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Systematic Review/Meta-analysis

Approaches to Comparing the Impact of Socioeconomic Disadvantage on Acute Myocardial Infarction Care Within and Across Countries: A Scoping Review

Leo E. Akioyamen, MD,[a] Dennis T. Ko, MD, MSc,[a,b,c,d] Peter Cram, MD, MBA,[d,e] and Bruce E. Landon, MD, MBA[f,g]

[a] Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada

[b] Schulich Heart Program, Sunnybrook Health Sciences Centre, Sunnybrook Research Institute Toronto, Ontario, Canada

[c] ICES, Toronto, Ontario, Canada

[d] Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto, Ontario, Canada

[e] Department of Medicine, UTMB, Galveston, Texas, USA

[f] Department of Health Care Policy, Harvard Medical School, Boston, Massachusetts, USA

[g] Division of General Medicine, Beth Israel Deaconess Medical Center, Boston, Massachusetts, USA

ABSTRACT

Background: Understanding how cardiovascular disease treatment and outcomes differ for socioeconomically disadvantaged patients across countries may reveal insights into the impact of countries' policy initiatives on health equity. However, methods of undertaking these studies are poorly characterized.

Methods: We performed a scoping review to identify studies describing between-country comparisons of socioeconomic inequalities in the care of acute myocardial infarction (AMI). We sought to determine the extent to which such comparisons have been conducted, the methodologies used, and outcomes assessed. We searched Medline from January 1, 2013 to September 30, 2023 for peer-reviewed English-language publications. Studies were included if they stratified patients by a measure of socioeconomic disadvantage (eg, race, ethnicity, income, education, occupation, immigrant status) and made comparisons between 2 or more countries.

Results: Our search yielded 4861 articles focused on patients with AMI, of which 7 met our inclusion criteria. Common individual-level

RÉSUMÉ

Contexte : Comprendre comment le traitement et les incidences des maladies cardiovasculaires diffèrent d'un pays à l'autre pour les patients défavorisés sur le plan socio-économique peut donner des indications sur l'impact des politiques publiques nationales sur l'équité en matière de santé. Toutefois, les méthodes utilisées pour réaliser ces études sont mal caractérisées.

Méthodes : Nous avons procédé à un examen approfondi de la littérature afin d'identifier les études décrivant des comparaisons internationales des inégalités socio-économiques dans la prise en charge de l'infarctus aigu du myocarde (IAM). Nous avons cherché à déterminer dans quelle mesure de telles comparaisons ont été effectuées, les méthodologies utilisées et les résultats évalués. Nous avons recherché dans Medline, du 1er janvier 2013 au 30 septembre 2023, les publications en langue anglaise et évaluées par les pairs. Les études ont été incluses si elles stratifiaient les patients selon une mesure de désavantage socio-économique (par exemple, la race, l'origine ethnique, le revenu, l'éducation, la profession, le statut d'im-

Across the globe, cardiovascular disease is the leading cause of morbidity and death.[1] This is particularly the case in high-income nations with well-established health care systems, where circulatory diseases contribute to more than one-third of deaths.[2] Nonetheless, the greatest burden of cardiovascular disease currently is in low- and middle-income countries,[3] which are experiencing increasing rates over time as modifiable risk factors become more common.[4] As many nations develop strategies to combat noncommunicable diseases,[5,6] there is burgeoning interest in understanding how different health care systems approach prevention and treatment of cardiovascular disease.

Traditional approaches for judging health system performance, exemplified by the Organization for Economic Cooperation and Development (OECD),[7] often involve evaluating disease-specific outcomes in the general population. However, general population data, such as those available from the OECD, typically lack the granularity to determine

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Corresponding author: Dr Bruce E. Landon, Department of Health Care Policy, Harvard Medical School, 180 Longwood Avenue, Boston, Massachusetts 02115, USA. Tel.: 617-432-3456.

E-mail: landon@hcp.med.harvard.edu

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proxies for disadvantage were self-reported income or education. In contrast, we found no cross-country comparisons focused on other measures of disadvantage such as race and ethnicity. There was marked heterogeneity in methods and thresholds used to define socioeconomic disadvantage at the individual level. All included studies found that patients with higher income and higher educational attainment had improved AMI outcomes.

