Health experiences and inequalities across intersecting social identities in health research: a scoping review

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Conflicts of interest

All authors declare no conflicts of interest.

Abstract

Background: Intersectionality provides a framework to help enable critical thinking about how sociodemographic factors interact. There is currently limited evidence on whether having multiple sociodemographic factors, typically associated with underrepresentation in research (e.g., minority ethnicity, lower socioeconomic status), affect health conditions and outcomes. Given the essential role that clinical trials have in the development of effective treatments, this makes it challenging to address whether intersectionality should be considered in trials.

Aim/objectives: This scoping review aimed to map the existing literature on the impact of intersectionality on health inequalities and outcomes in developed economies, and identify how intersecting sociodemographic factors affect health.

Methods: Following the Arksey and O'Malley Framework and Joanna Briggs Institute methodology, the review adhered to PRISMA-ScR guidelines. Databases searched included Medline, Embase, Web of Science, International Bibliography of the Social Sciences, and Sociological Abstracts. Selection criteria were based on the Population-Concept-Context mnemonic, targeting studies that explicitly referenced intersecting sociodemographic factors and their impact on health experiences. Data were extracted from the Discussions section of the included studies, specifically any reports of the effects of intersectional sociodemographic factors, such as ethnicity, sex, gender, and socioeconomic status, on health conditions and outcomes.

Results: Thirty-three studies met the inclusion criteria. The review found that people who belong to more than one sociodemographic group typically under-served in research (e.g., minoritised ethnic and experience of socioeconomic disadvantage), tend to have poorer health. This review also found that context is an important component, with some traditionally privileged groups (e.g., white, male and with a high socioeconomic background) having relatively poorer health outcomes depending on the context.

Conclusion: Overall, possessing greater intersectionality is likely to lead to poorer health, however there is no simple relationship, and context plays a role. These findings emphasise the need for

inclusive clinical trials that account for multiple sociodemographic factors and the necessity of designing inclusive research that reflects diverse populations.

Data availability statement

All information relevant to the review is included in the article or uploaded as supplementary information.

Keywords

Intersectionality, health inequalities, clinical trials, scoping review.

Introduction

Many health inequalities were highlighted by the COVID-19 pandemic, which showed the disproportionate impact of COVID on specific sociodemographic groups [1]. Some sociodemographic factors, which are the shared social or demographic characteristics held by a group, have been associated with more adverse health outcomes [2]. Minoritised ethnic groups for example were disproportionally affected by COVID-19 [3]. More attention is being paid to reducing these inequalities, and clinical trials provide a logical starting point as they are responsible for much of the evidence to support effective and safe healthcare. Without adequate inclusion of all groups in trials, there is a risk that some findings will not benefit those who may need it, because of issues such as low acceptance of treatments and unequal opportunity of access [4].

Different people's health can be influenced by factors related to their social identity and location, such as ethnicity, sex and gender, occupation, socioeconomic status, disability, immigration status, geographical location, place of residence and religion [5]. Their health can also be influenced by broader, structural societal systems, such as racism, sexism, and classism [6]. Differences in health status among groups underscores the unfairness and preventability of health imbalances, which are frequently rooted in social or economic disadvantage [7].

An under-served group in research refers to populations that are not adequately represented or included in clinical trials when compared to population estimates. The National Institute of Health and Care Research (NIHR) has described these groups as those who face barriers to participation due to a variety of factors, including but not limited to ethnic minorities, low-income populations, and gender and sexual minorities [8]. Research needs to involve diverse populations to ensure that findings are generalisable and applicable to all. While related, representation and outcome differences need separate attention. Representation concerns who is included in trials, while

outcome differences relate to how health varies across groups. We focused this review on the latter, examining whether overlapping sociodemographic factors are linked to poorer health outcomes. While intersectionality also draws attention to the structural processes that drive inequality, our review focuses on outcomes as an initial step to understand whether the overlap of social factors is associated with poorer health.

Inclusion has become a policy priority in recent years to ensure clinical trials include a diverse range of participants. [9]. This approach risks overlooking the multifaceted experiences of individuals at the intersection of multiple under-served identities, potentially neglecting their unique health experiences.

Introduced by Kimberlé Crenshaw in 1989, intersectionality challenges the focus on single axis approaches to understand health inequalities. As a theory, it advocates for a more nuanced and inclusive approach to research. According to Crenshaw, 'the focus of an intersectional approach is to highlight the need to account for multiple grounds of identity when considering how the social world is constructed' [10]. Intersectionality as a tool to address inequality is contested, with debate over its theoretical roots, scope, and practical application [11]. Our review adopts the position that intersectionality does offer a framework for understanding health differences and inequalities.

