two reviewers, 21 studies met the inclusion criteria and included a total of 19,448 participants (sample size range of 20 to 2652. *NB*: one included article had a total sample size of 10,000, however only 1,000 participants were from an African country).

A mixture of both quantitative (15/21) and qualitative (6/21) research methodologies were implemented in the papers included in this review. Studies took place in Kenya (n = 5), Ghana (n = 4), Ethiopia (n = 2), Nigeria (n = 2), South Africa (n = 2), Tanzania (n = 1), Namibia (n = 1), Uganda (n = 1), Botswana (n = 1), Burkina Faso (n = 1), Zimbabwe (n = 1). Countries studied in the articles included in this review are highlighted on a continent map in Appendix A4. Many African countries have not explored the link between the climate crisis and mental health in vulnerable populations, including largely populated countries such as Egypt, Democratic Republic of the Congo, Sudan and Algeria. Some geographical themes are evident across the research, e.g. studies based in Ethiopia explored the impact of drought in rural

Table 1. Study characteristics and baseline patient demographics

	Article	Sample Size	Country	Description of Participants (e.g. sex, age range, occupation)	Reason for Vulnerability	Climate Crisis Exposure	Study Design
Quantitative	Njeru et al. (2022)	400	Kenya	Smallholder crop farmers in Embu and Meru counties. Age, sex not reported.	Farmers	Multiple Impacts of Climate Change	Cross-sectional survey
	Abunyewah et al. (2024)	507	Ghana	Farmers. Male (63.1%) and female. Age range: 18–63 and above.	Farmers	Drought	Cross-sectional survey
	Libey et al. (2022)	469	Ethiopia	Rural People. Mean age = 35 years. Both male and female.	Rural population	Water scarcity	Cross-sectional survey
	Ndetei et al. (2024)	2652	Kenya	High School Children. Male (66.6%) and female. Mean age = 16 years old, range: 13–23 years.	Children and Adolescents	Multiple Impacts of Climate Change	Cross-sectional survey
	Nothling et al. (2024)	69	South Africa	Women, low-income. Age range: 18–44 years. Mean age: 26.3	Women	Flood	Cohort design, two time points (pre and post flood)
	Obaniyi et al. (2023)	120	Nigeria	Rural Farming Households. Age, sex not reported.	Rural population	Multiple Impacts of Climate Change	Mixed methods: structured questionnaires and interview schedules
	Prencipe et al. (2023)	2053	Tanzania	Young people. Age range: 18–23 years old. Male (55%) and female.	Children and Adolescents	Multiple Impacts of Climate Change	Cross-sectional survey
	Taukeni et al. (2016)	480	Namibia	Children (8–18 years old). Female (63%) and male.	Children and Adolescents	Flood	Cross-sectional survey
	Goodman, Raimer-Goodman et al. (2023)	362	Kenya	Adults participating in a community-based empowerment program. Mean age = 41.7 years old. Female (92%) and male.	Rural population	Resource scarcity	Cohort study (2 time points)

(*Continued*)

Table 1. (Continued).

	Article	Sample Size	Country	Description of Participants (e.g. sex, age range, occupation)	Reason for Vulnerability	Climate Crisis Exposure	Study Design
	Goodman, Sharma et al. (2023)	152	Kenya	Adults participating in a community-based empowerment program. Female (97.3%) and male. Mean age: 45 years old.	Rural population	Resource scarcity	Cohort study (2 time points)
	Abass et al. (2022)	767	Ghana	Flood-prone community-dwelling households. Mean age: 47.3 years. Males (61.4%) and females.	Survivors of Climate Trauma	Flood	Cross-sectional
	Abu et al. (2024)	505	Ghana	Relocated and non-relocated individuals living in Volta Delta region. Age range: 18–60+. Females (58.9%) and males.	Migrants	Rising sea levels	Cross sectional survey
	Clayton et al. (2023)	10,000	10 countries, 1000 participants per country: Australia, Brazil, Finland, France, India, *Nigeria*, Philippines, Portugal, the UK and the USA.	Young people aged 16–25. Mean age: 20.82 years old. Male (51.4%) and female.	Children and Adolescents	Multiple Impacts of Climate Change	Cross-sectional survey
	Kabunga et al. (2022)	276	Uganda	Landslide survivors in Bududa district. Female (67.3%) and male. Age range: 18–40+.	Survivors of Climate Trauma	Landslide	Cross-sectional study
	Tomita et al. (2022)	17,255	South Africa	Men and women (52.1%) living in South Africa, depression-free at baseline. Aged between 15 and 65+ years old.	Survivors of Climate Trauma	Extreme Weather Disasters	Prospective cohort study
Qualitative	Babugura (2008)	30	Botswana	Rural young people (10–18 years). Female (60%) and male.	Children and Adolescents	Drought	Interviews, picture drawing and story telling.

(*Continued*)

Table 1. (Continued).

Article	Sample Size	Country	Description of Participants (e.g. sex, age range, occupation)	Reason for Vulnerability	Climate Crisis Exposure	Study Design
Beyeler et al. (2023)	40	Kenya	Farmers living with HIV. Age range: 23 and 58 years old. Male (50%) and female.	Farmers	Multiple Impacts of Climate Change	Semi-structured interviews
Cooper et al. (2019)	64	Ethiopia	Pastoralists. Age range: 20–70 years old. Men and women.	Farmers	Water scarcity	Focus Groups and Semi-structured interviews
Kadio et al. (2024)	150	Burkina Faso	Pregnant/Post-Partum women, community representatives and healthcare professionals. Age range: 20–80 years old. Females (% not specified) and male spouses.	Women	Temperature increases	Focus Groups and Semi-structured interviews
Shoko Kori (2023)	54	Zimbabwe	Farmers. Male (82%) and female. Age range: 31–80 years old.	Farmers	Multiple Impacts of Climate Change	Exploratory Decriptive Qualitative Research (Semi-structured interviews)
Adams and Nyantakyi-Frimpong (2021)	20	Ghana	Adult residents of largest informal settlement in Accra (Ghana capital city). Age range: 18–55 years old. Male (75%) and female.	Migrants	Flood	PhotoVoice qualitative research methods (participants use photography and written narratives to represent their community's concerns).

Table 2. Main findings of studies.

	Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Quantitative	Njeru et al. (2022)	Aim: To investigate the effects of climate change on the mental health of smallholder crop farmers in the Embu and Meru Counties of Kenya	Self-Reporting Questionnaire 20-item (SRQ-20)	1. Prevalence of mental health issues (psychosomatic discomfort, anxiety, depression) among smallholder crop farmers in Embu and Meru is at 35.2%. 2. Strong positive correlation between climate change and increased mental disorders.	Average
	Abunyewah et al. (2024)	Aim: to investigate the effects of drought on the mental health–specifically, depression, anxiety and stress–of farmers (pastoralist, crop grower and agro-pastoral) in the Talensi district, Ghana.	Drought impact*, Depression, anxiety, stress, social capital	1. Drought impact has a positive statistically significant relationship with depression ($\beta = 0.51$, $p < 0.001$), anxiety ($\beta = 0.24$, $p < 0.05$) and stress ($\beta = 0.36$, $p < 0.001$). 2. Personal social capital was found to be a moderator between drought impacts and mental health outcomes.	High
	Libey et al. (2022)	Aim: to test whether the installation of motorized boreholes in this context contribute to improved water security and emotional well-being.	Water service level (joint monitoring programme), household water security (12 questions), water-related emotional distress (choosing emotion words)	1. Emotional distress from a household's water situation is related to the frequency of activity interruptions from water deprivation experienced. 2. More than 6 hours of borehole useage is associated with greater household security and emotional wellbeing.	High

(*Continued*)

Table 2. (Continued).

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Ndetei et al. (2024)	Aim: to determine the association of climate change with adolescent mental health and suicidality as reported by Kenyan high school students.	Climate-related worry/emotions*; Strengths and Difficulties Questionnaire; Suicidality Questions (5 questions)	1. Girls were more worried and afraid of climate change than boys. 2. Direct positive relationship between the severity of climate change experiences and emotional symptoms (SDQ). 3. Climate change experiences were positively associated with suicidal thoughts, plans and attempts.	Average
Nothling et al. (2024)	Aim: to determine the extent of damage, loss, injury and death resulting from floods that occurred in and around the city of Durban, South Africa, in April 2022, and associated changes in mental health pre- to post-floods in a low-income setting.	Kessler Psychological Distress Scale; Centre for Epidemiologic Studies Depression Scale (CES-D); Generalised Anxiety Disorder 7; Harvard Trauma Questionnaire (HTQ); Household Hunger Scale (HHS); Childhood Trauma Questionnaire–Short Form (CTQ-SF); Intimate Partner Violence (IPV) and Non-Partner Sexual Violence (NPSV); Composite Trauma Load Score; Flood Impact Questionnaire*	1. Loss of infrastructure (lacked access to drinking water, electricity, fresh food, could not travel to work, had to stay in a shelter and could not get hold of friends or family) was a predictor of post-flood change in levels of emotional distress and anxiety. 2. Higher levels of prior trauma exposure were associated with higher post-flood levels of emotional distress. 3. Higher pre-flood food insecurity was also associated with higher post-flood anxiety.	High

(*Continued*)

Table 2. (Continued).

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Obaniyi et al. (2023)	Aim: to examine the impacts of climate change on the health of rural farming households in Kwara State, Nigeria	Effect of climate change on human health*; Adaption to climate and health challenges.	1. Major effects of climate change on the participants were heat stress, decrease in productivity, malaria, fever, depression, hunger and death. 2. Adaptation strategies included personal hygiene and tree planting programme for soil protection and mitigation of climate change, practicing sanitation, prayer to god. 3. Age and educational level of the rural household influenced adaptation strategies to climate change	Low
Prencipe et al. (2023)	Aim: to measure self-perceived climate change distress among young people living in rural, low resource communities of Tanzania, and to identify whether climate-sensitive risk factors and climate distress were associated with worse mental health.	Depression (Centre for Epidemiological Studies Depression Scale); Cimate change knowledge (Gallup World Poll question: "How much do you know about global warming or climate change?"); Distress about changing weather patterns*(1 idiosyncratic question)	1. Higher education, religiousity, being female, younger and unmarried were linked to greater climate change awareness and climate distress. 2. Region and religiosity were key factors in predicting distress even after controlling for awareness. 3. Working in extreme temperatures, severe food and water insecurity were linked to higher depression.	High

(*Continued*)

Table 2. (Continued).