Conclusions: Between-country comparisons of socioeconomic disparities in AMI outcomes are scarce and heterogeneous, but all identified studies relied on metrics of disadvantage including income and education that could be uniformly measured across countries. We found no articles addressing other types of inequities, likely because of significant methodologic challenges.

migrant, etc.) et établissaient des comparaisons entre deux pays ou plus.

Résultats : Notre recherche a permis de trouver 4 861 articles portant sur des patients atteints d'IAM, dont 7 répondaient à nos critères d'inclusion. Les variables de substitution courantes, au niveau individuel, pour les mesures du désavantage étaient le revenu ou l'éducation auto-déclarés. En revanche, nous n'avons pas trouvé de comparaison transnationale portant sur d'autres mesures de désavantage telles que la race et l'appartenance ethnique. Il existait une hétérogénéité marquée dans les méthodes et les seuils utilisés pour définir le désavantage socio-économique au niveau individuel. Toutes les études incluses ont montré que les patients ayant un revenu et un niveau d'éducation plus élevés avaient de meilleurs pronostics lors d'un IAM.

Conclusions : Les comparaisons internationales des disparités socio-économiques concernant les pronostics de l'IAM sont rares et hétérogènes, mais toutes les études identifiées se sont appuyées sur des indicateurs de désavantage tels que le revenu et l'éducation, qui peuvent être mesurés de manière uniforme d'un pays à l'autre. Nous n'avons trouvé aucun article traitant d'autres types d'inégalités, probablement en raison d'importants défis méthodologiques.

the extent to which countries achieve equitable health outcomes for socioeconomically disadvantaged populations, whether measured by race, ethnicity, location, or other measures of socioeconomic status. Understanding how treatment and outcomes differ for more vs less socioeconomically disadvantaged patients can provide insights into the varying impacts of health system factors on individuals as well as the overall functioning of a health care system. Moreover, these patterns may highlight policy initiatives effective in promoting health equity in different populations within and across countries. Despite these potential benefits, consistent methods for conducting international comparisons of health disparities resulting from socioeconomic disadvantage are yet to be elaborated.

Many studies have examined disparities in cardiovascular disease outcomes among particular population subgroups within individual countries. However, these country-specific analyses identify socioeconomically disadvantaged populations pertinent to their historical, geopolitical, or demographic contexts and may not be applied readily to other countries. For example, studies from the United States have generally focused on race- or ethnicity-based comparisons of disparities such as comparisons of care delivered to Black or Hispanic people compared.

with White people,[8-10] but such comparisons might not extrapolate to countries with fewer or greater numbers of Black or Hispanic residents or those without a similar historical legacy of slavery and institutional racism.[11] Similarly, studies in Australia and New Zealand focus on aboriginal and Torres Straight populations,[12] whereas studies from Scandinavia focus on the Sami,[13,14] which are less relevant in other countries. Consequently, comparing socioeconomic disparities across countries requires identifying socioeconomically disadvantaged populations in a manner that transcends geopolitical borders.

To date, there have been no comprehensive summaries of international comparisons of socioeconomic disparities in cardiovascular treatment and outcomes, or the methods used to undertake these investigations, including the outcomes assessed in such studies. Such a summary could be useful both for advancing methods for performing comparative studies across countries and improving our understanding of the limitations of usual country-specific approaches. We therefore performed a scoping review of the literature describing between-country comparisons of socioeconomic and other inequalities in the management of patients with acute myocardial infarction (AMI). Our objectives were to understand the landscape of research comparing socioeconomic disparities in treatment of AMI across countries and to describe methodologic approaches to identifying and comparing socioeconomically disadvantaged populations across different countries/health systems, including the outcomes assessed (eg, mortality, readmissions, treatment processes). We focused on AMI because it is a prototypical cardiovascular condition and a leading cause of mortality in both high-income and low- to middle-income countries.

Methods

We followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses Extension for Scoping Reviews (PRISMA-ScR) consensus statement in this study's design and reporting.[15] A detailed protocol for this systematic review is provided in the Supplementary Material.