There is limited evidence to show whether people with multiple intersecting under-served identities experience worse health outcomes due to compounding disadvantage. This lack of understanding makes it difficult to design trials that account for the needs of diverse populations and the limited representation of these groups in trials further constrains the ability to investigate intersecting effects. This undermines efforts to explore intersectionality as a target for strategies to mitigate future health inequalities and ensure that trials are representative of the populations they aim to benefit. This review focuses on whether the overlap of more than one social factor is associated with poorer health outcomes, to inform whether greater attention to these intersections is warranted in future research. It aims to bridge this gap by mapping the existing literature on the topic. This scoping review is the first step in a broader project exploring inclusion in clinical trials. Our aim here was to identify whether intersectionality, understood as the overlap of two or more sociodemographic factors (e.g., race/ethnicity and sex/gender and/or socioeconomic status), is associated with poorer health outcomes in order to inform whether this should be prioritised in future trial design.

Methods

A protocol was developed and prospectively shared via OSF [12]. This review followed the Arksey and O'Malley Framework [13], Joanna Briggs Institute (JBI) methodology [14] and PRISMA-Scr guidelines [15].

Search Strategy

We developed a search strategy in collaboration with an Information Scientist at the University of Aberdeen. A three-step approach, based on JBI methodology, was followed. First, an initial search was conducted in Medline and Embase to identify relevant terms from titles, abstracts, and index headings. These terms were then used to refine and execute a comprehensive search across five databases: Medline, Embase, Web of Science, Sociological Abstracts, and the International Bibliography of the Social Sciences. A copy of the full electronic Medline search is available in appendix 3. Finally, reference lists of included studies were hand-searched for additional literature. Given the volume of search results during the first stage of screening (titles and abstracts), we refined the eligibility criteria to focus on studies that included any 2 of the following 3 factors: race/ethnicity, sex/gender or socioeconomic status. These 3 factors were also some of the most reported. This was to improve the depth and quality of analysis possible in the time available, and ensure a richer synthesis.

Selection Criteria

Eligibility criteria are shown in Table 1. The selection criteria were organised based on the Population—Concept—Context (PCC) mnemonic [16].

To what extent does intersectionality affect health inequalities: Protocol for a Scoping review			
Criteria to be applied to the literature search			
	PCC Component	**Inclusion criteria**	**Exclusion criteria**
Population	Groups of people that share more than one intersecting sociodemographic characteristic.	Intersecting factors that are associated with discrimination, and where authors have explicitly referenced that intersecting factors are being studied in the title/abstract. Factors defined as sociodemographic factors; any social or demographic feature that a group has in common. -Included factors are to fall under one of the following combinations of PROGRESS PLUS factors,	None.

		sex/gender AND race/ethnicity AND/OR Socioeconomic status [17]. The term intersecting should refer to factors that a person/group possesses at the same time.	
Concept	Health inequalities	Research reporting the effect of intersecting sociodemographic factors on health inequalities/health outcomes. Research reporting on singular or multiple health inequalities. Research that uses the term intersectionality (or a variation of the term e.g., intersecting factors) in the title or abstract. A health condition or disease that can be measured or demonstrated clinically or by self-report.	Research reporting the effects of intersecting sociodemographic factors on anything that does not directly relate to health outcomes. A mediating factor or proxy, such as a behaviour or experience, that would only potentially lead to a certain health condition or disease.
Context	Developed Economies	Research conducted in developed economies, according to the list of countries outlined by the World Economic Situation and Prospects (WESP) [18]. Full-text available in English only, due to research team language limitations. Qualitative or quantitative, or mixed methods. Research published from 1989 onwards to align with the coining of the term intersectionality. Empirical research studies.	Systematic review or any other type of review.

Literature Selection and Data Charting

We completed all searches on 15 February 2023. Duplicate citations were removed and the remaining records were imported into Rayyan for screening. One member of the author team conducted title and abstract screening in a staged process, with 10% independently screened by a second member in each round. Disagreements were resolved through discussion, and where needed, a third member was consulted. The same process was followed for full-text screening. Reasons for exclusion at the full-text stage were documented. The overall selection process is

presented in a PRISMA-ScR flow diagram (see figure 1). In line with Arksey and O'Malley's framework and JBI guidance, no formal quality appraisal was undertaken. We charted data using a collaboratively developed extraction form, piloted by two author team members and refined through discussion. In this review, we defined 'health outcomes' broadly as any reported health condition, risk, or status associated with intersecting sociodemographic factors. This operational definition of health outcomes was developed through author discussions and aligns with our eligibility criterion that a health condition or disease is measurable clinically or by self-report. We extracted 'findings' as author-reported interpretations and insights on whether the overlap of two or more sociodemographic characteristics influenced these outcomes. We focused on extracting 'findings' from the Discussion sections, as these often include reflective commentary where authors link their results to broader social and structural issues. This allowed the review to capture how researchers interpret and explain the influence of intersecting social characteristics on health. Where relevant findings were not present in the Discussion, we also reviewed Results sections to ensure important data were not missed.

