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# Socioeconomic inequalities in health: the Nordic welfare state perspective

A systematic literature review

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## Abstract

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The persistence of socioeconomic inequities in health is one of the public health failures. In nations of all income levels, health and illness follow a social gradient: the lower the socioeconomic position, the worse the health. Despite broad universal welfare systems and progressive taxation, the Nordic nations have relatively high socioeconomic inequalities in health compared to other European countries (Friedman et al., 2021). These health disparities are severe, with differences in average life expectancy ranging from 5 to 10 years. In addition, the gap in disability-free life expectancy ranges from 10 to 20 years (Mackenbach, 2017; Kinge, Vallejo-Torres, and Morris, 2015). Especially in the light of the growing amount of evidence that the economic and health consequences of the COVID-19 pandemic are unequally distributed, it is vital to examine the current health care systems to identify and understand the existing structural disparities in health (Reme, Wörn and Skirbekk, 2022). This systematic review aims to assess socioeconomic inequalities in health from one Nordic welfare state: Finland. The reviewed studies were published between 2016 and 2022, examining the association between socioeconomic status (SES) and Finland's health or health care access. The studies present overwhelming evidence that socioeconomic inequalities in health exist in the country across the different aspects of the Finnish health care system.

Keywords: health inequalities, socioeconomic inequalities, Nordic welfare state, public health, health care systems, socioeconomic status

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# 1 Introduction

One of the major disappointments in public health is the persistence of socioeconomic inequities in health. Globally there are systematic disparities in mortality and morbidity between residents with greater and lower socioeconomic status (SES), as measured by education, occupation, income, or wealth (Mackenbach et al., 2008). This study is an overview of the recent research on socioeconomic inequalities in health assessed from the point of view of one Nordic welfare state- Finland.

The link between socioeconomic status (SES) and health has been established in many studies (Melchior et al., 2007; Sundquist, 2004; Adams et al., 2003). There exists a long tradition of medical and social science interest in this disparity as it dramatically diminishes the public health care systems (Blane, 1995). The reviewed studies were published between 2016 and 2022, examining the association between socioeconomic status and health or health care access in Finland. The three databases used to conduct this systematic literature search were PubMed, ScienceDirect, and Taylor and Francis Online. All together there was 12 studies included in the current review. The overview of the findings of the studies are discussed and assessed.

As the issue is directly related to the social context, politics, and culture, the review focused on one country. Considering the increasing economic inequality globally, the quality of health care systems cannot be described as stagnant, and to keep systems equal, high quality must the existing systems be examined and evaluated (Hughes, 2008; Reme, Wörn and Skirbekk, 2022). Furthermore, reducing health inequities is viewed as both an issue of social justice and a means of providing additional opportunities and better quality of life, particularly for the most disadvantaged.

## 2 Background

Understanding the relationship between SES and health is complex without one clear cause (Dover and Belon, 2019). Further, it is a challenging subject to research as it poses several methodological issues.

First, this chapter presents some of the key concepts used in this paper related to health inequalities, SES, and health research. Finally, in this chapter, the pervasiveness of SES for health inequalities is further explained in the European context, and further, the phenomenon of the Nordic paradox is explained.

### 2.1 Socioeconomic inequalities in health

Over the last three decades, studies have confirmed the existence of socioeconomic inequalities in a variety of health outcomes, including premature mortality, cardiovascular disease, obesity, diabetes, self-reported ill health, and smoking-related cancers, as well as investigated potential mechanisms linking lower socioeconomic position to poorer health (Lawlor and Sterne, 2007).

There exists a technical distinction between the terms "health inequality" and "health inequity," which is that health inequality refers to all inequalities, but health inequity only refers to those that are unnecessary, avoidable, unethical, and unjust (EuroHealthNet, 2021; Walters and Suhrcke, 2021). This review uses the two concepts of 'health inequalities' and 'health equity' interchangeably.

When health outcomes for distinct groups of people are detected to be worse, that is described as a health disparity (Diderichsen et al., 2012). In health care, many dimensions of disparities exist in various contexts. Globally, SES is one of the significant influencers of health disparities. Health disparities unnecessarily burden health care systems and are driven by underlying social and economic inequities (WHO, 2018; Perez-Escamilla, 2013).