Search strategy

With the assistance of a research librarian with experience supporting systematic reviews, we developed a comprehensive search strategy to identify cross-country comparisons of socioeconomic disparities in treatment and outcomes of AMI among high-income countries (typically those within the OECD). Our searches leveraged high-sensitivity filters developed for core concepts[16-18] as well as database-specific subject headings and text words. To identify relevant contemporary citations, we searched Ovid MEDLINE from January 2013 to September 2023. Limits were imposed on our searches to

select English-language publications in human participants. Reference lists of eligible studies were also screened for additional citations and relevant studies were included, even if published before 2013. Results from the search were deduplicated, and citations were uploaded to a secure internet-based platform for screening (Covidence, Veritas Health Innovation, Melbourne, Australia). The database search strategy is provided in Supplemental Table S1.

Eligibility criteria

We included observational studies in adults (aged $\geq$ 18 years) reporting data related to the diagnosis, treatment, or outcomes of patients with myocardial infarction. To be eligible, studies were required to compare 2 or more countries by measures of socioeconomic disadvantage after stratifying individual patients within a country by 1 or more of the following measures of socioeconomic disadvantage: education, income, occupation, social class, inequality, deprivation, race, ethnicity, immigration status, language proficiency, or Indigenous status. Studies were required to include 1 or more outcomes of interest that included disease incidence, mortality, or readmissions. Secondary outcomes were collected if available and included the use of treatments indicated in the management of patients with myocardial infarction. This included use of medical therapies (eg, antiplatelets) and invasive diagnostic procedures and treatment (eg, cardiac catheterization, revascularization).

We excluded nonhuman studies, case reports, conference abstracts or proceedings, and systematic or narrative reviews. Finally, we also excluded studies considering only country-level measures of socioeconomic disadvantage (eg, the Gini index)[19] without within-country comparisons made at the individual level.

Study selection, data extraction, and synthesis

Following the removal of duplicate citations, titles, and abstracts were reviewed for potential eligibility using the aforementioned criteria. The remaining articles were selected for a full-text review and scrutinized in duplicate by independent reviewers (B.L., L.A., P.C.). Disagreements were resolved by discussion. We extracted data including details on general study characteristics (year, demographic information, methodologic approach); information about data sources and measures of socioeconomic disadvantage used; and information on the outcomes in the study. Given the anticipated heterogeneity of the data, we decided a priori to synthesize our findings narratively. We also present summaries of included studies and key variables in tabular format.

Results

Study selection

Our search identified 4861 unique citations (Fig. 1). Following the title and abstract review, 4821 were excluded, leaving 40 articles for full-text review. Of these, 7 met the final criteria for inclusion.[20-26]Among articles excluded after full-text review, 15 did not compare countries using a metric of socioeconomic disadvantage, 13 did not make international comparisons, 3 were systematic reviews, 1 did not make comparisons at the individual level, and 1 study failed to include a prespecified outcome.

Characteristics of included studies

Table 1 describes characteristics of studies describing between-country comparisons of socioeconomic disparities in myocardial infarction treatment and outcomes. Regarding study design, 4 were prospective cohorts,[22,23,25,26] and 3 were cross-sectional.[20,21,24] The number of countries included in individual studies ranged from 2 to 20; the most frequently included countries were the United States (n = 4) and the UK (n = 3), Finland (n = 3), France (n = 3), and Sweden (n = 3). The data sources used by included studies (Supplemental Table S2) were population-based health surveys (n = 4),[20,22,23,26] administrative claims databases (n = 2),[21,24] and post hoc analyses of prospective cardiovascular disease registries and cohorts (n = 1).[25] Studies included patients accrued between calendar years 1982 and 2018. The only measures of socioeconomic disadvantage assessed at the individual or small area level were income and wealth (n = 6)[20–25] and education (n = 5).[20,22,23,26,27] No studies classified individuals or small areas based on race, ethnicity, immigration status, Indigenous status, language proficiency, occupation, or other similar measures.

Metrics used for cross-country comparisons of socioeconomic disparities in AMI outcomes

Income. Table 2 describes methods used to identify socioeconomically disadvantaged populations based on income. Although the majority of studies (n = 5) ascertained household income using self-report,[20,22,23,25] a small number of studies leveraged administrative databases to derive area-based measures of income (n = 2).[21,24] Among studies using income as a measure of socioeconomic disadvantage, there was marked heterogeneity in how income strata were generated and defined. Three studies divided participants into tertiles,[20,22,25] whereas 2 placed participants into deciles.[21,24] Only 1 study used specific income cutoffs based on US dollar values.[23] No study attempted to define income levels across countries according to a common metric such as purchasing power parity; rather, the income metrics were all defined within a country with high- and low-income strata then compared across countries.