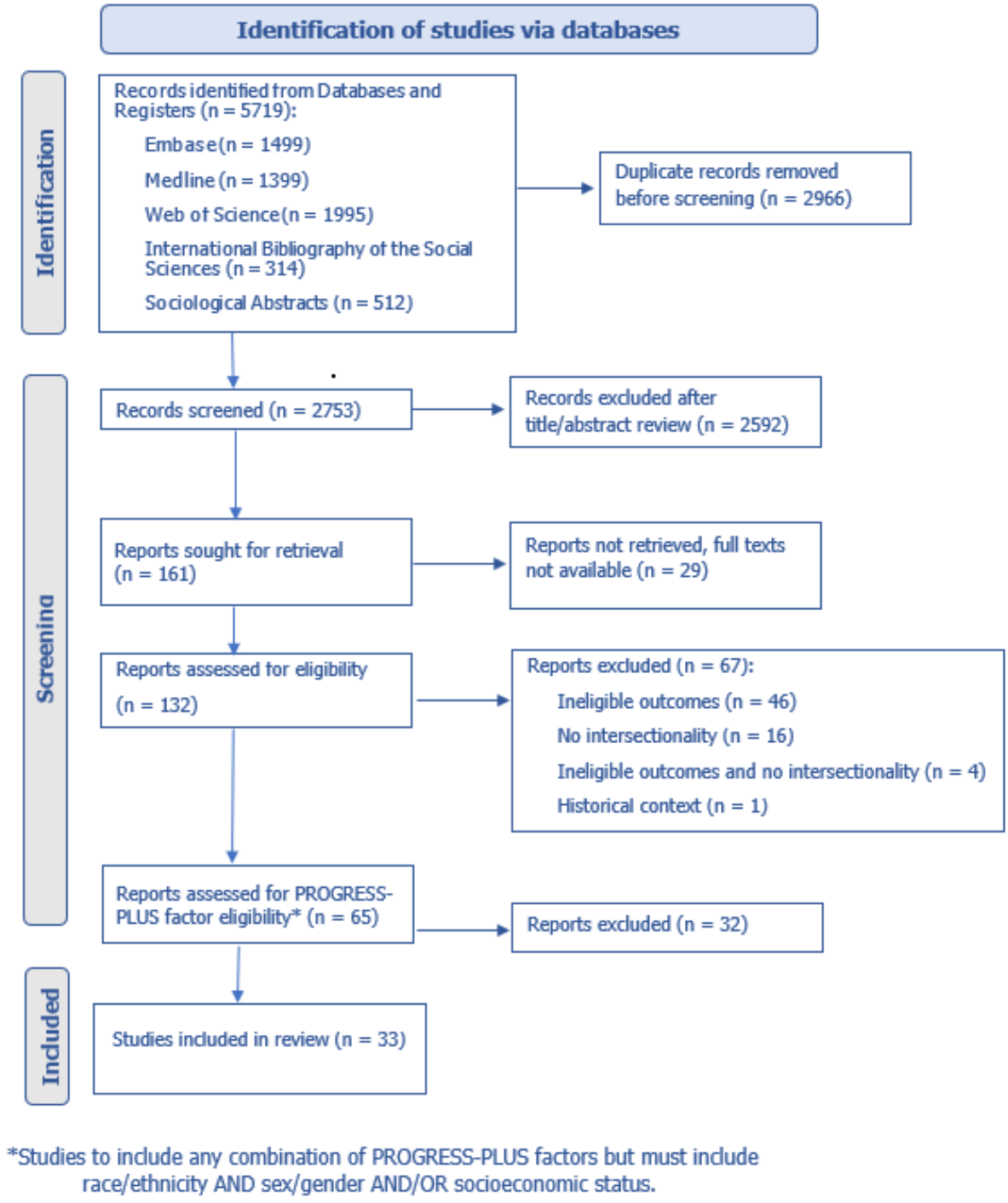

Figure 1. PRISMA Flow diagram representing identification, screening, and selection of studies for scoping review. Adapted from [19].

Analysis

We used a narrative synthesis approach to collate and present findings descriptively [20]. Findings were grouped by the main combinations of sociodemographic factors and summarised by the type

and direction of reported health outcomes. This approach described patterns in author reported intersectional statements; it did not pool estimates or quantify effects.

Patient and Public Involvement

Patients and the public contribute to components of the larger project but were not involved in this review.

Findings

Thirty-three studies met the inclusion criteria.

All included studies were observational, with the majority being cross-sectional surveys, cohort studies or secondary data analyses. No interventional studies met the inclusion criteria. Intersectional findings refer to any finding reported by the authors of included studies that considers the impact or effect of two or more sociodemographic factors on a health condition.

We grouped reported intersectional author reported insights from included studies according to the main sociodemographic factors they were relevant to. To avoid misinterpretation, we followed authors' own descriptions of sociodemographic factors, which may vary across cultural and social contexts. See Appendix 2, for this scoping review's definitions of sociodemographic factors. Tables 2, 3 and 4 provide some takeaway insights to provide a quick overview of the types of intersectional relationships the included studies found.

Included studies looked across the following health conditions and outcomes: 6 on cardiovascular conditions, 2 on asthma, 8 on mental health, 5 on COVID-19, and 13 across other areas. See Appendix 1 for a full list of included studies.