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Taukeni et al. (2016)	Aim: to assess post-traumatic stress disorder (PTSD) in school children as a result of floods in Namibia.	PTSD (Child Trauma Screening Questionnaire)	1. 55% children aged 12 and below and 72.8% aged 13 and older reported re-experiencing symotoms of trauma, 2 years post-flooding event.	High
Goodman, Raimer-Goodman et al. (2023)	To investigate the temporal relationships between food insecurity, anxiety and depression among adult participants in a community-based empowerment program in Meru County, Kenya.	Food insecurity (Household Food Insecurity Access Scale), anxiety (GAD-7), depression (BDI-II).	1. Food insecurity predicted higher subsequent depression and anxiety at T2. 2. Anxiety at T1 predicted higher subsequent food insecurity.	High
Goodman, Sharma et al. (2023)	To investigate temporal relationships between food insecurity, water insecurity and generalized anxiety within rural Kenyans during a period of erratic rainfall.	Food insecurity (Household Food Insecurity Access Scale), Household water insecurity* (Household Water Insecurity Access Scale); anxiety (GAD-7),	1. Food insecurity (T1) was more strongly predictive of water insecurity (T2) than water insecurity (T1) predicted food insecurity (T2). Baseline better food security may reduce the impact of future water instability. 2. generalized anxiety may reduce the capacity to adapt to future disruptions to water security.	High

(*Continued*)

Table 2. (Continued).

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Abass et al. (2022)	Aim: to examine associations of flood exposure with Psychological Distress among flood survivors in a representative sample in Ghana and to evaluate whether age and sex differences modify this association.	Psychological distress, measured using the Kessler Psychological Distress Scale (K – 10).	1. Strong association between exposure to floods and psychological distress: the prevalence of PD increased with increasing levels of flood exposure. 2. Loss of economic assets and life support systems, disruption to household businesses, damage to personal properties, injuries, and health problems occasioned by flood events increased distress. 3. Females and younger participants were more vulnerable to psychological distress when exposed to flood.	Average
Abu et al. (2024)	Aim: To explore the outcomes of planned relocation on well-being in the Volta Delta region of Ghana.	Idiosyncratic survey* with items measuring the following concepts: Social identity, Attachment to place and home, Community-based self-efficacy, Safety, Well-being, anxiety.	1. Individuals who experienced planned relocation as a result of sea-level rising had worse well-being, anxiety and lower perceptions of safety when compared to a community that is equally exposed but has not moved. 2. Relocated community members reported significantly lower levels of attachment to the local area and home, significantly lower levels of community-based self-efficacy, and significantly lower levels of overall community-based identity.	Average

(*Continued*)

Table 2. (Continued).

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Clayton et al. (2023)	To examine differences in climate related emotions associated with gender and age (important predictors of vulnerability to the impacts of climate change).	Survey* which included questions on: climate-related worry, climate-related functional impact, climate-related emotions (presence of 14 positive and negative key emotions about climate change), climate-related thoughts, experience of being ignored or dismissed when talking about climate change, beliefs about government response to climate change, emotional impact of government response to climate change (reassurance/betrayal).	[Findings on Nigeria only reported, main findings of the study are not applicable to this review]. 1. In India, the Philippines and Nigeria, more than two-thirds reported functional impact; by contrast, US, UK and Finland reported the least functional impact. 2. Nigeria had among the lowest percentages of people reporting angry, guilty, ashamed, despair and powerless. 3. Participants were most likely to report being ignored or dismissed in India, Nigeria, Brazil and the Philippines.	High
Kabunga et al. (2022)	Aim: To assess the prevalence and correlates of post-traumatic stress disorder among Bududa landslide survivors.	PTSD measured using the checklist—civilian version (PCL-C-5)	1. 46.8% of participants had PTSD symptoms. 2. Male gender, widowhood, lack of counseling and lesser duration since the landslide were associated with an increased likelihood of screening for PTSD in landslide survivors.	High

(*Continued*)

Table 2. (Continued).

	Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
	Tomita et al. (2022)	Aim: To assess the impact of natural disaster incidents on the onset of depression.	Center for Epidemiologic Studies Depression Scale (CES-D)	1. Exposure to a disaster was associated with significant depressive symptoms. 2. Women, black african, lower educational attainment and lower income groups were more likely to experience depression.	High
Qualitative	Babugura (2008)	Aim: to explore vulnerabilities of children and youth during drought disasters.	Thematic analysis	1. Emotional distress 2. increased workload 3. vulnerability shaped by demographics	Average
	Beyeler et al. (2023)	Aim: to identify potential social and economic pathways through which climate change impacts mental and emotional wellbeing, focusing on a vulnerable population of Kenyan smallholder farmers living with HIV.	Thematic analysis	1. High degrees of stress; fear and concern about the future; and sadness, worry, and anxiety from losing one's home, farm, occupation, or ability to support their family. 2. Climate-related economic insecurity is a main driver of emotional distress. 3. Widespread economic insecurity disrupts systems of communal and family support, which is an additional driver of worsening mental health.	High

(*Continued*)

Table 2. (Continued).

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Cooper et al. (2019)	Aim: to explore relations between emotion, wellbeing and water security among pastoralist communities in Afar, Ethiopia.	Thematic analysis	1. Participants associated water situation (drought) with negative emotional wellbeing, e.g. extreme worry and fatigue during dry season.	Average
Kadio et al. (2024)	Aim: to investigate how women perceive the impacts of heat on their physical and mental health, in addition to their social relationships and economic activities.	Thematic analysis	1. Extreme heat affects women's functionality and well-being. 2. Heat undermines a woman's ability to care for themselves and their child and interferes negatively with breast feeding. 3. Heat negatively affects abilityto work and to maintain relationships. 4. Cultural practices such as ataboo on taking the baby outside before the 40th dayexacerbates the negative consequences of heat.	High
Shoko Kori (2023)	Aim: to establish the implications of the psychosocial impacts of climate change on sustainable development among smallholder farmers in Chirumanzu	Grounded Theory	Themes identified: 1. Threat of climate change, 2. Feeling humiliated/embarassed at having to ask for money/food from others, 3. Negative feelings, thoughts and emotions.	Average

(*Continued*)

Table 2. (Continued).

Article	Research Aim/Objective	Outcome Measure	Main Findings	Overall Quality Assessment
Adams and Nyantakyi-Frimpong (2021)	Aim: to examine how recurrent flooding interacts with gendered vulnerability, social differentiation, and place-related historical and structural processes to produce unequal physical and mental health outcomes.	Thematic analysis	1. Five forms of fear were particularly worrying to residents: unpredictable timing of rains, fear of death from drowning or electrocution, fear of property destruction or theft, fear of sicknesses, and fear of fire outbreaks; differentiated and gendered vulnerabilities; and structural and socio-political concerns about place. 2. Women and children are disproportionately more vulnerable to flooding and its consequent health effects. As well, social markers such as housing type, class and wealth, family size, and social relations shape vulnerability. 3. Structural and socio-political concerns about place, specifically community helplessness, feeling neglect by authorities, and threatened sense of place and identity.	High

*Subjective measures of wellbeing, including eco-emotions.

Table 3. Standard quality assessment criteria for evaluating primary research papers from a variety of fields, or the "Kmet criteria".

	Article	1	2	3	4	5	6	7	8	9	10	11	Total	Summary Score	Quality Rating Category
Quantitative	Njeru et al. (2022)	2	1	1	2	0	1	2	1	0	2	2	14	0.64	Average
	Abunyewah et al. (2024)	2	2	2	1	2	2	2	2	0	2	2	19	0.86	High
	Libey et al. (2022)	2	2	1	1	2	2	2	2	1	1	2	18	0.82	High
	Ndetei et al. (2024)	2	2	1	1	1	1	2	0	0	1	2	13	0.59	Average
	Nothling et al. (2024)	2	2	1	2	2	1	1	2	2	0	2	17	0.77	High
	Obaniyi et al. (2023)	1	0	1	0	0	0	0	1	0	0	1	4	0.18	Low
	Prencipe et al. (2023)	2	2	1	2	1	2	2	2	2	1	2	19	0.86	High
	Taukeni et al. (2016)	2	2	2	1	2	2	2	1	0	2	2	18	0.82	High
	Goodman, Raimer-Goodman et al. (2023)	2	2	2	1	2	1	2	2	2	0	2	18	0.82	High
	Goodman, Sharma et al. (2023)	2	2	2	2	2	1	2	1	1	2	2	19	0.86	High
	Abass et al. (2022)	1	2	1	1	1	1	1	2	2	0	2	14	0.64	Average
	Abu et al. (2024)	1	1	1	2	1	1	2	1	0	2	2	14	0.64	Average
	Clayton et al. (2023)	2	2	1	1	2	1	2	2	0	2	2	17	0.77	High
	Kabunga et al. (2022)	2	2	2	2	1	2	1	2	0	2	2	18	0.82	High
	Tomita et al. (2022)	2	2	2	2	1	1	2	2	1	1	2	18	0.82	High
Qualitative	Babugura (2008)	2	2	2	1	1	2	1	1	2	0	N/A	14	0.7	Average
	Beyeler et al. (2023)	2	2	2	1	1	2	2	2	2	0	N/A	16	0.8	High
	Cooper et al. (2019)	2	2	2	2	2	1	1	0	2	0	N/A	14	0.7	Average
	Kadio et al. (2024)	2	2	2	1	2	2	2	2	2	0	N/A	17	0.85	High
	Shoko Kori (2023)	2	2	2	1	2	2	2	0	2	0	N/A	15	0.75	Average
	Adams and Nyantakyi-Frimpong (2021)	2	2	2	2	1	2	2	2	2	2	N/A	19	0.95	High

communities, whereas Kenyan-based studies tended to explore the impact of resource scarcity.

10/15 quantitative studies used cross-sectional designs for the research (Abass et al., 2022; Abu et al., 2024; Abunyewah et al., 2024; Clayton et al., 2023; Kabunga et al., 2022; Libey et al., 2022; Ndetei et al., 2024; Njeru et al., 2022; Prencipe et al., 2023; Taukeni et al., 2016). Three of the quantitative articles included were cohort studies (Goodman, Raimer-Goodman et al., 2023; Goodman, Sharma et al., 2023; Nothling et al., 2024). One used mixed methodologies, interviewing participants for additional and complimentary qualitative findings, however in both studies the quantitative outcomes were the central focus of the research (Obaniyi et al., 2023).

Two qualitative studies used semi-structured interview techniques alone (Beyeler et al., 2023; Shoko Kori, 2023). Two qualitative studies used image-based data collection, to complement semi-structured interview techniques (Adams & Nyantakyi-Frimpong, 2021; Babugura, 2008). The final two articles reported on studies which collected qualitative data from both individual semi-structured interviews and focus groups (Cooper et al., 2019; Kadio et al., 2024). All qualitative studies used thematic analysis to synthesize the data, with the exception of one study which used Grounded Theory (Shoko Kori, 2023).