Education. Among the 5 studies using education to identify socioeconomically disadvantaged populations (Table 3),[20,22,23,25,26] there also was marked heterogeneity in how educational levels were ascertained and how strata were constructed. Some studies measured education using the total years of schooling (n = 3),[20,22,26] whereas others categorized education using stages completed (eg, primary, secondary education, university).[22,25] Only 1 study[22] categorized individuals using a validated international classification system (ie, the International Standard Classification of Education).[28] All studies measured education at the individual level, ascertained through self-reports.

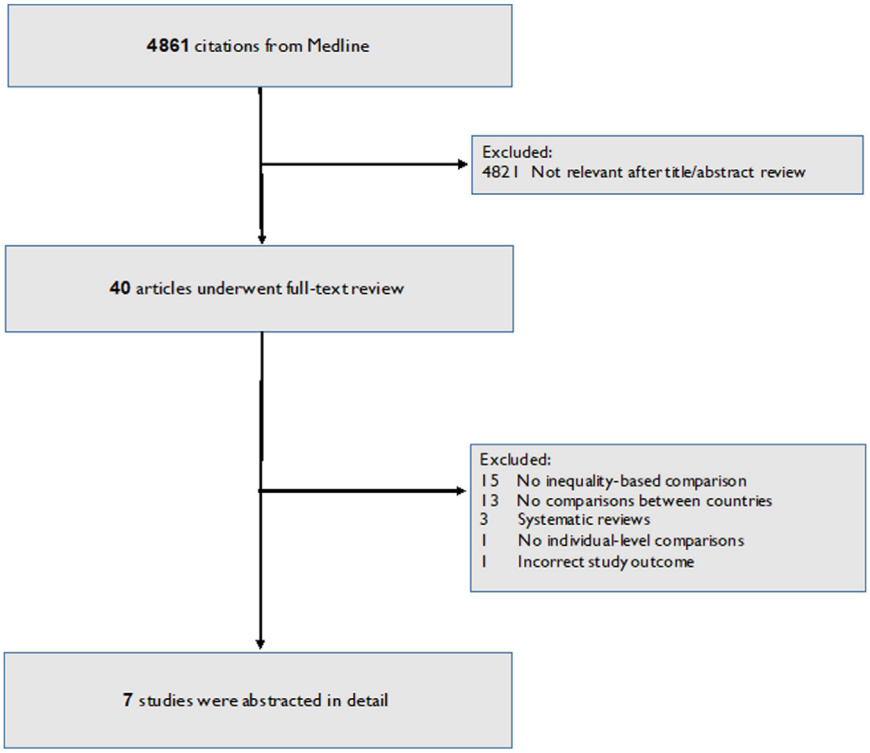

Figure 1. Flow of studies evaluated in systematic review.

Definitions and measurement of outcomes and study findings

The most commonly used method (n = 4) to ascertain myocardial infarction outcomes was self-report (Table 4).[20,22,23,25] Two studies supplemented these reports with review of hospital records and physician notes.[23,25] Three studies identified outcomes using data from national registers or administrative claims databases.[21,23,24] Regarding our primary outcomes, 2 studies examined myocardial infarction incidence,[20,23] whereas 5 examined mortality and other adverse outcomes. With respect to secondary outcomes, 1 study examined disparities in readmission or use of invasive procedures (ie, cardiac catheterization, revascularization).[24] No studies reported on the use of medications in patients with myocardial infarction.

Included studies found variable relationships between income and myocardial infarction outcomes. One study comparing the US and England found a larger inverse association between the incidence rate of myocardial infarction and income in the US than in England.[20] By contrast, Kucharska-Newton and colleagues[23] studied myocardial infarction incidence in the US and Finland and found greater incidence of myocardial infarction in low-income US women but not men. In addition, no differences were found in the Finnish cohort by income. Only 1 study examined longer-term outcomes of individuals after sustaining a myocardial infarction; Landon and colleagues[24] found greater 30-day and 1-year mortality among low-income individuals who sustained a myocardial infarction in 6 countries. The absolute difference for 1-year mortality between low-income and high-income quintiles were highest in Israel (9.1% difference for non–ST-elevation myocardial infarction [NSTEMI] and 6.7% difference for ST-elevation myocardial infarction [STEMI]).[24] This contrasts findings of the **P**rospective **U**rban **R**ural **E**pidemiology (PURE) study, which found weak associations between household wealth and cardiovascular mortality in 20 countries.[25]

Lower education was consistently associated with greater incidence of myocardial infarction and poorer outcomes.[20,22,23,25,26] In addition, lower education was associated with greater cardiovascular mortality in 3 studies representing more than 30 countries.[23,25,26] No identified studies examined associations between education and treatment of myocardial infarction.