Intersection between two factors: 'race or ethnicity' and 'sex or gender'

Study	**Some takeaway insights**
Kanchi et al (2018)	Black women have higher hypertension rates than Black men and other ethnic groups.
Kanchi et al (2018)	White men have higher hypertension rates than white women.
Veenstra et al (2016)	Among Latino and Asian populations, women are more likely to be diagnosed with hypertension than men.
Robertson et al (2021)	Transgender individuals, especially white or Native American, have higher odds of depression.
Rushovich et al (2021)	Black men have a significantly higher risk of COVID-19-related death compared to other groups.
Madera et al (2023)	Black and Native American women have a higher likelihood of tooth loss (edentulism) compared to men and other racial groups.

Curry et al (2021)	Black individuals and males of minority ethnic groups have higher non-remitting asthma rates.

Table 2. Overview of some of the intersectional insights from the included studies that focused on the intersection between two factors, specifically ethnicity/race and sex/gender.

Intersectionality between two factors was widely explored in studies on cardiovascular outcomes. Kanchi et al. (2018) found that Black women had a higher prevalence of hypertension compared to men of the same ethnic group and other ethnic groups such as white, Latino, and Asian. Among white individuals, men had higher hypertension rates than women. Immigration was also shown to elevate the risk of hypertension and diabetes [21]. Patterson and Veenstra (2016) reported that Black-White inequalities in hypertension were further compounded by gender, with Black women more likely to report the condition compared to Black men and White men or women. In contrast, Veenstra et al (2020) revealed comparable prevalence of diabetes and hypercholesterolemia between men and women across racial/ethnic groups, with white women having a higher diabetes diagnosis rate than white men. Asian men and women however reported lower hypertension and diabetes rates than white men and women [22]. Veenstra et al (2016) found that among Latino and Asian populations, women were more likely to be diagnosed with hypertension than men. Black and Asian men were more frequently diagnosed with diabetes than women, though data on this was limited [23]. Lett et al. (2021) found that the Hispanic population, across all gender identities, had a lower prevalence of cardiovascular disease and hypertension compared to non-Hispanic whites [24]

In the asthma related studies, Curry et al (2021) found that Black individuals and males of other minority ethnic groups had higher rates of non-remitting asthma, while Hispanic/Latinx females experienced significantly lower rates compared to white females. Patterson and Veenstra (2016) also reported that native-born Black women were less likely to report asthma compared to native-born white women after adjusting for socio-economic factors [25].

In mental health studies, Robertson et al (2021) reported that transgender individuals, especially those who were white or Native American, had higher odds of being diagnosed with depression compared to cisgender white adults [26]. Another study found that females and ethnic minorities generally exhibited greater likelihood to experience clinical depression than males and white individuals [27].

In COVID-19 studies, Rushovich et al (2021) found that men, particularly Black men, had a significantly higher risk of COVID-19-related death compared to women and other racial groups [28]. Native Americans also exhibited higher mortality and kidney injury risks from COVID-19, with Black individuals facing the highest risks for acute kidney injury and haemodialysis [29].

In studies reporting across various health outcomes, such as Madera et al (2023) who looked at oral health, it was reported that Black and Native American women had a higher likelihood of tooth loss (edentulism) compared to men and other racial groups [30]. Millard et al. (2015) found that being Asian lowered mortality risk compared to white individuals, but the gap between men and women in survival rates was wider in Asian and Pacific Islander populations than in any other group [31]. Lett et al. (2020) found gender minority Black individuals faced worse health outcomes than both cisgender Black and gender minority white individuals [32].

Intersection between three factors: 'socioeconomic status', 'race or ethnicity' and 'sex or gender'

Study	Some takeaway insights
Veenstra and Gerry (2013)	Higher income increases hypertension risk among men, especially Black men, while higher income reduces risk for Black and South Asian women.
LoSchiavo et al (2020)	Low-income ethnic minorities, particularly Latinx and Native American women, had significantly higher depression scores when compared to high-income white men.
McClendon et al (2021)	African American women with low income reported significantly higher pain levels than other demographic groups.
Assari (2015)	Education lowered chronic medical conditions in Black men more than in Black women or White men and women.

Table 3. Overview of some of the intersectional insights from the included studies that focused on the intersection between three factors, specifically ethnicity/race and sex/gender and socioeconomic status.

Several studies considered the role of socioeconomic status (SES) alongside race or ethnicity, and sex or gender. For cardiovascular outcomes, Veenstra and Gerry (2013) found that higher income increased hypertension risk among men, particularly Black men, while higher income reduced the risk for Black and South Asian women [33]. Another study noted that while household income was associated with a lower likelihood of hypertension in men, the opposite was true for women. Among Black women, lower income was strongly linked to a higher risk of both hypertension and diabetes, suggesting that race, gender, and income together create significant health vulnerabilities [34]. Hall et al (2022) identified a strong link between higher socioeconomic vulnerability and increased type-2 diabetes prevalence among Hispanic youth [35].

Socioeconomic disadvantage was also linked to higher asthma prevalence. Hall et al. (2022) found that Hispanic children from economically disadvantaged backgrounds had the highest asthma burden, while Native American and Asian children exhibited the lowest prevalence of asthma [35]. Curry et al. (2020) reported lower asthma likelihood in Hispanic/Latinx females compared to white females, with sexual minority status increasing asthma odds among Hispanic/Latinx females [36].