Most studies recruited both men and women, and the ages of participants ranged from 8 to 80 years old, though several of the studies focused on young people and no studies were specifically researching the older population. The vulnerable populations studied include women, young people, farmers, migrants, people living in rural areas, survivors of climate-related traumatic experiences (such as extreme weather events). The climate-related exposure variables studied in the articles found for this review include drought, water scarcity, flooding, landslides, temperature increases and climate change more broadly. Mental health outcomes measured in the studies include anxiety, depression, climate-related emotions (such as eco-anxiety, eco-guilt), PTSD, psychological/emotional distress, suicide rates and water-related emotional distress (defined as the emotional response that individuals experience in relation to their water security, particularly in terms of coping with water scarcity, having adequate water for needs and the challenges of water access across seasons).

Quality assessment

The Standard Quality Assessment criteria (Kmet, 2004) was utilised for all included studies (Appendix A3). Papers were assessed as follows: <0.55 = low quality, 0.55 to 0.77 = average, >0.77 = high. The total summary scores ranged from 0.18 to 0.95. The average quality score was 0.74 and one paper scored considerably lower than this, at 0.18 (Obaniyi et al., 2023) which is below the 0.55 level of acceptability suggested by Kmet (2004). Compared to other

papers, Obaniyi et al. (2023) provided limited descriptions or justifications for the study methodology, outcome measures used, subject characteristics or analysis methods used. They also did not report about any attempts to control for confounding in their study.

The majority scored highly on the initial items of the criteria indicating strengths in the quality of the methodological aspects of the design such as the description of the research question, explanation of outcome measures used and the description of the recruitment strategy. All studies drew conclusions which were supported by the results.

Sufficient relevant demographic information clearly characterizing the participants was not provided adequately in most papers (9/14 quantitative studies included in this report were assessed as "partially" fulfilling this quality assessment criteria – Kmet, 2004). Studies varied regarding the quality of reporting on measures taken to control for confounding variables and a score of 0 was most frequently assigned due to there being no evidence for this occurring in data analysis. Regarding reporting on an appropriate sample size, most studies were assigned a score of 1 due to there being limited evidence of a priori power calculations. Qualitative papers were most likely to lose points on item 10 which required papers to provide evidence of reflexivity. This was due to absent records of reflexivity within the articles, which would normally take the form of a section within the paper acknowledging the authors' own positionality, subjectivity and biases.

Excluded studies

There were a number of studies that were highly relevant to the present research question that were excluded from inclusion in the review due to ineligibility. For example, research by Tfifha et al. (2021) was excluded from the review due to the article being abstract-only, the research having been presented at a conference. A full assessment of research quality was therefore not possible given the limited information available from the abstract.

Two papers were excluded because they did not directly investigate climate crisis exposures, as defined in the inclusion criteria, though findings related to the climate crisis may be relevant (Prencipe et al., 2021; Myers et al., 2022). A further paper was excluded because the research explored the mental health impact of migration, caused by both war and conflict, but also by climate change, making it impossible to delineate the mental health impact of the climate crisis from the findings (Ali et al., 2023).

One relevant paper was excluded as it did not meet the inclusion criteria for the research having taken place in an African country (Di Giorgi et al., 2020). However, the paper did explore the mental health of African migrants in Italy and linked migration to climate change.

Finally, two relevant papers were excluded for not meeting the inclusion criteria for measuring mental health outcomes (Balakrishnan et al., 2024; Militao et al., 2022). Outcomes measured in the studies (coping strategies, socio-ecological measures) are relevant and linked to mental health outcomes but were felt to be distinct from the mental health outcomes specified in the inclusion criteria.

The following section synthesizes findings from the reviewed articles, categorizing them by group identity: farmers and pastoralists, young people, rural communities, women, migrants and survivors of climate-related trauma. This approach was taken as there was greater convergence in terms of group identity when compared with the mental health outcomes measured in the studies, which were highly heterogenous.

Farmers and pastoralists

Farmers and pastoralists were a vulnerable group which was most frequently studied in the articles included in this review. The first quantitative study used a cross-sectional design to survey a Kenyan small-holder crop farming community that reported a 35.2% prevalence of mental health difficulties (psychosomatic discomfort and symptoms of anxiety and depression were measured using the 20-item Self-Reporting Questionnaire, Andreou et al., 2011) (Njeru et al., 2022). Regression analyses in Njeru's study found a positive correlation between the poor mental health of smallholder farmers and climate changes ($R = 0.126$, p-value = <.005). This high-quality study clearly outlines the methodology used to conduct the study and the statistical analysis, making replication of the methods possible. A second, high-quality study explored the specific impact of drought on the mental health of farmers in Ghana through a cross-sectional survey design (Abunyewah et al., 2024). Through Exploratory Factor Analysis, Abunyewah and colleagues found that drought impact had a statistically significant, positive relationship with depression ($\beta = 0.51$, $p < 0.001$), anxiety ($\beta\_ = 0.24$, $p < 0.05$) and stress ($\beta\_ = 0.36$, $p < 0.001$), and that personal social capital was a moderator between drought impacts and mental health outcomes.

Three qualitative studies included in this review, exploring the views of farmers, took place in Kenya, Ethiopia and Zimbabwe. The highest quality study used thematic analysis on transcripts of semi-structured interviews to find that, almost universally, smallholder Kenyan farmers living with HIV report some level of climate change impact on emotional health, including high degrees of stress; fear and concern about the future; and sadness, worry and anxiety from losing one's home, farm, occupation or ability (Beyeler et al., 2023). Shoko Kori (2023) corroborated these findings, reporting that Zimbabwe farmers felt humiliated and embarrassed at having to ask for resources from others as a result of climate changes, including resource

scarcity (NB: Average quality study). Similarly, Ethiopian farmers reported negative emotional wellbeing as a result of climate changes, such as feeling threatened by climate change, extreme worry and fatigue, especially during times of drought or the dry season (Cooper et al., 2019; NB: average quality study).

Young people

Young people were a vulnerable group commonly studied in the articles found in the present systematic review, with three high-quality quantitative research articles (Clayton et al., 2023; Prencipe et al., 2023; Taukeni et al., 2016) and one average quality study (Ndetei et al., 2024). A qualitative study also explored the impact of climate change in this vulnerable group (Babugura, 2008).

Findings show that 46% of young people (18–23 years old) surveyed in Tanzania reported some distress about climate change, with climate awareness, female gender, higher education, religiosity, older age and working in extreme temperatures, identified as predictive factors (Prencipe et al., 2023). Depression, measured using the Centre for Epidemiological Studies Depression Scale (CES-D10) was also found to be 23 percentage points (95% CI 17–28) higher among youth who had severe water or food insecurity. Though a lower quality study, Ndetei et al. (2024) found similar results in Kenyan high school students, after using a cross-sectional survey in 10 schools in 3 regions of Kenya. Female students reported an increased risk of mental health difficulties related to climate change, such as emotional symptoms and suicidal thoughts and ideation. Ndetei and colleagues attempted to sample in a representative way, selecting schools within three regions of Kenya to ensure representation from across the socioeconomic spectrum within the country, however they do not describe trying to control for any other demographic variables. The worldwide survey exploring climate-related emotions by Clayton et al. (2023) corresponds with these findings, with results indicating that more than two-thirds of Nigerian youth feel a functional impact of the climate crisis, whereas young people from the US, UK and Finland were unlikely to report functional impact. Nigerian respondents, along with young people from India, Brazil and the Philippines, were most likely to report being ignored or dismissed when they tried to talk about climate change.

A high-quality study on the effects of extreme weather events on young Namibians found that 2 years after a flooding event, 55% of children aged 12 and under, and 72.8% of those aged 13 and older, reported re-experiencing trauma symptoms (Taukeni et al., 2016).

A lower quality qualitative research article described the impact of drought on Botswanan participants, aged 10–18 years old, with descriptions of the

emotional impact of seeing wildlife dying during drought, their increased workloads during times of drought and anxiety about food insecurity, separation from loved ones and losing opportunities for education reported in the article (Babugura, 2008).

Rural communities

Four quantitative studies explored the impact of the climate crisis on mental health in rural communities. A survey of 469 Ethiopian heads of households established that water insecurity was positively correlated with water-related emotional distress (0.57, $p < 0.01$), and that lower income and being female increased this risk (Libey et al., 2022; NB: high-quality study). Similarly, food and water insecurity was identified as a predictor for the onset of anxiety and depression in rural Kenyans with diagnoses of HIV (Goodman, Raimer-Goodman et al., 2023; Goodman, Sharma et al., 2023; NB: high-quality studies).

The lowest quality study included in the review investigated the impact of the climate crisis on Nigerian people living rurally, belonging to farming households (Obaniyi et al., 2023). Nigerian participants reported heat stress, malaria, depression, hunger and death were common impacts of the climate crisis on health. Despite being of low quality, due to lack of clarity about outcome measures used, data analytic methods and the lack of described attempts to control for confounding variables, this study represents an important overlap between vulnerable groups identified in the present review, as farmers and pastoralists are likely to live in rural communities, thus making this population at a specific increased vulnerability due to their dependency on a stable climate for financial income and potential risks related to living in a small, rural community.

Women

Two studies included in the review reported on the impact of the climate crisis on women specifically.

Qualitative research conducted in Burkina Faso describes the specific impacts of extreme heat in pregnant women: women reported feeling irritable, sad and anxious during pregnancy (Kadio et al., 2024; NB: high-quality study). Women additionally reported relationship difficulties, difficulties in self-care and caring for their child, e.g. breastfeeding. Moreover, one high-quality study found that, in the wake of extreme weather events such as flooding in South Africa, 38.2% women belonging to low socio-economic groups were found to have above clinical levels of PTSD symptoms, which is an increase of 19.1% from rates prior to flooding (Nothling et al., 2024; NB: high-quality study). Women affected by poverty, food insecurity and a history

of trauma were at greater risk of the additive adverse mental health effects of floods, including PTSD, depression and anxiety.

Migrants

Migration is a predicted social impact of the climate crisis. Abu et al. (2024) investigated the mental health impact of migrating on Ghanaian coastal communities exposed to extreme sea-level rising and coastal erosion. Using an idiosyncratic measure assessing concepts such as social identity, attachment to place and community-based self-efficacy, authors found that relocated individuals reported significantly lower levels of overall wellbeing, higher levels of anxiety and lower perceptions of safety, compared to non-relocated community members, despite both groups being exposed to the same climate changes (NB: average quality study). The authors understood these outcomes as being related to the disruption of community connection, identities and feelings of efficacy.

Adams and Nyantakyi-Frimpong (2021) conducted a qualitative study in Ghana, exploring the impact of flooding, which received the highest quality rating of all included studies in this review. Findings from a large informal settlement, made up of displaced individuals, indicate that residents fear: unpredictable timing of rains, fear of death from drowning or electrocution, fear of property destruction or theft, fear of sicknesses and fear of fire outbreaks. Women and children are disproportionately more vulnerable to flooding and its consequent health effects. Housing type, class and wealth, family size and social relations shape vulnerability. Finally, respondents reported structural and socio-political concerns about place, specifically community helplessness, feeling neglected by authorities and threatened sense of place and identity.