Discussion

This scoping review examining cross-country comparisons of socioeconomic disparities in the management of AMI revealed several key findings and provides important insights into potential approaches for conducting such studies. First, all identified papers defined strata of socioeconomic disadvantage either based on family income (measured either at the household or area level) or educational attainment (measured using a variety of approaches); however, there was significant heterogeneity how strata of socioeconomic disadvantage were generated and how income and education were defined. Second, there were no examples of papers that defined socioeconomic disadvantage based on other commonly used metrics for studying within-country disparities including race

Table 1. Characteristics of studies included in systematic review

Author (year)	Study design	Countries included	Data sources	Accrual period	Study objective	Inequality metric
Banks et al.[20] (2006)	Cross-sectional	England, US	Longitudinal health survey	1999-2003	To compare measures of morbidity according to 2 measures of SES in nationally representative samples in the United States and England	Education Household income
Emanuel et al.[21] (2021)	Cross-sectional	Australia, Austria, Canada, Denmark, Finland, France, Germany, Japan, Netherlands, Norway, Sweden, Switzerland	Census data OECD data Administrative claims	2013-2015	To assess whether the health outcomes of White US citizens living in the 1% and 5% richest counties are better than those of average residents in other developed countries	Household income (county level)
Hassen et al.[22] (2020)	Prospective cohort	Belgium, France	Longitudinal health survey	2011-2017	To identify the socioeconomic determinants and behavioural risks of CVD among older adults in Belgium and France	Education Household income
Kucharska-Newton et al.[23] (2011)	Prospective cohort	Finland, US	Longitudinal health survey	1987-2001	To determine whether a gradient of low SES was present in 2 population-based cohorts	Education Household income
Landon et al.[24] (2023)	Cross-sectional	Canada, England, Israel, Netherlands, Taiwan, US	Population-based administrative data	2013-2018	To determine whether treatment patterns and outcomes for patients presenting with acute myocardial infarction differ for low- vs high-income individuals across 6 countries	Regional income
Rosengren et al.[25] (2019)	Prospective cohort	Argentina, Bangladesh, Brazil, Canada, Chile, China, Colombia, India, Iran, Malaysia, Pakistan, Palestine, Poland, Saudi Arabia, South Africa, Sweden, Tanzania, Turkey, UAE, Zimbabwe	CVD registry	2001-2017	To explore the association between education and household wealth and CVD and mortality and assess which marker is the stronger predictor of outcomes	Education Household wealth index Country income
Veronesi et al.[26] (2016)	Prospective cohort	Denmark, Finland, France, Germany, Italy, Lithuania, Poland, Russia, Sweden, UK	Longitudinal health survey	1982-2010	To estimate the burden of social inequalities in coronary heart disease and to identify their major determinants in 15 European populations	Education

CVD, cardiovascular disease; OECD, Organization for Economic Cooperation and Development; SES, socioeconomic status; UAE, United Arab Emirates.

Table 2. Descriptions of income strata used in eligible studies

Author (year)	Measure	Source	Ascertainment	Strata
Banks et al.[20] (2006)	Household income	Self-report	Individual	Tertiles of household income (low, medium, high) so that one-third of the population was in each group
Emanuel et al.[21] (2021)	Median household income (county-level)	Census OECD	County level	1% highest-income counties 5% highest-income counties
Hassen et al.[22] (2020)	Household income	Self-report	Individual	Quantiles (upper, middle, and lower one-third)
Kucharska-Newton et al.[23] (2011)	Household income	Self-report Statistics Finland	Individual	Low (< 15,999 USD) Medium (16,000-34,999 USD) High (35,000+ USD)
Landon et al.[24] (2023)	Regional income	Administrative data sources	Area level*	Poorest (patients living in areas with the lowest 20% of income distribution) Wealthiest (patients living in areas with the top 20% of income distribution)
Rosengren et al.[25] (2019)	Household wealth index	Self-report	Individual	Categorized into thirds (low, middle, highest) of the overall study population by an index on the basis of ownership of assets and housing characteristics