In mental health outcomes, LoSchiavo et al (2020) found that low-income ethnic minorities, particularly Latinx and Native American women, had significantly higher depression scores when compared to high-income white men [27]. The neurotype ADHD was also more prevalent in low-income, non-Hispanic Black children compared to their white peers, with economic disadvantage amplifying the likelihood of a diagnosis [37]. LoSchiavo et al. (2020) found lower depression odds for college-educated, higher-income, exclusively homosexual individuals [38].

In COVID-19 mortality, Lin et al. (2022) found that counties with higher COVID-19 mortality had larger Hispanic and uninsured populations, particularly in urban areas. Meanwhile, non-Hispanic white populations in rural areas also faced higher mortality due to limited access to healthcare [39].

McClendon et al (2021) explored the role of perceived discrimination in osteoarthritis-related pain and found that African American women with low income reported significantly higher pain levels than other demographic groups [40]. Additionally, Weiss (2021) found that lower SES contributed more to dementia incidence than lifestyle factors, especially among non-Hispanic Black men and women [41]. Assari (2015) found education lowered chronic medical conditions in Black men more than in Black women or White men and women [42], and Shariff-Marco et al. (2015) found high education and advantaged neighbourhoods reduced mortality in non-Latina white women, while disadvantaged neighbourhoods increased it [43].

Further additional intersections

Study	Some takeaway insights	Intersecting factors
Assari et al (2017)	Being unmarried is associated with major depressive disorder risk in all Black gender groups, except in Caribbean Black men.	Social capital and ethnicity/race and sex/gender
Bostwick et al (2014)	Combined racial, gender, and sexual orientation discrimination significantly increases mental health disorder odds.	Sexuality and ethnicity/race and sex/gender

Table 4. Overview of some of the intersectional insights from the included studies that focused on additional intersections that did not fall under 'ethnicity/race and sex/gender' or 'ethnicity/race and sex/gender and socioeconomic status'.

Various findings were reported that included less common sociodemographic factors. Curry et al (2021) found that sexual identity, when considered alongside ethnicity and gender, led to more pronounced disparities. Hispanic/Latinx females who identified as sexual minorities had much higher odds of developing asthma compared to their heterosexual counterparts, a pattern that was reversed for non-minority females [44]. The same study also found gay males had an increased chance of non-remitting asthma compared to heterosexual males [44]. Ahmed et al. (2022) found that language and education level influenced diabetes risk differently across ethnic groups. White

females with lower income and who spoke Spanish had higher rates of diabetes compared to their English-speaking counterparts. Black females in the same income bracket, however, faced the highest risk of developing diabetes regardless of language. Interestingly, having higher education or income did not necessarily correlate with improved health outcomes for Asian, Black, or South Asian men, further highlighting the complex interaction between SES, ethnicity, and health outcomes [45]. Assari et al (2017) found that in all Black gender groups being unmarried is associated with the risk of major depressive disorder, except in Caribbean Black men, further underlining the gendered nuances in mental health [46]. Bostwick et al (2014) found that combined racial, gender, and sexual orientation discrimination significantly increased mental health disorder odds [47].

Discussion

Intersectionality, as a theoretical framework, has gained attention in health, particularly in understanding health disparities and inequalities [48]. While this review was not designed to provide direct guidance on trial design or redressing inequalities, identifying patterns in how overlapping sociodemographic factors relate to health outcomes offers an important first step for informing more inclusive research practices. Findings highlighted complex interactions between sociodemographic factors such as ethnicity, sex, gender, and SES and the current landscape of research addressing their impact on health outcomes. The findings underscore the interplay of sociodemographic factors and the context-specific approaches needed to address health inequalities. There are two key takeaways from the review:

1. People who belong to intersectional sociodemographic groups which are typically associated with being under-served in research, tend to have poorer health outcomes. In the UK, such examples include minoritised ethnic groups, women, and people with experience of socioeconomic disadvantage. However, there was no single pattern. Although belonging to multiple under-served groups may be more detrimental to health, this was not always the case.
2. To fully understand the relationship between sociodemographic factors and health inequalities, findings must be examined in light of the specific social, political, and economic settings in which they occur. While we did not examine underlying mechanisms in depth, the review found that across conditions, intersectionality generally contributed negatively to health outcomes. Predominantly, the studies found a relationship between poorer health and holding more than one ‘disadvantaged’ or ‘under-served’ identity.

Health inequalities manifest along various axes, such as sex and gender identity, age, ethnicity, socioeconomic experience, geographic location, sexual orientation, religion and disability. Intersectionality sheds light on how these disparities compound and are shaped by systemic discrimination and historical power imbalances. For instance, it provides some explanation for why it was found in this review that Black women with low-income have a higher prevalence of hypertension (32), or why females who hold both an underserved sexual and ethnic identity are more likely to have asthma (42), or why a combination of racial, gender, and sexual orientation discrimination can increase odds of mental health disorders (45). This review underscores the notion that various forms of discrimination can compound, intensifying the effects of multiple broad social and structural influences simultaneously, like racism, sexism, and classism. The combined effects of these disadvantages may therefore be what is leading to greater health inequalities.