Survivors of climate-related trauma

The final vulnerable community researched in the studies identified was survivors of disasters caused by the climate crisis. Following repeated landslides in the Bududa district of Uganda, killing close to 1000 people, 46.8% of survivors surveyed in the study reported symptoms of PTSD, even after at least 2 years after the most recent event (Kabunga et al., 2022; NB: high-quality study). Female gender, widowhood, lack of counselling, low social support and duration since the landslide were significantly associated with PTSD.

In Ghanaian adults, exposure to urban flooding was significantly and positively associated with psychological distress ($\beta = 0.030$; $p < .005$), among male participants ($\beta = 0.019$; $p < .05$) and female participants ($\beta = 0.048$; $p < .001$), this was significant in young adults more so than in older adults

(Abass et al., 2022; NB: average quality study). "Exposure to flooding" was measured using an idiosyncratic measure which included items assessing the damage the respondent experienced as a result of flooding (damage to property, loss of livestock, death of loved ones). These findings remained true after controlling for socio-demographic factors, including age, gender, education level, employment status and income level. The article by Abass and colleagues lacked transparency in its reporting of sampling and statistical analysis methods, and results reported lacked detail.

Finally, a high-quality piece of South African research implemented a prospective methodology to follow-up participants who were healthy at baseline, finding that cumulative exposure to natural disasters was significantly associated with the onset of depression (Tomita et al., 2022). Symptoms of depression were particularly common in those exposed to natural disasters who were also female, black African, of lower educational attainment and on a lower income.

Discussion

The aim of this systematic review was to build on the existing understanding of how the climate crisis is impacting mental health, but specifically examining the impact in African nations. This review provided updated evidence in an area of research which is rapidly evolving, while also focusing on vulnerable populations, which has not been done in previous reviews (such as in Atwoli et al., 2022). A total of 21 papers of low to high methodological quality were identified and included in this review, including a total of 36,425 participants.

The 21 studies included in this review span 11 African countries: Kenya, Ghana, Ethiopia, Nigeria, South Africa, Tanzania, Namibia, Uganda, Botswana, Burkina Faso and Zimbabwe. Given that Africa comprises 54 countries, this research cannot be assumed to be representative of the entire continent and does not encompass the diversity of experiences across all African populations. Notably, no studies were identified from island nations, such as Madagascar, which is significant as these nations may be especially vulnerable to the adverse impacts of the climate crisis.

Findings from the review indicate that the climate crisis, both in terms of immediate climate impacts (e.g., natural disasters) and slower or more indirect effects (e.g., rising temperatures), increases symptoms of depression, anxiety, PTSD and incidents of suicide. Vulnerable groups studied include farmers, young people, women, migrants and survivors of climate disasters. Drawing from this narrative review, we may hypothesise that farmers and rural communities face lifestyle threat, economic instability and income loss due to climate disruptions (drought, floods, unpredictable weather), which may trigger anxiety, depression and other mental health distress.

Demographics and personal traits can place people at pre-disposed increased risk for the development of poor mental health in response to climate change exposure (Lawrance et al., 2022). Young people may experience heightened emotional distress, including existential dread, due to the anticipation of a compromised future. Women face social and economic inequalities which can place them at specific risk for mental health difficulties. Responsibilities such as caregiving and securing household resources become more challenging under environmental stress, increasing vulnerability to mental health conditions like depression and anxiety. Disrupted community networks further exacerbate mental health risks (Lawrance et al., 2022), particularly for migrants, who may experience cultural dislocation and isolation, compounding the emotional toll of displacement. Lastly, survivors of climate disasters are exposed to immediate and direct impacts of the climate crisis and may develop mental health difficulties due to physical injury, observed loss of life, loss or damage to infrastructure (e.g. homes).

In line with previous reviews, studies included in this review measured the following mental health outcomes: symptoms of anxiety, depression, PTSD and climate-specific emotions (such as eco-anxiety, food-anxiety and water-stress). A similar review, by Sharpe and Davison (2022), which reviewed research from various Lower- and Middle-Income Countries (LMICs) found that PTSD and depression were the most common mental health outcomes, whereas this review found anxiety and depression to be the most common. Similarly to previous reviews, the present review did not identify papers measuring other relevant mental health outcomes, such as eating disorder prevalence or symptomatology, despite the identified impact of the climate crisis on this mental health presentation (Rodgers et al., 2023). This could reflect limitations in the search terms used, though more likely reflects an absence of research in this area. Sharpe and Davison (2022) similarly found that outcome measurements used in included studies were heterogeneous.

Findings from a review based in Africa on the mental health impacts of extreme weather events aligned with our results in certain aspects, such as the observed increase in mood disorders, trauma symptoms and suicide rates (Deglon et al., 2023). However, this review did not identify research measuring disturbed sleep, difficulties in emotion regulation or alcohol use, areas that were examined in Deglon and colleagues' review. This discrepancy is likely due to the lack of research focused on these specific outcomes within vulnerable African populations, and further research should bridge this gap, to further knowledge regarding these mental health outcomes.

The vulnerable populations identified in this review map onto the vulnerable populations referenced in a South African-based review, where women, fishing communities, farmers and people living in informal settlements were identified (Chersich et al., 2018). This review finds additional research with young people, rural communities and survivors of climate disasters.

The vulnerability of young people has been previously established globally (Lawrance, 2024), with social media engagement on climate and war crises being implicated as compounding psychological distress. Our findings correspond with this, in showing that young people in Tanzania, Namibia, Nigeria, Kenya and Botswana experience symptoms of depression, PTSD and suicidal thoughts which are related to extreme weather events, temperature increases, resource scarcity and climate crisis awareness. Research with children reported in this review ranged in methodological quality, with average to high-quality ratings given. No studies identified explored the role of social media and how its use in young African people might mediate or moderate negative mental health impacts.

Farmers and pastoralists have previously been identified as a vulnerable community to the effects of climate change, with previous literature outlining how farmers in Kenya, Somalia and Tanzania often have to leave their land and livelihoods, leading to mental health difficulties, e.g. feelings of hopelessness, and increased alcohol and substance abuse (Atwoli et al., Sheriff & Mash, 2022). Longitudinal research with Australian farmers indicates that, regardless of financial hardship, drought worry or adverse farming events, farmers had worse mental health than non-farm workers and were less likely to visit a GP or mental health professional (Brew et al., 2016). Further research into help-seeking behaviour in farmers in African countries should be conducted, to establish whether farmers in Africa need support to overcome barriers to accessing available mental health support.

Our findings suggest that extreme weather has a particularly significant impact on the mental health of women, with relationship difficulties, child-rearing and PTSD symptoms all specifically identified. Notably, findings from the present review on the impact of the climate crisis on women are from high-quality research papers. One paper identified in the review also found a connection between high temperatures and suicide attempts, particularly suicide by hanging, in women (Tfifha et al., 2021). However, this research could not be included in the study as the research is only available in conference abstract form. Results in this review correlate with a review of global literature on women's mental health in response to the climate crisis (Rothschild & Haase, 2023), where women, especially those in marginalized or low-income communities, are found to be disproportionately affected by socioeconomic impacts, leading to heightened eco-anxiety and negative effects on parenting and child development. The authors recommend integrating mental health strategies into climate policies and emphasize the need for gender-sensitive climate action to address these challenges, particularly for women of colour and those in developing nations. Gender-sensitive interventions described include facilitating women's re-connection with and valuation of nature, as well as working collaboratively with obstetricians/

gynaecologists to ensure that patients are supported in making the right reproductive decisions for themselves amidst a changing environment.

Limitations

There are some limitations of this systematic review that need to be considered when interpreting the results presented. First, there is a large variation in the mental health outcomes reported in the studies and how studies reported these outcomes. Depression, anxiety, water-related emotional distress, climate-worries, PTSD symptoms and diagnoses and behavioural difficulties were just some of the outcomes reported in the studies. In papers where outcomes were similar (e.g. depression in Goodman, Raimer-Goodman et al., 2023; Nothling et al., 2024), different measures were used (Beck's Depression Inventory vs Centre for Epidemiologic Studies Depression Scale), making meta-analysis impossible and in-depth comparisons of outcomes difficult.

Secondly, the term "vulnerable communities" is difficult to define. Although we use a previously adopted definition (White et al., 2023), it was still challenging to determine whether certain groups studied met inclusion criteria. The researchers opted to be inclusive, meaning that, for example, studies with participants from rural populations were included as their vulnerability to the climate crisis was assumed, even if their specific vulnerability was not outlined in the research paper. The study excluded papers where stakeholders or professionals were participants, as the inclusion criteria stated that participants should be African residents from vulnerable populations. This means that some potentially relevant studies were excluded (e.g. Lindvall et al., 2020; Sorgho et al., 2020). It is likely that the authors' lack of geographical knowledge will have prevented the identification of certain types of vulnerability specific to the local area, for example groups may be vulnerable due to the local provision of mental health care (or lack of), local societal/political events or differences across the continent in the exposure to indirect impacts of climate change (e.g. heat levels rising).

The impact of the climate crisis is also difficult to determine. For example, studies investigating the impact of war or conflict were excluded, though some may argue that war can oftentimes be linked to climate change (Koubi, 2019). Migration also was not included as a specific search term, despite the recognised link between the climate crisis and migration (Trummer et al., 2023), so studies where migration is studied as a climate change impact were only included if the authors themselves linked migration to climate change (and therefore used terms such as "climate change" in the manuscript). This means that some relevant papers may not have been included. Similarly, resource scarcity was included as a climate change exposure variable when authors linked the conditions causally to the climate crisis.

Due to practical constraints, this review includes only studies published in English, as access to professional translation services was not available. While this may limit the inclusion of relevant research in other languages, it ensures the accuracy and consistency of data extraction and analysis. Future reviews should prioritise access to translation services to enable the inclusion of papers written in the languages spoken in Africa. Moreover, accessing and including grey or unpublished literature was also outside of the scope of this review. Although this increases the likelihood of publication bias, it also increases the likelihood that included studies are of a higher methodological standard, with peer-reviewed studies being required to include full methodological disclosure.

Finally, this review focuses on the adverse impacts of climate change on mental health in Africa and negates research into coping and adaption. Research with indigenous African communities reveals that coping strategies including weather-forecasting systems based on changes in animal behaviour, livestock and crop diversification, cattle stress-management techniques and division of labour (to allow for acclimatisation to drought challenges) are effective practices in use (Leal Filho et al., 2021).

Future research directions

Although many of the papers included in this review were deemed to be of a high quality, much research was of average to low quality. Higher quality research in this field is required, and the use of longitudinal methodologies, rather than cross-sectional surveys, is recommended to enable greater understanding of the long-term impact of climate changes and temporal relationships between mental health factors. Barriers to improving research quality include limited funding, which constrains study design and scope; the absence of standardized methodologies for measuring climate-related mental health impacts, which could lead to inconsistent research approaches; and mental health stigma, leading to underreporting and challenges in accessing representative populations.