OECD, Organization for Economic Cooperation and Development; USD, United States dollar.
*Defined by 5-digit zip code.

and ethnicity, immigrant status, language proficiency, Indigenous status, or composite measures of disadvantage. Third, the types of data sources leveraged to identify socioeconomically disadvantaged populations and assess outcomes were diverse (eg, longitudinal health surveys, administrative databases, cardiovascular disease registries). Finally, in nearly all studies, greater socioeconomic disadvantage was found to be associated with poorer cardiovascular disease outcomes. Our review reveals that despite the large literature examining disparities in care of AMI, there has been scant attention paid to assessing the consistency of socioeconomic disparities across different countries and their respective health systems.

The lack of studies examining socioeconomic disparities in care as defined by commonly used measures of socioeconomic disadvantage such as race and ethnicity, immigrant status, or language proficiency serve to highlight several challenges when trying to use such metrics across countries that make their use impractical. First, definitions of underserved populations differ markedly across countries. In the United States, studies often focus on Black race or Hispanic ethnicity.[8-10] Yet, focusing on Black race in a country such as Japan (with almost no Black population) or Nigeria (with few non-Black individuals) would not be useful; majority and minority racial and ethnic groups are highly country specific. Similarly, other socioeconomically disadvantaged populations are most relevant to a specific country, such as the Arab population in Israel[29] or the Rohingya in Myanmar.[30] Second, even Indigenous populations such as the Maori in New Zealand, Aboriginals in Australia, or First Nations in Canada are not necessarily equivalent, as each has their own distinct, cultural, linguistic, or historical identities.[31] Finally, even for measures that might be measurable across countries such as native

Table 3. Descriptions of educational strata used in eligible studies

Author (Year)	Source	Ascertainment	Strata
Banks et al.[20] (2006)	Self-report	Individual	United States Low: high school or less (0-12 years of schooling) Medium: more than high school but not a college graduate (13-15 years of schooling) High: college or more (≥16 years of schooling) England Low: O-level (0-11 years of schooling) Medium: A-level or equivalent (12-13 years of schooling) High: Higher qualification (> 13 years of schooling)
Hassen et al.[22] (2020)	Self-report	Individual	Low (ISCED level 0-2; early childhood to lower secondary education) Medium (levels 3 and 4; upper secondary to postsecondary nontertiary education) High (levels 5 and 6; short-cycle tertiary education to doctoral or equivalent)
Kucharska-Newton et al.[23] (2011)	Self-report Statistics Finland	Individual	Low (< 9 years of formal education) High (10+ years of formal education)
Rosengren et al.[25] (2019)	Self-report	Individual	Lowest (primary school education only) Intermediate (secondary school education) Highest (completion of trade school, college, or university)
Veronesi et al.[26] (2016)	Self-report	Individual	Tertiles (high, medium, low) based on population-specific, sex-specific, and birth cohort specific distributions of the total years of schooling

ISCED, International Standard Classification of Education.