This review revealed nuanced patterns of disparities. In the context of the United States, general health indicators often show better outcomes for white people compared to Black, Native Americans, and Hispanic/Latinx people [49]. Men are generally seen to hold a more advantageous social status than women [50]. Yet, this review found instances where being part of traditionally advantaged groups, such as being white and identifying as a man, was associated with worse health outcomes. These findings must be interpreted carefully, as social pressures vary across groups. For instance, Hispanic/Latinox people may be less likely to report mental illness due to perceived stigma in their communities [51].

Most included studies were published from 2019 onwards, which may reflect growing interest in intersectionality following major global events such as the COVID-19 pandemic and the murder of George Floyd in the US. This shift may have influenced the types of patterns and populations prioritised in recent research. However, this research did not address whether any specific intersecting factors have a greater influence on certain health outcomes and therefore require more focus in research design. Although the sociodemographic factors of race or ethnicity, sex or gender, and SES emerged as more commonly studied intersections, this does not necessarily indicate they are the most impactful or that they should always be prioritised. The context of the study is particularly important, as the unique social, and demographic conditions surrounding each study may better inform which intersections deserve closer attention.

The significance of intersectionality in addressing health inequalities, as emphasised in this review, cannot be overstated. Clinical trials generate the evidence that underpins the effectiveness and safety of healthcare; they need to therefore include diverse participants if they are to contribute to healthcare for everyone. Inclusive research helps address health disparities by acknowledging the

interplay of sociodemographic factors. This review included only observational studies, such as cross-sectional surveys and cohort designs. No interventional studies met the inclusion criteria, which reflects a gap in the existing evidence base. Through intersectionality, researchers can design trials that are better tailored to the needs of under-served groups, who often face compounded health challenges. Interventional studies would add important insight into how different groups respond to treatments and remain an area for future research.

By identifying which groups may be most affected by specific health issues, researchers can create studies that are reflective of real-world diversity, ensuring that medical treatments and healthcare services address the needs of those most impacted. We focused this review on race/ethnicity, sex/gender, and socioeconomic status to offer a practical entry point for trial teams aiming to apply intersectional thinking. These characteristics are already supported by frameworks designed to guide inclusive research, and centring them in this review helps build a clearer bridge between evidence and action. This approach does not capture the full spectrum of intersecting identities, but it highlights how even a focused lens can expose meaningful patterns that warrant attention in trial design.

Strengths and limitations

A strength of this review is the inclusion of studies spanning multiple health conditions and outcomes. This supports a broader understanding of how sociodemographic factors shape health, aligning with the growing use of intersectionality to understand disparities [48] [52]. Furthermore, the review's focus on developed economies offers a context-specific approach to the effect of intersectionality on health inequalities. The decision to include only studies published from 1989 onwards, postdating the coining of the term 'intersectionality,' ensures that the research is grounded in the contemporary application of this theoretical framework. Also, extracting insights from discussion sections supported a more nuanced analysis of how intersectionality is interpreted and discussed within the published literature. This approach helped ensure that the findings reflected author interpretations and the wider context in which results were discussed.

However, a few limitations should be acknowledged. Firstly, the search strategy focused on databases and sources in English, potentially introducing language bias. The restriction to empirical research studies published from 1989 onward, aligned with the coining of the term intersectionality, may have excluded earlier relevant works. Thirdly, the decision to include only research conducted in developed economies, guided by the WESP classification [18], will limit the applicability of findings to other socioeconomic contexts. This choice, driven by the intended application of results to the United Kingdom, might not fully capture the global landscape of intersectionality and health

inequalities. Most studies in this review were conducted in the United States, which may limit the generalisability of findings to other contexts. For example, the US healthcare system's reliance on private insurance creates specific access barriers that are less common in countries with universal healthcare systems, such as the UK [53].

The eligibility criteria, while designed to ensure relevance to the scoping review question, might inadvertently exclude valuable studies that do not explicitly use the term "intersectionality". As the review was completed in 2023, it is possible that more recent eligible studies have since been published. A focus on discussion sections may have introduced bias, as these reflect author interpretations rather than objective findings. This may have influenced which intersectional patterns were reported and how they were framed. Finally, the eligibility criterion requiring studies to include sex/gender and race/ethnicity, and/or socioeconomic status may have excluded studies addressing other intersecting factors.

Implications and future directions

By summarising the literature on health experiences and inequalities across intersecting factors, this review establishes why intersectionality cannot be ignored if we want to design research that reflects and responds to real-world inequalities. We recognise there are methodological challenges in applying intersectionality, including selecting which factors to include and how to explore their overlap without misrepresenting results. As this scoping review aimed to map existing patterns across multiple sociodemographic characteristics, it did not explore reasons for current evidence gaps. However, this remains an important area for future work. Researchers and trial teams should be encouraged to reflect on how structural and social factors shape health outcomes, as doing so can lead to better decisions in trial design and support research that is more inclusive and relevant to those most affected by health inequalities.