No research studies were found in our search investigating the mental health impact of climate change in the following vulnerable groups within Africa: those with pre-existing health conditions, historically marginalised or persecuted communities, e.g. ethnic minorities, indigenous groups, LGBTQ+ communities. Future research should work with these vulnerable groups to understand their unique experiences. Future research would benefit from the use of mixed methods, using interviews or focus groups to compliment survey data, to understand how pre-existing risk factors (such as belonging to one of these vulnerable groups) interact with direct or indirect exposure to climate changes, resulting in possible mental health difficulties.

The studies included in this review occurred in a total of 12 African countries, with the majority taking place in Ghana and Kenya. Given the size of the African continent, and the differing impacts of the climate crisis across the various eco-systems within it, it is vital that future research studies the unique impacts of the climate crisis on mental health in other African countries, especially in island communities who are likely to feel the impact of the climate crisis keenly. Future research in island African nations could use longitudinal methods to monitor exposure to the direct impacts of the climate crisis and mental health outcomes. Future research should also investigate impacts on individuals with neurodevelopmental conditions, such as autism and ADHD, who may have sensory needs that are affected by climate changes (Georgiou et al., 2025). Additionally, research could investigate resilience and protective factors in these nations to better understand personal or community resources that enable island populations to withstand unstable climate changes. Currently, there is a significant bias in the climate-change psychological literature, with research predominantly taking place in the Global North, and this imbalance needs to be addressed, via funding and research attention from within the African content.

Finally, future pilot intervention-based studies should work with farmers and people living in rural areas in Africa. Farmers and people living in rural communities were consistently identified as particularly vulnerable to the impacts of the climate crisis in this review. The impact of improved mental healthcare access in rural areas should be measured following small-scale pilots. Mental health interventions may include a focus on resilience, strengthening community and activism. Mental health interventions could be implemented alongside farming-based adaptions which focus on modifications to farming methods which maintain production stability despite unstable climate changes.

Implications for policy

Policies and interventions across Africa are currently focused on minimizing the physical and societal impact of climate-related disasters and extreme weather events. For example, the World Meteorological Organization (WMO) announced an "Early Warnings for All Action Plan" for Africa in 2023, which aims to build infrastructure to allow timely and accurate information about natural hazards and impending disasters to reach all segments of African society, particularly the most vulnerable (World Meteorological Organization, 2024). However, policymakers also need to consider pre-emptive resourcing for interventions to encourage "mental health disaster preparedness" (dos Santos, 2022).

Greater action by policymakers in Africa is required to prevent the impacts of climate change on mental health by addressing the root causes of climate change; proactively address the mental health impacts outlined in this review as well as predicted mental health impacts; and innovate in response to these

challenges through evidence-based interventions for policy and practice (Grantham Institute, 2021). Policy changes that address the climate crisis may also reduce adverse mental health impacts, in a "win-win" policy strategy, e.g. reducing burning fossil fuels will reduce climate change and the impact on warming temperatures could have a positive effect on mental health, as research described in this paper has linked rising heat levels with poor mental health outcomes.

Conclusion

This systematic review analysed articles that investigated the mental health impact of the climate crisis in vulnerable populations living in Africa.

The main findings indicate that the climate crisis, both in terms of extreme weather events and more gradual impacts (such as sea level and temperature rises), is severely impacting the mental health of farmers, young people, women, migrants and people who have survived climate-related traumatic events. The most consistent findings were in relation to symptoms and rates of depression, anxiety and PTSD. Future high-quality research is needed to establish longitudinal impacts of the climate crisis and to explore the impacts on vulnerable groups which are, as yet, neglected in the research, including, e.g. ethnic minorities, indigenous groups, LGBTQ+ communities.

Ethical approval statement

Due to the nature of this research, ethical approval is not required. The article is a review of previously published literature, meaning no primary data collection took place during this research.

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SRL Appendices

Appendix A1. Search terms

African Countries AND	Subject heading term: **"Africa" (explode)** Specific Terms: "North Africa" or Egypt* or Libya* or Libia* or Tunisia* or Algeria* or Morocco* or "West Africa" or Benin or "Burkina Faso" or Cameroon or "Cape Verde" or Chad or "Canary Island" or "Cote d Ivoire" or "Ivory Coast" or Gambia* or Ghana* or Guinea* or Guinea-Bissau or Jamahiriya or Liberia* or Mali or Mauritania* or Niger* or Nigeria* or Benin* or Senegal* or "Sierra Leone" or Togo or "Central African Republic" or Congo* or "Democratic Republic of Congo" or Zaire or "Equatorial Guinea" or Gabon* or "Sao Tome and Principe" or "East Africa" or Eritrea* or Ethiopia* or Somalia* or Djibouti* or Sudan* or "South Sudan" or Uganda* or Kenya* or Tanzania* or Rwanda* or Burundi* or "The Comoros" or Mauritius or Seychelles or Madagasca* or "South Africa" or "St Helena" or Angola* or Botswana* or Lesotho* or Malawi* or Mozambique* or Namibia* or Swaziland or Zambia* or Zimbabwe* or "cabo verde" or eswatini* or Liberia or "sub-saharan".ti,ab.
Changes in the climate AND	Subject heading term: **"climate change" and related terms** Specific terms: "Climate change" or climate* or "climate crisis" or "natural disasters" or avalanche* or "cyclonic storm" or drought* or flood* or landslide* or tornado* or wildfire* disaster* or weather* or "extreme weather*" or humidit* or "rain fall" or "change in temperature" or "temperature change" or lightning* or ice or "greenhouse effect" or "greenhouse gas" or "global warming" or biodiverse* or "particulate matter" or "air pollution" or "air pollutants" or "water quality" or "water pollutant" or "soil pollutant" or "weather events" or "climatic variability" or "ecological change" or "heat wave" or "land use" or "extreme temperature" or "cold wave" or snowstorm* or frost* or freez* or fog* or storm* or derecho* or hail* or thunderstorm* or rockfall* or mudflow* or "wave action" or "rogue wave" or "glacial lake outburst" or "forest fire" or "land fire" or "brush fire" or "bush fire" or "pasture fire" or "habitat loss" or "resource scarcity".ti,ab.
Mental Health Difficulties	Subject heading term: **mental illness and related terms** Specific terms: "mental health" or "mental illness" or "mental disorder" or "mental distress" or "psychological disorder" or "psychiatric disorder" or psychopatholog* or anxiet* or depress* or "post-traumatic stress" or OCD or "obsessive compulsive disorder" or "posttraumatic stress" or PTSD or suicide* or "self harm" or "self injury" or "self injuries" or "substance use" or "substance abuse" or "alcohol use" or "alcohol misuse" or "alcohol abuse" or "drug abuse" or "drug misuse" or "mood disorder" or depression* or anxiet* or psychos* or schizophreni* or bipolar* or "bipolar disorder".ti,ab.

Appendix A2. Included questions from kmet quality assessment tool

Quantitative

Q1. Question / objective sufficiently described?
Q2. Study design evident and appropriate?
Q3. Method of subject/comparison group selection or source of information/input variables described and appropriate?
Q4. Subject (and comparison group, if applicable) characteristics sufficiently described?
Q5. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?
Q6. Sample size appropriate?
Q7. Analytic methods described/justified and appropriate?
Q8. Some estimate of variance is reported for the main results?
Q9. Controlled for confounding?
Q10.Results reported in sufficient detail?
Q11. Conclusions supported by the results?

Qualitative

Q1. Question / objective sufficiently described?
Q2. Study design evident and appropriate?
Q3. Context for the study clear?
Q4. Connection to a theoretical framework / wider body of knowledge?
Q5. Sampling strategy described, relevant and justified?
Q6. Data collection methods clearly described and systematic?
Q7. Data analysis clearly described and systematic?
Q8. Use of verification procedure(s) to establish credibility?
Q9. Conclusions supported by the results?
Q10. Reflexivity of the account?

Appendix A4. Map of african counties studied in research papers included in review

Appendix F: SIP - Project Approval Letter

THIS FORM ONLY TO BE USED WHERE NO OTHER GOVERNANCE SYSTEMS CAN BE ACCESSED. IT SHOULD NOT BE USED AS AN ALTERNATIVE TO USUAL GOVERNANCE ARRANGEMENTS

Oxford Clinical Psychology Course – Multi-site Clinical Audit/Quality Improvement Proposal Form

Title	**Improving the ways in which we engage with and support women experiencing homelessness**		
Lead Unit	**Oxford Institute of Clinical Psychology Training and Research**	**Other Units involved (ie where data is to be collected**	**ordshire, Hall, 106- , Oxford**
Name and Title of project lead(s)		**Amy Lewins**	
Contact telephone number		**07502 347437**	
Contact email address		**amy.lewins@stx.ox.ac.uk**	
Named leads in other units		**Dr Alasdair Churchard**	
Proposed start date		**01.06.2023**	
Proposed finish date		**01.12.2023**	
This project is a:			
☒ First audit/ quality improvement		☐ Re-audit/ quality improvement If yes, date of last audit/ quality improvement _____	
What is the resource implication for carrying out project		Vouchers - (£15) x5 hours = £75	
Reason for audit or evaluation (tick all that are applicable)			
☐ National priority	☐ Trust priority	☐ Course priority	☐ CCG priority
☐ NICE guidance	☒ Third sector organisation priority	☐ Other (please state)	
If NICE guidance, please state which guidelines:			

Background to Project

Homeless Oxfordshire provides supported accommodation for homeless individuals and aims to support people along their journey to a more stable life and provides various care services. Charity staff, including the Head of Support Services, have identified difficulties in engaging and supporting homeless women, who are less likely to attend meetings, engage with support workers or support groups and often abscond from their supported accommodation. This could be related to the high rates of interpersonal trauma experienced by homeless women leading to a widespread distrust of others. This service improvement project aims to develop gender-tailored, trauma-informed guidance for support staff to increase engagement with homeless women.

Standard(s) for audit or quality improvement

Homeless Link guidance on working with women experiencing homelessness (https://homeless.org.uk/tagged/women/).

Scope and Methodology for Project

- Small quantitative audit component (involving scoping the basic data on i. proportion of female referrals made to Homeless Oxfordshire, compared with male and ii. Outcome data for women who enter the service). Other demographic information will also be analysed, e.g. age, ethnicity, sexuality. More details below:

    1) Number of people referred to service from April 2022 – April 2023, broken down by sex to determine proportion of women referred in.
    2) Demographic information for referrals (age range to protect anonymity, ethnicity category, sexuality).
    3) Housing status outcomes for men and women, e.g. number of people referred within this time frame who are either i. have successfully found independent accommodation, ii. are in supported accommodation with Homeless Oxfordshire or iii. have become homeless again or iv. other.
    4) Engagement outcomes, such as whether or not they are regularly attending appointments with Turning Point (drugs and alcohol support service) or regularly attending support worker meetings. *This is slightly dependent on the data the service has available*.