Table 4. Outcomes of included studies

Author (year)	Participant characteristics	Countries Compared	Inequality Metric	Outcomes	Outcome ascertainment	Principal findings	Key limitations
Banks et al.[20] (2006)	Residents aged 55 to 64 years from nationally representative samples in population-based health surveys	England, US	Education Household income	MI incidence	Self-report	In both England and the US, greater educational attainment was associated with lower incidence of MI.	• Restricted to non-Hispanic White populations. • Health surveys use patient self-reports. • Only prevalent disease considered.
Emanuel et al.[21] (2021)	White citizens living in the 1% and 5% highest-income counties in the US whose outcomes were compared with residents in 12 other developed countries	Australia, Austria, Canada, Denmark, Finland, France, Germany, Japan, Netherlands, Norway, Sweden, Switzerland	Household income	AMI mortality (30-day)	OECD data Patient-level data from Medicare fee-for service claims	The age- and sex-standardized 30-day mortality rate for Americans living in the wealthiest 1% of counties was substantially higher than for average citizens in Norway and Denmark.	• Restricted to White populations. • Only the wealthiest 1% and 5% of US citizens considered. • Area-based measure of income could result in misclassification of individuals. • Estimates for AMI mortality limited to age $\geq$ 65 years.
Hassen et al.[22] (2020)	A population-based sample of community- dwelling adults aged 50 years and older and their partners with no history of CVD at enrollment.	Belgium, France	Education Household income	CVD (MI, stroke) incidence	Self-report	In Belgium and France, being in the upper tertile of education or income were associated with lower adjusted odds of CVD relative to individuals in lower tertiles. There was no significant variation in the effect sizes among the countries.	• Used patient self-reports for education, income, and outcome reporting. • Data capture disease prevalence for outcomes of interest. • Did not separate distinct disease entities (eg, MI from stroke).
Kucharska-Newton et al.[23] (2011)	Population-based samples of adults aged 45 to 64 years without history of coronary heart disease.	Finland, US	Education Household income	MI incidence SCD (28-day) NSCD (28-day)	Interviews Physician/coroner questionnaires Review of medical records Death certificate information National registers	In adjusted analyses, low income was associated with greater adjusted hazards of nonfatal MI in US women but not men. Adjusted analyses showed no difference in the risk of MI by income in Finland. In both the US and Finland, low education was associated with a greater adjusted risk of nonfatal MI.	• Used self-report data for ascertaining income in ARIC. • No specific income cut-points could be established for FINRISK because of data limitations. • Recruitment in both ARIC and FINRISK were limited to select geographic regions within the country.

Continued

Table 4. Continued.

Author (year)	Participant characteristics	Countries Compared	Inequality Metric	Outcomes	Outcome ascertainment	Principal findings	Key limitations
Landon et al.[24] (2023)	Adults aged 66 years or older without history of MI who were hospitalized for at least 1 day with a primary diagnosis of STEMI or NSTEMI identified using population-representative administrative claims.	Canada, England, Israel, Netherlands, Taiwan, US	Regional income	Mortality (30-day and 1-year) CC Revascularization Length of stay Readmissions	Administrative claims	In all countries residents of lower income neighbourhoods had statistically significantly higher age/sex standardized 30-day and 1-year mortality than residents of lower income neighbourhoods. Residents of lower income neighbourhoods also were less likely to receive cardiac revascularization, had longer hospital length-of-stay and higher readmission rates.	• Administrative data lacked detailed clinical information on MI severity or treatments. • Area-based measures of income could potentially cause misclassification. • Limited to adults aged 66 years or older.
Rosengren et al.[25] (2019)	Community-dwelling adults aged 35 to 70 who were expected to remain in their community for at least 4 years	Argentina, Bangladesh, Brazil, Canada, Chile, China, Colombia, India, Iran, Malaysia, Pakistan, Palestine, Poland, Saudi Arabia, South Africa, Sweden, Tanzania, Turkey, UAE, Zimbabwe	Education Household wealth index Country income	CVD incidence CVD mortality (28-day)	Self-report (participants or family members) Verbal autopsies Physician review of documents	People in low and middle-income countries with less education had higher CVD incidence and mortality, but there was little association between household wealth and CVD.	• Used self-report data for ascertaining household wealth and education.
Veronesi et al.[26] (2016)	Middle-aged European adults free from CHD.	Denmark, Finland, France, Germany, Italy, Lithuania, Poland, Russia, Sweden, UK	Education	CHD mortality (28-day) First CHD event (fatal or nonfatal MI, unstable angina pectoris)	Hospital records	People with less education had higher CHD incidence and mortality than their most educated counterparts in all countries. Gradients were often larger in women than in men.	• Self-reports used to ascertain educational class and outcomes. • Did not distinguish between myocardial infarction and unstable angina. • Heterogeneity may have been introduced by disparate measures of education among countries.

AMI, acute myocardial infarction; ARIC, Atherosclerosis Risk in Communities; CC, cardiac catheterization; CHD, coronary heart disease; CV, cardiovascular; CVD, cardiovascular disease; FINRISK, Finnish Risk Study; HIC, high-income country; LMIC, low- to middle-income country; MI, myocardial infarction; NSCD, nonsudden cardiac death; NSTEMI, non−ST-elevation myocardial infarction; OECD, Organization for Economic Cooperation and Development; SCD, sudden cardiac death; SES, socioeconomic status; STEMI, ST-elevation myocardial infarction.

language proficiency or immigrant status, these data are rarely available in large datasets and—even when available—can be defined in a number of ways that may not be equivalent across countries. Similarly, we did not identify any studies that used composite measures of socioeconomic disadvantage (ie, the US Area Deprivation Index or the Canadian Marginalization Index, likely because these approaches tend to be country specific based on data availability in individual countries.