Explicit definitions of the concepts are needed since not all health differences between groups of people are disparities. For instance, higher mortality among elderly than young people cannot automatically be described as a health disparity. The concept of a health disparity concerns the differences between the treatment and health outcomes of those who are more advantaged than those less advantaged due to their socioeconomic standing (Braveman, 2014).

## 2.2 Socioeconomic status

To better understand the relationship of socioeconomic status (SES) to health must, macroeconomic frameworks and social determinants, social surroundings, individuals' unique responses, and biological predispositions and processes be considered (Øversveen et al., 2017). SES is a social construct that impacts human experiences daily in diverse ways. In its most straightforward form, a person's SES is determined by their economic, social, and occupational standing concerning the rest of their community. Many different theories are proposed to explain better where a person may fall, but socioeconomic status is often divided into three tiers (high, middle, and poor). When categorizing a family or person, any or all three variables: income, education, and occupation, might be included. Additionally, SES combines various other socioeconomic variables, including age, sex, marital status, race, and ethnicity—all correlating with health in one context or another (Fuchs, 2004).

Health and sickness follow a social gradient in nations of all income levels: the lower the socioeconomic position, the poorer the health. A key concept for explaining the gradient has been the social determinants of health (SDH), understood as the social and economic factors shaping health outcomes at the individual and population levels (World, 2019). A social determinant of health describes a non-medical factor that influences individuals' health outcomes. SES is a social determinant of health, and it reflects three significant aspects of health: health care, environmental exposure, and health behaviour (Braveman et al., 2010). Lower socioeconomic status (SES) is associated with reduced access to

care, poorer health outcomes, and increased mortality and morbidity (Braveman and Gottlieb, 2014; McMaughan, Oloruntoba, and Smith, 2020).

Existing research recognizes the critical role played by SES in health disparities. However, the findings of studies looking at the role of SES and health disparities have produced mixed results. According to Shavers (2007), these factors include 1) a lack of precision and reliability of measures; 2) difficulties in collecting individual SES data; 3) the dynamic nature of SES over time; 4) the classification of women, children, retired, and unemployed people; 5) a lack of or poor correlation between individual SES measures; and 6) inaccurate or misleading interpretation of study results. The most appropriate variable or method for evaluating SES is determined by its relevance to the population and outcomes under investigation (Shavers, 2007). To reduce these limitations in the current review, the focus population is people living in Finland. Additionally, the articles' definitions of SES variables and how the data was collected in the studies are reported in the data extraction.

### 2.2.1 Fundamental Cause theory

To explain why social disparities in health (e.g., the socioeconomic gradient in mortality) persists despite medical innovation and illness eradication, Jo C. Phelan and Bruce G. Link developed the theory of fundamental causes in 1995. Since then, it has developed into the most cultivated theoretical explanation and most recognized social science framework examining the processes that lead to health disparities. Fundamental Cause Theory (FCT) operates within the social determinant perspective of health inequality research (Øversveen et al., 2017). According to Fundamental Cause Theory, social inequality is connected to health inequality, not only because of the restraints put on individuals of low status but also because of the health benefits obtained by those of high status.

Fundamental causes include a lack of access to resources that can be used to avoid risks or minimize disease consequences. According to Link and Phelan's rubric, three criteria qualify a disease caused as fundamental. For starters,

fundamental causes frequently result in multiple diseases. Second, multiple risk factors are determined by fundamental causes. Third, fundamental causes tend to persist. Despite its widespread influence, the idea is still substantially underutilized in practical and applied health disparities research (Hammad Mrig, 2020). This review utilizes FCT as part of the theoretical framework to discuss the findings. In short, the theory suggests that the processes that link SES to disease and death vary over time as individuals, households, and social groups employ unequally distributed SES-related resources to gain privileged access to protective variables and to assist in avoiding risk factors.

### 2.3 Health inequalities in the European context and the Nordic paradox

Even though past empirical literature gives various interpretations of the evidence, most studies conclude that average health is lower in more economically unequal countries. However, this link is not perfect since it is influenced by various causes (Lago et al., 2017). Even in the European region's high- and middle-income countries, individuals' and families' chances of thriving and having a healthy life are still heavily influenced by their socioeconomic circumstances. The research indicates a pervasive increase in societal inequality in health across Europe (Dahlgren and Whitehead, 2006). While the average level of health has continued to improve, significant disparities in health persist both between and within EU member states (Scholz, 2020).