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Appendices

Appendix 1: List of included studies

#	Author and year	Study title	Health conditions and outcomes	Social identities & positions of interest	Location	Sample size	Study design
1	Veenstra et al, 2020	Asian-White Health Inequalities in Canada: Intersections with Immigration	Self-reported hypertension and diabetes	Race; gender; immigrant status	Canada	611919	Quantitative
2	Brennan et al, 2022	Association of Race, Ethnicity, and Rurality With Major Leg Amputation or Death Among Medicare Beneficiaries Hospitalised With Diabetic Foot Ulcers	Major leg amputation or death during the index hospitalisation or within 30 days after hospital discharge.	Race/ethnicity; rurality; neighbourhood disadvantage	USA	124487	Quantitative
3	Kanchi et al, 2018	Gender and Race Disparities in Cardiovascular Disease Risk Factors among New York City Adults: New York City Health and Nutrition Examination Survey (NYC HANES) 2013-2014	Prevalence of cardiovascular disease risk factors (relevant factors including diabetes, hypertension and hypercholesterolemia)	Race/ethnicity; gender	USA	1527	Quantitative
4	Gagne & Veenstra, 2017	Inequalities in Hypertension and Diabetes in Canada: Intersections between Racial Identity, Gender, and Income	Self-reported hypertension and diabetes	Race/ethnicity; gender; income	Canada	613909	Quantitative
5	Ahmed et al, 2022	Moderation of the Association between Primary Language and Health by Race and Gender: An Intersectional Approach	Diabetes	Race; gender; income	USA	437436	Quantitative
6	Veenstra, 2013	Race, gender, class, sexuality (RGCS) and hypertension	Presence of hypertension	Race; household income; education; sexual orientation	USA	90310	Quantitative
7	Curry et al, 2021	Asthma Remission Disparities Among US Youth by Sexual Identity and Race/Ethnicity, 2009-2017	Non-remitting asthma	Race; gender; sexual identity	USA	129196	Quantitative

8	Curry et al, 2020	Lifetime asthma prevalence and Correlates Among US Youths by Sexual Identity and Race/Ethnicity, 2009-2017	Lifetime asthma	Race; sex; age; region	USA	307303	Quantitative
9	Bostwick et al, 2014	Discrimination and Mental Health Among Lesbian, Gay, and Bisexual Adults in the United States	Past year mental health disorder	Race/ethnicity; gender; sexual identity	USA	34652	Quantitative
10	Evans & Erickson, 2019	Intersectionality and depression in adolescence and early adulthood: A MAIHDA analysis of the national longitudinal study of adolescent to adult health, 1995-2008	Depression	Gender, race/ethnicity, immigration status, and family income	USA	20745	Quantitative
11	Bergey et al, 2022	Mapping mental health inequalities: The intersecting effects of gender, race, class, and ethnicity on ADHD diagnosis	ADHD diagnosis	Child and household: race/ethnicity; gender; parent education level; income level	USA	138009 households	Quantitative
12	Robertson et al, 2021	Mental Health Disparities at the Intersections of Gender Identity, Race, and Ethnicity	Lifetime depression diagnosis	Race; gender	USA	939817	Quantitative
13	Assari et al, 2015	Race Attribution Modifies the Association Between Daily Discrimination and Major Depressive Disorder Among Blacks: the Role of Gender and Ethnicity	Major depressive disorder (MDD)	Race/ethnicity; gender	USA	5008	Quantitative
14	Alvarez et al, 2019	Race/ethnicity, nativity, and lifetime risk of mental disorders in US adults	DSM-IV diagnoses	Race/ethnicity; parental education; nativity	USA	21024	Quantitative
15	LoSchiavo et al, 2020	The Confluence of Housing Instability and Psychosocial, Mental, and Physical Health in Sexual Minority Young Adults: The P18 cohort study	Depression, anxiety, and posttraumatic stress	Race/ethnicity; sexual orientation; gender identity; education; income	USA	665	Quantitative
16	Jason & Erving, 2022	The Intersecting Consequences of Race-Gender Health Disparities on Workforce Engagement for Older Workers: An Examination of Physical and Mental Health	Multiple chronic conditions (MCC) with and without depression	Race; gender	USA	4250	Quantitative
17	Lin et al, 2022	Assessment of Structural Barriers and Racial Group Disparities of	COVID-19 mortality	Race; rurality; other social determinants of health	USA	3142 counties	Quantitative