- Focus groups (x2 groups) conducted using semi-structured interviewing. Thematic analysis will be used to interpret the transcripts.
- 3x individual interviews with female support staff with lived experience of homelessness.
- Findings will be presented at a Homeless Oxfordshire training event. Results will be written in plain English and a guide will be produced for distribution to all front-line workers in Homeless Oxfordshire. Guidance will be included in the induction handbook for new staff.

How are you going to collect the data (tick all that are applicable)

☒ Case notes (paper/ electronic)	☐ Observations	☒ Patient/ Staff Survey	☐ Other (please state) focus group

Data Protection Act

Please tick to confirm "yes" you will comply with:

☒ All data collected will be anonymised (specify when and how here)

- Interview and focus group transcripts will be anonymised upon writing (i.e. all names, DOBs, addresses, any other identifiable data will be removed).
- Audit data, taken from online system will be pulled from the online system into an excel output file. Only essential and non-identifiable data will be pulled from the system (i.e. just number of men and women referred to homeless Oxfordshire, and their housing outcomes).
- Once anonymised, data will be analysed in an excel spreadsheet saved on the University of Oxford encrypted One Drive system.

☒ No patient or staff identifiable data will be reported

Ethics Screening	
Gather any information about a patient beyond that collected in routine patient care	☐ Yes ☒ No
Pose any risk for or burden on a patient beyond those of his/her routine patient care	☐ Yes ☒ No
Infringe on any patient's rights	☐ Yes ☒ No
Risk breaching any patient's confidentiality or privacy	☐ Yes ☒ No
Involve the use of any untested clinical or systems intervention	☐ Yes ☒ No
Do you intend to publish the findings?	☒ Yes ☐ No
- keep a copy of governance/ethics.	

Requested Support from the Course Team	

Trainee and Supervisor:

Indicate here why this form is being used, and which other avenues were explored by the investigators.

Trainee Signature and Date

26/06/2023

Lead Supervisor Signature and Date

A. J Churchard

Course Review Group (Service Improvement Projects)
Myra Cooper, Louise Johns, Neil Carrigan, Alasdair Churchard, Matt Hotton, Paul Salkovskis

Comments:

Approved **X**☐
Approved subject to amendments in comments ☐
Not approved ☐

Name of Reviewer One:…….Matthew Hotton…….

Signature - Reviewer One:…… ……..

Date of Approval – Reviewer One:…….6th July 2023

Name of Reviewer Two:……Neil Carrigan……

Signature - Reviewer Two:…… ……..

Date of Approval – Reviewer Two:… 6th July 2023……

Appendix G: SIP - Topic Guide

Understanding Best Practice for Supporting Women Experiencing Homelessness – A Service Evaluation – Interview Schedule (1:1)

Introduction

- Confidentiality
- Purpose of study
- Safety warning: remind participant that some questions may be sensitive and personal. If anything comes up that they don't feel comfortable answering, that is okay. If they become upset, we can take a break and reconvene or end the interview early if necessary.
- There will be time after interview to redact any information if they go away and change their mind about something shared.

Personal Experience of Homelessness

1. Could you tell me a little bit about your journey into homelessness?

2. How long did you experience homelessness? (this can include sleeping rough, but also living in hostels and supported accommodation).

Being Homeless as a Woman

3. What was it like to be a woman experiencing homelessness?

4. What particular challenges did you face as a woman experiencing homelessness?

    Prompt: was there anything about being a woman that made being homeless especially difficult?

The support that helped and the support you needed

~~5.~~ What helped along your journey of homelessness?

6. Was there anything in particular you remember support workers/charities doing to help support you?

7. Based on your experience, what's the most important thing Homeless Oxfordshire can be doing to support women in the homeless pathway?

Thank yous and check-in on how participant is feeling. Offer follow up.

Understanding Best Practice for Supporting Women Experiencing Homelessness – Interview Schedule for Groups

Introduction

Introduce participants to the purpose of the group, discuss length of time and the topic of discussion. Reassure workers that this is not an evaluation of their individual work in any way, but instead an opportunity to brainstorm ways in which the service **as a whole** could improve the way we care for and support women experiencing homelessness. Explain that everyone will have different levels of experience supporting women, some people may mostly work with men, but I would still like to hear from everyone as I value everyone's input.

About You

Short demographics questionnaire (should take less than 5 minutes).

Understanding Experience of Working with Women Experiencing Homelessness

1. In your experience, how does working with women who access the service differ from working with men?

2. What do you enjoy about working with women who access the service?

   Prompt: have there been any standout cases where you've supported a woman?

3. Have you faced any challenges while working with women who access the service? (and if so what are they?)

   Prompt: Are there any barriers that you've faced and overcome, when working with women?

4. In what ways do you adapt your ways of working when working with women?

5. In what ways does being a [woman / man] help or hinder your support of women experiencing homelessness?

    Prompt: is there anything about being a [female / male] staff member that, in your experience, has helped women experiencing homelessness to access the support? Or has being a [woman / male] actually made things worse?

6. How comfortable do you feel working with women who access the service?

    Prompt: what would make you feel more comfortable?

Feedback on How to Improve Service

7. In what ways could Homeless Oxfordshire improve the service they provide to women?

8. In an ideal world, what changes to the service would benefit women experiencing homelessness?

9. What mistakes can we learn from, in terms of supporting women experiencing homelessness?

10. Homeless Link recommend women-only support spaces for Homelessness Charities. In your view, do you feel that these spaces work?

    Prompt: Are there any downsides to single-sex spaces?

11. Losing custody of children has been identified as a difficulty experienced by women experiencing homelessness. In your experience, how does this impact the clients you work with?

    Prompt: What struggles do you have working with clients going through this?

Appendix H: SIP - Theoretical Assumptions and Reflexivity

Theoretical Assumptions and Reflexivity

An inductive approach was used when analysing the data, meaning that the data were used to determine themes, rather than the researchers having pre-determined themes or codes (Braun & Clarke, 2013). This approach is informed by social constructionist ideologies and the epistemological stance, i.e. that the meaning we derive from experiences is co-created and constructed by language and there is no one objective truth (Chamberlain, 2015). As such, the authors recognise that the themes identified in the data are likely to reflect subjective biases and alternative researchers from different backgrounds would likely find different themes. Initially, semantic themes were identified to describe the data, however, through the analysis latent themes were recognised and used as part of the analysis.

The research team was comprised of two Clinical Psychologists (AC & EG), both with direct experience working with women experiencing homelessness, one Trainee Clinical Psychologist (AL) and one Research Assistant (FS). EG also currently works within Homeless Oxfordshire. For the first year of clinical training, AL worked within Homeless Oxfordshire while on placement. Therefore, pre-existing relationships between the researcher and Homeless Oxfordshire staff participating in the study were present. It is likely that these established relationships influenced the shape of the interviews; anonymity of the data was emphasised by AL in an attempt to encourage openness and honesty despite pre-existing

relationships. A position statement is provided in Appendix I to contextualise interpretations made by the primary researcher throughout analysis. A bracketing interview took place between the primary researcher and FS following data analysis to help inform the position statement.

Appendix I: SIP Positioning Statement

SIP Positioning Statement

I am a white British 28-year-old woman. My family background is working class, and I belong to the first generation in my family to go to university. I have never been homeless and have had no experience of anyone in my family experiencing homelessness. Before starting my first-year placement with Homeless Oxfordshire, as part of my doctoral training in clinical psychology, I had never worked directly with people experiencing homelessness, though I had worked with people residing in prison who had prior experience of homelessness.

Throughout the process of this project, I kept a reflective diary, which helped me to track how the project was shaped by the personal experiences I was having at the time and how the project also shaped me. For example, my partner and I bought our first house during the process of this project and through the diary I was able to explore how guilt, at the immense privilege I embody, may have played a role in my research. Moreover, I took part in a positioning interview which was facilitated by the Research Assistant on our research team. This helped me to better understand how my personal history and cultural background may have influenced how I came to understand the data. For example, we discussed my working-

class background, having witnessed and felt financial strains and pressure at a young age, while also currently existing in a middle-class professional space.

My prior academic experiences should also be considered and reflected upon. I am currently undertaking doctoral training in clinical psychology, including an additional course in Systemic Theory and Therapy. Previously, I achieved a bachelor's degree in Psychology and a master's degree in Clinical Mental Health Sciences. I have previously conducted qualitative research, meaning I am familiar with the process of thematic analysis. This may have influenced my adoption of a social constructionist, epistemological stance.

Appendix J: SIP - Summary of Participant Quotes, According to Theme

* = Individual Interview
MS = Male support worker (from men's focus groups)
FS = Female support worker (from women's focus group)

Relationship Between Client and Support Worker				
Fearfulness about working with women (as a man)	**Women and/or the relationship being fragile or volatile**	**Competition or a threat**	**Parentified support workers**	**Low confidence when working with women in domestic abuse relationships**
MS - "It is always in the back of my mind though, what allegations they could make. They have quite a lot of power, you know? As a male, I may be perceived as someone who might be open to manipulation." (P5).	MS - "I'm always really careful about what I talk about with the women. Like not talking about their children or school or anything, just in case it triggers something." (P2);	FS - "I watch what I wear because sometimes they might think that I'm some posh bird that doesn't have a clue. I think some women can struggle with another woman as a support, especially if they've relied on men a lot. It's hard to trust other women."	FS - "Another challenge is trying to be non-judgmental about their relationships, while also trying to steer that person a little bit in the direction of you know, their best interest." (P7).	MS - "We don't have a written policy on [domestic violence]. And without a written policy on it, there's a lot of confusion... It's like, "do we report, or don't we?" (P1);

		(P7).		
MS - “I had another female client who told lots of lies. She could be quite manipulative, and so sometimes I think that’s how I see all the women, like they’re a bit more sneaky.” (P2)	MS - “Women have to have gone through a lot more before they get to being homeless, because society would have protected them before they got to that point. Which makes the extra vulnerable because they don’t know how the world works and they’re more likely to be less physically powerful that men.” (P1)	MS - “it’s so common for women in the pathway to have been abused by their primary caregiver. So that might be why they actually don’t want to engage with a female support staff member.” (P3)		MS – “Sometimes I forget that some behaviours we see just aren’t acceptable [domestic abuse]. I have to keep reflecting on what I’m seeing and reinforcing my beliefs. I need to not allow inappropriate behaviour to become the norm. I think there’s a danger that if you’re doing this job everyday, you can easily get pulled into thinking this stuff is acceptable.” (P5)
MS – “if there are no cameras, or anything, then it’s just your word against theirs. And that is just something that’s hard to get out of your head.” (P2)	MS - “In my experience, women are normally quite heavily traumatised. More so than men. Like things have got to be quite serious for a woman to end up in [hostel accommodation]. Like they’re more fragile and vulnerable, more bad things have happened to them.” (P3)	MS – “They find it difficult to trust and mix with other women.” (P2)		
MS – “I mean if it’s your word against theirs. You could lose your job. Very easily, you know? It’s scary to think about. Or it could be worse, you could go to court and have to defend yourself if they really wanted to.” (P2)	MS - I’m always really careful about what I talk about with the women. Like not talking about their children or school or anything, just in case it triggers something. (P3)			