All five Nordic countries, Finland, Denmark, Iceland, Norway, and Sweden have been considered the leading countries to reduce health care inequalities (Christiansen et al., 2018). These countries are recognized for employing the Social-democratic welfare state model, also known as the Nordic welfare model; there existing a great emphasis on equal access to health care (Iqbal and Todi, 2015).

However, the Nordic Paradox illustrates how the Nordic countries exhibit high health inequities compared to other European countries (Friedman et al., 2021; Bambra, 2011). Despite broad universal welfare systems and progressive

taxation that aim to redistribute money, which in theory should diminish health inequalities, the Nordic nations have relatively high socioeconomic inequalities in health (Mackenbach, 2012).

People with a lower level of education, occupational class, or income tend to die at an earlier age and have a higher frequency of various health conditions in the Nordics (Mackenbach et al., 2017). These health disparities are significant, ranging from 5 to 10 years difference in average life expectancy (Kinge, Vallejo-Torres, and Morris, 2015). Furthermore, 10 to 20 years difference in disability-free life expectancy (Mackenbach, 2017). Several reasons for the perplexingly high levels of health inequalities in the Nordics have been proposed from inequalities in, e.g., access to material and immaterial resources, social selection, and personal characteristics. Overall, it is a complex phenomenon to explain with no one clear cause. The Nordic Paradox continues to be a key topic to those concerned with reducing inequality, as it raises questions regarding health care policy and social support (Friedman et al., 2021).

### **3 Aim and Research question**

This systematic literature review examines the association between socioeconomic disadvantage and health in Finland. The review aims to provide further insights into the mechanics of SES that persist in creating health disparities and inequalities between patients in Finland by summarizing, presenting, and analysing previous findings.

The research question posed to be answered 1. In what way the SES facilitates health disparities in Finland?

## 4 Method

Reviews are used to offer overviews of current and historical knowledge obtained from literature. Reviews are used to offer overviews of current and historical knowledge obtained from literature. They frequently rely on published literature; typically, publications mentioned in a literature review have undergone blind peer-review. A literature review may comprise research papers that give facts and conceptual or theoretical literature that focuses on a topic (Aromataris and Pearson, 2014).

### 4.1 Systematic literature review

To answer the research question and meet the aim of this paper, a systematic literature review was chosen as the method of study. The research limitations chapter will discuss further why this method of study was preferred. A systematic literature review is a written summary and synthesis of the studies already undertaken within a specific area of re-search using prescribed methods (Jesson, Matheson, & Lacey, 2011). The formulation of a PICO (Participants, Intervention/Exposure, Comparison, and Outcome) was used to aid the stages of this process.

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<b>PICO</b>	
Participants	Adults, children, and families living in Finland
Intervention/Exposure	People in disadvantage due to low (SES)
Comparison	People not in disadvantage due to their (SES)
Outcome	Worse health outcomes

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## 4.2 Search strategy

This literature review was conducted by using three databases. The databases were chosen due to the topics they cover and further the easy access Metropolia UAS provides to these databases. The three databases used for the literature search were PubMed, ScienceDirect, and Taylor and Francis Online. These were chosen as they are substantial databases that cover the fields of social sciences and health research.

Several different search strings were tested before conducting the final searches for each database. The focus was on studies that covered the issues with lower socioeconomic status and health. These concepts were the foundation for the search string. The search words can be seen in the chart below and the limitations for the searches. No limitations were added regarding the age not to exclude relevant literature. For the search words, synonym research was conducted to find other suitable search words. An example of a final search string used in PubMed: (((((((poverty[Title/Abstract]) OR (poor[Title/Abstract])) OR (low-income[Title/Abstract])) OR (socioeconomic status[Title/Abstract])) OR (low socioeconomic[Title/Abstract])) OR (disadvantage\*[Title/Abstract])) AND (health\*[Title/Abstract])) AND (Finland[Title/Abstract])).