		COVID-19 Mortality With Spatial Analysis		(SDOH) including socioeconomic factors			
18	Rushovich et al, 2021	Sex Disparities in COVID-19 Mortality Vary Across US Racial Groups	COVID-19 mortality	Race; gender; age	USA	COVID-19 death records	Quantitative
19	Chunara et al, 2021	Telemedicine and healthcare disparities: a cohort study in a large healthcare system in New York City during COVID-19	COVID-19 diagnosis	Race/ethnicity; gender; home zip codes	USA	90991	Quantitative
20	Martin et al, 2022	Disparities by Sex in COVID-19 Risk and Related Harms among People with Opioid Use Disorder	Positive COVID-19 test of patients hospitalised with opioid use disorder (OUD)	Race; sex	USA	2600	Quantitative
21	Pal et al, 2022	Gender and Race-Based Health Disparities in COVID-19 Outcomes among Hospitalized Patients in the United States: A Retrospective Analysis of a National Sample	Key outcomes for patients hospitalised for COVID-19	Race; sex	USA	1611152	Quantitative
22	Brouwer et al, 2022	Sociodemographic Survival Disparities for Lung Cancer in the United States, 2000-2016	Lung-cancer specific survival	Race/ethnicity; sex	USA	557555	Quantitative
23	Mcclendon et al, 2019	Cumulative Disadvantage and Disparities in Depression and Pain Among Veterans With Osteoarthritis: The Role of Perceived Discrimination	Osteoarthritis-related pain severity	Race; sex; income; education; disability	USA	2728	Quantitative
24	Madera et al, 2023	The Influence of Race, Sex, and Social Disadvantage on Self-reported Health in Patients Presenting With Chronic Musculoskeletal Pain	Edentulism and periodontitis	Race/ethnicity; gender; socioeconomic position (SEP) measured by poverty income ratio (PIR); nationality	USA	1193	Quantitative
25	Cheng et al, 2022	The intersections of socioeconomic position, gender, race/ethnicity and nationality in relation to oral conditions among American adults	Self-reported health in patients with chronic musculoskeletal pain	Race; biological sex; degree of social disadvantage (as measured by the 2018 Area Deprivation Index (ADI))	USA	> 50,000	Quantitative
26	Millard et al, 2015	Mortality differences and inequalities within and between 'protected characteristics' groups, in a Scottish cohort 1991-2009	Mortality	Race; age; sex; socioeconomic status; disability; religion	Scotland	5.3% of Scotland	Quantitative

27	Weiss, 2021	Contribution of socioeconomic, lifestyle, and medical risk factors to disparities in dementia and mortality	Dementia incidence	Race/ethnicity; educational attainment; occupation; gender	USA	16234	Quantitative
28	Lett et al, 2020	Intersectionality and Health Inequities for Gender Minority Blacks in the U.S.	Self-report of cardiovascular disease, pulmonary disease, arthritis, depressive disorders, and diabetes	Race; gender	USA	77446	Quantitative
29	Shariff-Marco et al, 2015	Intersection of Race/Ethnicity and Socioeconomic Status in Mortality After Breast Cancer	All-cause and breast cancer (BC) mortality	Race/ethnicity; individual SES level (measured via education); neighbourhood SES (nSES)	USA	9372	Quantitative
30	Hall et al, 2022	The Association of Socioeconomic Vulnerability and Race and Ethnicity With Disease Burden Among Children in a Statewide Medicaid Population	Prevalence of asthma, Type-2 Diabetes or ADHD	Ethnicity; socioeconomic status	USA	2874162	Quantitative
31	Patterson & Veenstra, 2016	Black-White health inequalities in Canada at the intersection of gender and immigration	Presence or absence of hypertension, diabetes and asthma	Racial identity; gender; immigration status	Canada	611919	Quantitative
32	Lett et al, 2021	Characterizing Health Inequities for the U.S. Transgender Hispanic Population Using the Behavioral Risk Factor Surveillance System	Chronic conditions - comparing history of cardiovascular disease, diabetes, pulmonary disease, arthritis, and depression	Race; gender	USA	97764	Quantitative
33	Assari 2017	Combined Racial and Gender Differences in the Long-Term Predictive Role of Education on Depressive Symptoms and Chronic Medical Conditions	Number of chronic medical conditions (hypertension, diabetes, chronic lung disease, heart disease, stroke, cancer, and arthritis)	Gender; race; age; education	USA	1129	Quantitative

Term	Meaning
Age	Number of years a person has been alive.
Sex	A classification assigned to a person at birth based on visual anatomy – male, female, or intersex [54]
Gender	A social identity that encapsulates various attributes, roles, behaviours, and attitudes within a given society or community. Someone's gender may include but is not limited to being a man, woman, or non-binary.
Race	A social construct determined by perceived physical differences, usually skin colour, for example, black, white, brown or mixed-race.
Ethnicity	An approach to grouping people based on common cultural characteristics such as nationality, geographical origin, language and religion.
Socioeconomic status	The categorisation of an individual or group of people by social and economic factors such as but not limited to personal income or household income, level of education, neighbourhood deprivation and occupation.
Country/Location	A country or area within a country where someone lives, resides or is originally from.
Sexual identity	A self-perception of who someone is sexually or romantically attracted to.

Appendix 2: Scoping review's definitions of included sociodemographic factors.

# ▲	Searches
1	exp *health inequities/
2	limit 1 to yr="1989 - 2023"
3	(health adj3 (ineq* or equit* or equalit* or disparit*)).tw.
4	limit 3 to yr="1989 - 2023"
5	2 or 4
6	intersectional framework/
7	limit 6 to yr="1989 - 2023"
8	intersect*.tw.
9	limit 8 to yr="1989 -Current"
10	7 or 9
11	5 and 10

Ovid **MEDLINE**(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions <1989 to 2023>

*Search conducted on 15 February 2023.

Appendix 3: Medline search strategy

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