Traumatic Experiences and Traumatised Responses					
Constant threat and fear	**Extensive and continuous violence**	**Sexual violence**	**Escape (Flight Response)**	**Staying in romantic relationships with men for protection**	**Inner strength or "post-traumatic growth**
MS - "women are scared. They're more frightened of being homeless and finding themselves where they are. And that means they can be more motivated and can actually get out of the system um.. quicker." (P2)	FS - "We've had quite a few women recently who have been strangled and then seeing them going back to the partners is a big challenge." (P7).	*"You can see that it's toxic and unhealthy from the outside, but you can't say or do anything. And for homeless women, these aren't real relationships, but they cling on to it. Even if it's abusive" (P9)	MS - "Women are always leaving for days on end and you never know if they're going to come back. That just doesn't happen in the same way with the men." (P4).	FS - "Particularly in homeless women, when you're in a relationship and you feel as though you've got someone, you will feel more secure. When you don't have a secure relationship in your family, you don't have anyone else. It just makes sense that you're looking for that safe place in someone, but often that person is troubled themselves." (P6)	*"So I went cold turkey. And I just stayed in my living room, on the mattress for 13 days, no food, TV or distractions. Locked in every single day, because I was so determined that when I went back to rehab, I didn't want to be on any substances. I wanted to get back to my children" (P11).
*"People would say "Do you wanna come out here? Hang out over here?", but there was always a threat there. All I wanted to do was get out." (P9)	*"Women entering risky relationships and things like that, that's just about their self-worth. That's all they feel worth of." (P11)	*"You know, a lot of them are sex working. Many have been sexually assaulted and I think the things that they may have to do in order to survive on the streets of different [to men]". (P10)	FS -"Women are always leaving for days on end and you never know if they're going to come back. That just doesn't happen in the same way with the men we support." (P8)	* "they obviously weren't real relationships. I was with them because they could get me drugs, and that was it really. And they treated me horribly, but at the time I just did it, got on with it" (P10)	*I was only in [hostel name] for seven nights and then I got moved to [another accommodation]. But I still remember those 7 days very clearly. I was terrified. They seemed to last a lifetime. I figured out exactly how to survive in there to avoid people [...]. I would get up really early and go

					out all day. I remember that it was summer time, so I'd spend all my time outside. Go to museums. And then I would make sure I got back into my room before night time, which is when it turned to chaos again." – P9
*"I knew the dangers. I knew but didn't care. I mean, at times I thought I was going to die, I knew that and I still stayed with those men. So it's hard to know what could have got me out of that." (P10)		*"You're more susceptible to being exploited sexually [...]. That happened quite a lot. I was not unattractive. And I was looking to try and get through whatever I was trying to get through and that left me susceptible to allowing myself to be open to lots of abuse from men." (P11)	MS - Women get so easily lost in the system. I think they're ashamed of being homeless. I've noticed that their less involved in the support systems, you know? Like they might enter the system and leave pretty quickly, or disappear. Like they're more likely to have "no fixed abode", but be moving from friend to friend, rather than going to a hostel or supported accommodation. (P3)		
			*"I was often on the run. I would run away from homes or wherever I was, whether it was a family, children's homes or		

			institutions. I would spend many, many nights on the street as a child. And then throughout my adult life, I have walked out of homes because life was becoming too unbearable." (P11).		

Shame for Failing to Enact Society's Stereotypical Role for Women		
Being a bad mother	**Losing custody of children**	**Physical Appearance**
*"You feel like such a failure, as a woman as a mum. All I wanted to be was a good mum. I can look back now and know that I wasn't a good mum to my daughter. I shouldn't have been responsible for that child, they did the right thing. I think I even knew it at the time. But that doesn't make it any easier." (P10)	FS - "I know that men do lose custody of their kids, probably more so than women, but whenever you walk into a woman's room you always see school pictures on the wall, and it just breaks your heart." (P8)	*"There's something about losing all respect for how you look and your appearance, that as a woman I found really hard. Like, being unwashed, hair being a mess, feeling disgusting and ugly. I think losing that self-respect and self-care and self-love, that was just awful for me. (P10)
*"There was a lot of stigma around being homeless and being a young mum and actually that actually put me off accessing services, support services, for fear that I would lose my children, that I would be judged, that, you know, at that did happen at times" (P11)	FS - "When something happens, children have to be taken from them… I mean it's the worst possible thing that could happen to a women. You might as well just take a gun to their head." (P7)	*I was quite pretty and I hated it. I hated myself and how I looked. So I wanted to scar myself [gestured at face]. I didn't eat, I went through all of the range of eating disorders. I had so much self-loathing. (P11).

	FS - “Women who'd had their children taken from them… it’s like they just felt like that was it. There was nothing else to fight for. It seems to send them into a spiral of just…awfulness. Some women whose children were in local authority care or had been fostered find it really difficult to be at that meeting or turn up for that visitation or they'd be late because of the chaos going on in their lives and that's tough as well.” (P7)	

Appendix K: SIP - Pre- and Post-training Outcome Measure

Pre-training/feedback event:

1. What is your job title?

2. Please rate the following questions from 0 – 100 in terms of how far you agree with the statement (0 = completely disagree, 100 = completely agree):

    a. I feel confident talking to female service users about gender-specific issues, such as losing custody of their children, abortions and menstruation (0 – 100)

    b. I understand some of the reasons that may help to explain why women accessing homelessness services are more likely to abscond from their accommodation (0 – 100).

    c. I have a good understanding of why the women I work with are often in abusive relationships (0 – 100).

    d. I know how to work with women in abusive relationships (0 – 100).

3. During a wellbeing check, you notice that a woman you are working with, named Joanne, has large, dark bruises on her arms and one black eye. When you ask what's happened, she informs you that her partner got angry last night and hit her repeatedly. She told you that she knows it's wrong, but that he apologised afterwards and seemed really sorry this time. She doesn't want to talk any more about what happened. What would you say to this woman initially?

4. Would you ask any follow up questions? If so, what would you ask and why?

5. What steps would you take to deal with this situation after you've finished your wellbeing checks?

Post-training:

1. Please rate the following questions from 0 – 100 in terms of how far you agree with the statement (0 = completely disagree, 100 = completely agree):

    a. I feel confident talking to female service users about gender-specific issues, such as losing custody of their children, abortions and menstruation (0 – 100)

    b. I understand some of the reasons that may help to explain why women accessing homelessness services are more likely to abscond from their accommodation (0 – 100).

    c. I have a good understanding of why the women I work with are often in abusive relationships (How far do you agree with this statement? 0 – 100).

    d. I know how to work with women in abusive relationships (0 – 100).

2. Think back to Joanne from the scenario at the beginning. Has the training you've received influenced how you would respond to this situation (either in terms of what you would say, the questions you would ask, or what you would do afterwards)?

3. What did you find helpful about today's training?

4. What did you find less helpful?

Appendix L: Research Highlights for Journal Submission

As specified in the Guidance for Authors, below is a summary of research highlights and a description of how the submission is community-based and psychology-related:

- Gender differences in terms of service-access were identified in the study via an audit, with three times as many men accessing Homeless Oxfordshire support. This gender equality is reflective of the "hidden homelessness" concept.
- Three themes were identified from the interviews and focus groups: "the relationship between support worker and service user", "shame for failing to enact society's stereotypical role for women" and "traumatic experiences and traumatised responses". Staff confidence in working with women increased following the feedback and training event provided.
- The study is informed by lived experience as individual interviews were conducted with staff members with lived experience of homelessness. The emphasis on amplifying lived experience voices demonstrates a commitment to community-based research.
- The study contributes to applied community psychology by exploring systemic barriers for women experiencing homelessness, a topic relevant to today's society, with homelessness in men and women on the rise.
- Findings informed actionable service recommendations and training on trauma-informed care provided by the researcher. The recommendations and training were designed to improve support services for homeless women by increasing knowledge, confidence and psychological-mindedness in staff. This

element of the research demonstrates real-world psychological and social application.

Appendix M: SIP – Author Guidelines Journal of Community Psychology

This journal participates in the Wiley Social and Personality Psychology Publishing Network. This exciting collaboration between a number of high quality journals simplifies and speeds up the publication process, helping authors find a home for their research. At the Editors' judgement, suitable papers not accepted by one journal may be recommended for referral to another journal(s) in the network. Authors decide whether to accept the referral offer, with the option to transfer their paper with or without revisions. Once the referral is accepted, submission happens automatically, along with any previous reviewer reports (if applicable), thereby relieving pressure on the peer review process. While a transfer does not guarantee acceptance, it is more likely to lead to a successful outcome for authors by helping them to find a route to publication quickly and easily.

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Thank you for your interest in *Journal of Community Psychology*. Note that submission implies that the content has not been published or submitted for publication elsewhere except as a brief abstract in the proceedings of a scientific meeting or symposium.

New submissions should be made via the Research Exchange submission portal. Should your manuscript proceed to the revision stage, you will be directed to make your revisions via the same submission portal. You may check the status of your submission at anytime by logging on to submission.wiley.com and clicking the "My Submissions" button. For technical help with the submission system, please review our FAQs or contact submissionhelp@wiley.com.

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Journal of Community Psychology now offers free format submission for a simplified and streamlined submission process.

Before you submit, you will need:

- Your manuscript: this can be a single file including text, figures, and tables, or separate files – whichever you prefer. All required sections should be contained in your manuscript, including abstract, introduction, methods, results, and conclusions. Figures and tables should have legends. References may be submitted in any style or format, as long as it is consistent throughout the manuscript. If the manuscript, figures or tables are difficult for you to read, they will also be difficult for the editors and reviewers. If your manuscript is difficult to read, the editorial office may send it back to you for revision.

- The title page of the manuscript, including statements relating to our ethics and integrity policies:
    - data availability statement
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    - conflict of interest disclosure
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Important: the journal operates a double-blind peer review policy. Please anonymise your manuscript and prepare a separate title page containing author details.

(Why is this important? - We need to uphold rigorous ethical standards for the research we consider for publication.)

- Your co-author details, including affiliation and email address. *(Why is this important? We need to keep all co-authors informed of the outcome of the peer review process.)*
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To submit, login here and create a new submission. Follow the submission steps as required and submit the manuscript.

If you are invited to revise your manuscript after peer review, the journal will also request the revised manuscript to be formatted according to journal requirements as described below.