Low socioeconomic Free-text (Title OR abstract)	Health care Free-text (Title OR abstract)	Finland Free-text (title OR abstract)	Databases	Limit to
poor	Health*	Finland	All databases	Peer reviewed
poverty			ScienceDirect does not support the use of *	Published 2015 to 2020
low-income				English
socioeconomic status				
low-socioeconomic				
disadvantage*				

Table 2. The search words used in each database during the search procedure

### 4.3 Selection criteria

Before conducting the literature search, inclusion and exclusion criteria were determined, guided by the research question and the PICO method. Initially, the inclusion/exclusion criteria included criteria data collected after 2005. This was, however, changed in the initial trial searches as several studies were cohort studies data collection dating back even decades. This was done not to miss any relevant literature. The inclusion and exclusion criteria were developed in response to the research topic and the systematic review's objectives.

Inclusion criteria	Exclusion criteria
<b>Publication type</b> Articles published as a full text Peer-reviewed journal/research articles Published in English Published between 01.01.2010-31.12.2020	Thesis, books, PowerPoints, conference abstracts not peer reviewed etc. grey literature Published in other language Published outside the chosen dates
<b>Population</b> Low-income Living in relative poverty Adults, children, households, families Finland	Cross-national studies Country comparative studies
<b>Measure</b> Worse health outcomes Different level of care Diagnosis, treatment, and referral differences	Intervention studies testing an intervention method
<b>Design</b> Quantitative Qualitative Mixed methods	Literature reviews

Table 3. Inclusion and exclusion criteria

#### 4.4 Selection process

There were two stages to the article selection process: Title/Abstract screening and full-text screening. These stages are presented in the following chapters. No automation tools were used in the process. The selection process can be seen in the figure 1. The figure was adapted to be more suitable to this review from “PRISMA 2020 Flow Diagram” by Page et al (2020).