Measures of socioeconomic disadvantage based on either income or education constituted all of the studies identified in our systematic review. The finding that income and education comprised the entirety of the studies we identified comparing socioeconomic disparities across countries may be construed as evidence that these measures are more generalizable and can be measured in almost every country, whether through area-level measures, administrative databases, or self-report. There are important nuances, however, that researchers should consider when conducting international comparisons. Income generally can be measured at either the individual or household level or by using a broader area-level measure. Individual or household income might create more accurate classifications, particularly for working-aged people. However, there are several important limitations that should be considered. First, although correlated, income is not synonymous with wealth, as income typically refers to annual wages, whereas wealth pertains to total accumulated assets; relying solely on individual or household income could result in misclassification of social class. This is particularly the case for elderly populations that may report lower incomes despite substantial wealth assets. Second, individual assessments may mask important determinants of health and patterns of care that manifest better at an area level including the built environment, access to healthful food choices, exercise spaces, and local health care resources, including both numbers and the quality of available hospitals and providers. Finally, most researchers have chosen to focus on defining income-related disparities within countries instead of using a common income definition based on—for instance—purchasing parity. Importantly, other potential measures such as the degree of income (or wealth) inequality represented by the upper and lower income strata have not been explored in cross-country studies.

The studies that evaluated educational attainment as a predictor of myocardial infarction care were generally subject to similar methodologic challenges as those that used income. Interestingly, in the case of education, there are common international metrics (eg, the International Standard Classification of Education) that make it possible to use similar methods for creating strata across different countries.[28] Nevertheless, several of the studies we identified had chosen to identify strata using country-specific measures.

Limitations

Naturally, a scoping review conducted on a complex topic such as this bears several limitations. First, our database searches were limited to recent English-language publications identified in Medline. Although this made it feasible to present a focused review of the contemporary literature, it also made it possible that we may have missed some relevant publications. We offset this risk by using highly sensitive search filters[16-18] in electronic databases and conducting a careful hand search of bibliographies of retrieved articles for additional studies. Moreover, our focus on published manuscripts introduces the possibility of publication bias,[32] particularly if studies showing no relationship between income and education and myocardial infarction care are less likely to be published. Our searches were restricted to high-income nations comprising the OECD, making it likely that our study does not reflect approaches used to compare outcomes in low- or middle-income countries. In addition, our study focused on patients with AMI, and it is likely that there are studies of other disease conditions that could provide insight regarding cross-country comparisons of health disparities. Finally, there was significant heterogeneity among studies included in our systematic review. This applied to methods used to identify study populations, data sources employed by different studies (surveys, administrative data, registries), measures of inequality, and even outcomes of interest. In highlighting this heterogeneity, this review draws attention to the need for studies to devise standardized methods for making international comparisons of health disparities.

Conclusions

Our scoping review revealed a paucity of papers comparing country-level AMI treatment and outcomes socioeconomic disparities across 2 or more countries. These results highlight an opportunity for future research, as such papers will be crucial in guiding policy makers seeking to understand how well their health system mitigates socioeconomic disparities or the impact of health policies on disparities. Our results highlight the usefulness of universal measures such as income and education for performing such comparisons but also underscore methodologic issues involved for each. Finally, future research should focus on formalizing definitions for comparing socioeconomic disparities based on income or education across countries, developing common measures for inclusion in administrative databases, or developing definitions of socioeconomically disadvantaged populations that identify similar populations (eg, specific minority populations) that differ across countries.

Ethics Statement

This work is a scoping review of existing published literature so was considered not to be human subjects research.

Patient Consent

The authors confirm that patient consent is not applicable to this article. This was a scoping review of the literature and did not involve use of primary patient-level data.

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Supplementary Material

To access the supplementary material accompanying this article, visit the online version of the *Canadian Journal of Cardiology* at www.onlinecjc.ca and at https://doi.org/10.1016/j.cjca.2024.03.013.