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We look forward to your submission.

2. AIMS AND SCOPE

PLEASE NOTE: All submissions should include a short, bullet list document of research highlights and details on how the submission is either *community-based and psychology-related*. This will allow the editor to see the reasoning more quickly for why the authors think the article is in scope before rejecting or unsubmtting.

The *Journal of Community Psychology* is a peer-reviewed journal devoted to research, evaluation, assessment, and intervention. Although review articles that deal with human behavior in community settings are occasionally accepted, the journal's primary emphasis is on empirical work that is based in or informs studies to understand community factors that influence, positively and negatively, human development, interaction, and functioning. Articles of interest include descriptions and evaluations of service programs and projects; studies of youth, parenting, and family development; methodological studies for the identification and systematic alteration of risks; and protective factors for emotional and behavioral disorders and for positive development. The journal also publishes the results of projects that inform processes relevant to the design of community-based interventions including strategies for gaining entry, engaging a community in participatory action research, and creating sustainable interventions that remain after project development and empirical work are completed.

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PLEASE NOTE: All submissions should include a short, bullet list document of research highlights and details on how the submission is ***community-based and psychology-related***. This will allow the editor to see the reasoning more quickly for why the authors think the article is in scope before rejecting or unsubmitting.

The manuscript should be submitted in separate files: title page; main text file; figures.

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- (iv) the author's institutional affiliations at which the work was carried out;
- (v) acknowledgments
- (vi) three to four referees (see below).

Authors will be required to include the names, institutions, e-mail addresses, and research specialties of three to four persons outside the author's institution who have not collaborated with the author(s) in the past 5 years and who are qualified to referee the paper. An effort will be made to obtain at least one referee from this list.

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Authorship
Please refer to the journal's authorship policy the Editorial Policies and Ethical Considerations section for details on eligibility for author listing.

Acknowledgments
Contributions from anyone who does not meet the criteria for authorship should be listed, with permission from the contributor, in an Acknowledgments section. Financial and material support should also be mentioned. Thanks to anonymous reviewers are not appropriate.

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You will be asked to provide a conflict of interest statement during the submission process. See the section 'Conflict of Interest' in the Editorial Policies and Ethical Considerations section for details on what to include in this section. Please ensure you liaise with all co-authors to confirm agreement with the final statement.

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Manuscripts can be uploaded either as a single document (containing the main text, tables and figures), or with figures and tables provided as separate files. Should your manuscript reach revision stage, figures and tables must be provided as separate files. The main manuscript file can be submitted in Microsoft Word (.doc or .docx) format. As papers are double-blind peer reviewed the main text file should not include any information that might identify the authors.

Your main document file should include:

- A short informative title containing the major key words. The title should not contain abbreviations
- Acknowledgments;
- Abstract structured (aims/methods/results/conclusion)
- Seven keywords;
- Main body: formatted as introduction, materials & methods, results, discussion, conclusion
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- Tables (each table complete with title and footnotes);
- Figures: Figure legends must be added beneath each individual image during upload AND as a complete list in the text.

Abstract
The Abstract should be divided into the following sections 'Aims', 'Methods, Results' and 'Conclusion'; it should not exceed 150 words for articles and brief reports.

Keywords
Please provide seven keywords. Keywords should be taken from those recommended by the US National Library of Medicine's Medical Subject Headings (MeSH) browser list at https://www.nlm.nih.gov/mesh/. REX will attempt to automatically extract keywords from the manuscript.

Main text
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Footnotes to the text are not allowed and any such material should be incorporated into the text as parenthetical matter.

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References should be prepared according to the *Publication Manual of the American Psychological Association* (7th edition). This means in text citations should follow the author-date method whereby the author's last name and the year of publication for the source should appear in the text, for example, (Jones, 1998). The complete reference list should appear alphabetically by name at the end of the paper.

A sample of the most common entries in reference lists appears below. Please note that a DOI should be provided for all references where available. For more information about APA referencing style, please refer to the APA FAQ. Please note that for journal articles, issue numbers are not included unless each issue in the volume begins with page one.

Journal article

Beers, S. R. , & De Bellis, M. D. (2002). Neuropsychological function in children with maltreatment-related posttraumatic stress disorder. The American Journal of Psychiatry, 159, 483–486. doi:10.1176/appi.ajp.159.3.483

Book

Bradley-Johnson, S. (1994). Psychoeducational assessment of students who are visually impaired or blind: Infancy through high school (2nd ed.). Austin, TX: Pro-ed.

Internet Document

Norton, R. (2006, November 4). How to train a cat to operate a light switch [Video file]. Retrieved from http://www.youtube.com/watch?v=Vja83KLQXZs

Endnotes

Endnotes should be placed as a list at the end of the paper only, not at the foot of each page. They should be numbered in the list and referred to in the text with consecutive, superscript Arabic numerals. Keep endnotes brief; they should contain only short comments tangential to the main argument of the paper.

Footnotes

Footnotes should be placed as a list at the end of the paper only, not at the foot of each page. They should be numbered in the list and referred to in the text with consecutive, superscript Arabic numerals. Keep footnotes brief: they should contain only short comments tangential to the main argument of the paper and should not include references.

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Tables should be self-contained and complement, but not duplicate, information contained in the text. They should be supplied as editable files, not pasted as images. Legends should be concise but comprehensive – the table, legend and footnotes must be understandable

without reference to the text. All abbreviations must be defined in footnotes. Footnote symbols: †, ‡, §, ¶, should be used (in that order) and *, **, *** should be reserved for P-values. Statistical measures such as SD or SEM should be identified in the headings.

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Legends should be concise but comprehensive – the figure and its legend must be understandable without reference to the text. Include definitions of any symbols used and define/explain all abbreviations and units of measurement.

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Figures submitted in color may be reproduced in color online free of charge. Please note, however, that it is preferable that line figures (e.g. graphs and charts) are supplied in black and white so that they are legible if printed by a reader in black and white.

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Appendices will be published after the references. For submission they should be supplied as separate files but referred to in the text.

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The following links provide general advice on formatting and style.

- **Abbreviations:** In general, terms should not be abbreviated unless they are used repeatedly and the abbreviation is helpful to the reader. Initially use the word in full, followed by the abbreviation in parentheses. Thereafter use the abbreviation only.

- **Units of measurement:** Measurements should be given in SI or SI-derived units. Visit the Bureau International des Poids et Mesures (BIPM) website at http://www.bipm.fr for more information about SI units.
- **Numbers:** numbers under 10 are spelled out, except for: measurements with a unit (8mmol/l); age (6 weeks old), or lists with other numbers (11 dogs, 9 cats, 4 gerbils).
- **Trade Names:** Chemical substances should be referred to by the generic name only. Trade names should not be used. Drugs should be referred to by their generic names. If proprietary drugs have been used in the study, refer to these by their generic name, mentioning the proprietary name, and the name and location of the manufacturer, in parentheses.

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2. Been involved in drafting the manuscript or revising it critically for important intellectual content;
3. Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content; and
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Contributions from anyone who does not meet the criteria for authorship should be listed, with permission from the contributor, in an Acknowledgments section (for example, to recognize contributions from people who provided technical help, collation of data, writing assistance, acquisition of funding, or a department chairperson who provided general support). Prior to submitting the article all authors should agree on the order in which their names will be listed in the manuscript.

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Appendix N: TDRP - Letter of HRA Ethical Approval

Ymchwil Iechyd a Gofal Cymru
Health and Care Research Wales

NHS
Health Research Authority

Miss Amy Lewins
Trainee Clinical Psychologist
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25 June 2024

Dear Miss Lewins

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**Understanding the Impact of Traumatic Experiences Throughout the Lifespan and Feelings of External Shame on the Experience of Hearing Voices.**
IRAS project ID:	**334076**
Protocol number:	**17740**
REC reference:	**24/SS/0048**
Sponsor	**Research and Development Department, Oxford Health NHS Foundation Trust**

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The standard conditions document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **334076**. Please quote this on all correspondence.

Yours sincerely,
Carolyn Halliwell

Approvals Specialist

Email: approvals@hra.nhs.uk

Copy to: *Ms Natalia Jastrzebska*

Appendix O: TDPRP - DAIMON-EV Sub-Scale on Voice to Person Dialogue

When I speak or converse with the voice(s), the voice(s) gives me orders (get dressed, go outside) about what I can or cannot do.

1. When I speak or converse with the voice(s), the voice(s) forbids me to do things (get dressed, go outside) that I may or may not follow.

2. When I speak or converse with the voice(s), the voice(s) asks me questions about myself, or about the things that happen to me during the day.

3. When I speak or converse with the voice(s), the voice(s) gives me information about the things that happen in my life or in my environment.

4. When I speak or converse with the voice(s), the voice(s) tells me unpleasant things about me or about the people in my environment.

5. When I speak or converse with the voice(s), it threatens to hurt me, or the people in my environment

All answered on likert scale (0-5) from “I have not talked” to “I have always talked”

Appendix P: TDRP – Statistical Assumptions Tested

The normal distributions of the mean scores for all variables was assessed using the Kolmogorov-Smirnov test and visual inspection of Q-Q plots. Three variables were normally distributed: Social Rank, Voice Content and External Shame. All remaining variables (age, age onset of voice hearing, gender, ethnicity, education, voice frequency, level of distress, anxiety, low mood) were skewed and/or kurtosed. Outlying scores for all variables were examined using box plots, with each case followed up with an inspection of scores across measures. Based on an absence of clear evidence that outlying scores did not reflect natural variation in the population, no outliers were removed.

There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.910. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were no studentized deleted residuals greater than ±3 standard deviations, no leverage values greater than 0.2, and values for Cook's distance above 1.

Appendix Q: TDRP – Author Guidelines for British Journal of Clinical Psychology

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- aetiology, assessment and treatment of the whole range of psychological disorders irrespective of age group and setting
- biological influences on individual behaviour

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The Journal is catholic with respect to the range of theories and methods used to answer substantive scientific problems. Studies of samples with no current psychological disorder will only be considered if they have a direct bearing on clinical theory or practice.

The following types of paper are invited:

- papers reporting original empirical investigations;
- theoretical papers, provided that these are sufficiently related to empirical data;
- review articles, which need not be exhaustive, but which should give an interpretation of the state of research in a given field and, where appropriate, identify its clinical implications;
- Brief Reports and Comments.

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Papers describing quantitative research should be no more than 5000 words (excluding the abstract, reference list, tables and figures). Papers describing qualitative research (including reviews with qualitative analyses) should be no more than 6000 words (including quotes, whether in the text or in tables, but excluding the abstract, tables, figures and references). Brief reports should not exceed 2000 words and should have no more than one table or figure. Any papers that are over this word limit will be returned to the authors. Appendices are included in the word limit; however online appendices are not included.

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Refer to the separate guidelines for Registered Reports.

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Before you submit, you will need:

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Provide appropriate keywords.

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