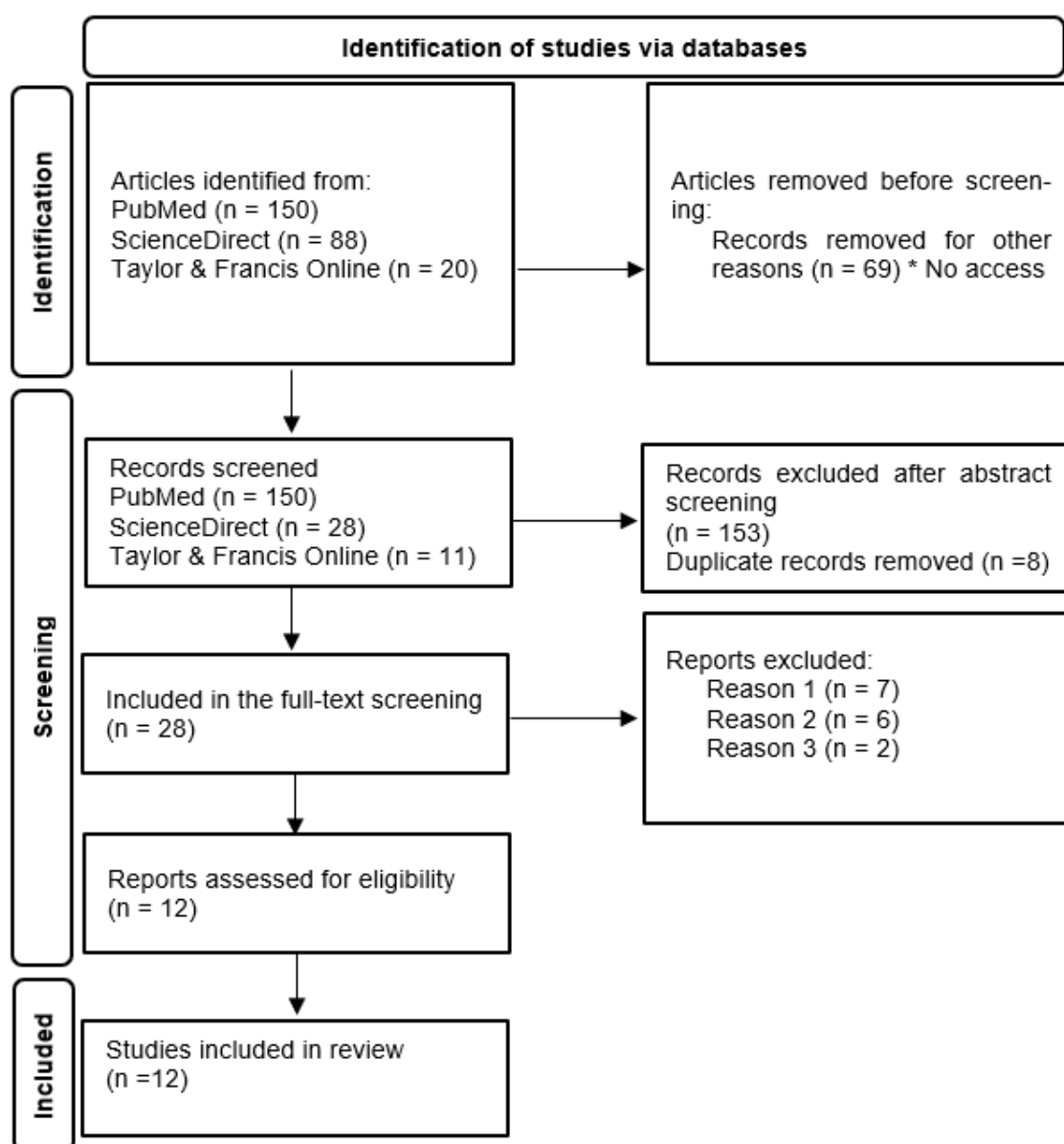


Figure 1. Flow chart of included and excluded studies

#### 4.4.1 Title/Abstract screening

In total, there were 258 studies found in all three databases. Title and abstract screening were conducted with each database individually after the search. The search log for each database is provided to the reader if requested. In this part, articles were excluded due to the initial inclusion and exclusion criteria for

different reasons. These reasons were variable. Altogether, 153 articles were excluded at this stage, and after duplicates were re-moved, 28 articles remained.

#### 4.4.2 Full-text screening

With the remaining 28 articles, a full-text screening was conducted. Of these 28 articles, 16 articles were removed. Seven articles were removed due to the focus being another type of disparity than health: lower employment opportunities or lower academic achievement due to SES. Six articles investigated health disparities but did not examine SES's correlation; for example, if the article identified health disparity between two groups but was not looking at the participants' SES, it was excluded. Further, three articles were removed due to excluded study design such as review and intervention study. The 12 remaining articles in the review can be seen in the table below. Notably, all the studies were published after 2016. Furthermore, all the studies were register observation studies, except A10 which used mix-methods.

INS	Authors	Year	Title
A1	Torssander et al.	2018	Partner resources and incidence and survival in two major causes of death
A2	Tolkkinen et al.	2018	Impact of parental socioeconomic factors on childhood cancer mortality: a population-based registry study
A3	Savijärvi et al.	2019	Trends of colorectal cancer incidence by education and socioeconomic status in Finland
A4	Kivimäki et al.	2020	Association between socioeconomic status and the development of mental and physical health conditions in adulthood: a multi-cohort study
A5	Lumme et al.	2020	Cumulative social disadvantage and hospitalizations due to ambulatory care-sensitive conditions in Finland in 2011–2013: a register study

A6	Blomgren and Virta	2020	Socioeconomic differences in use of public, occupational and private health care: A register-linkage study of a working-age population in Finland
A7	Harkko et al.	2020	Socioeconomic Differences in Occupational Health Service Utilization and Sickness Absence Due to Mental Disorders: A Register-Based Retrospective Cohort Study
A8	Acacio-Claro et al.	2017	Adolescent reserve capacity, socioeconomic status and school achievement as predictors of mortality in Finland - a longitudinal study
A9	Seikkula et al.	2018	The impact of socioeconomic status on stage specific prostate cancer survival and mortality before and after introduction of PSA test in Finland
A10	Tiittala et al.	2018	Missed hepatitis b/c or syphilis diagnosis among Kurdish, Russian, and Somali origin migrants in Finland: linking a population-based survey to the national infectious disease register
A11	Toivakka et al.	2018	The usefulness of small-area-based socioeconomic characteristics in assessing the treatment outcomes of type 2 diabetes patients: a register-based mixed-effect study
A12	Pankakoskia et al.	2020	Differences in cervical test coverage by age, socioeconomic status, ethnic origin and municipality type – A nationwide register-based study

Table 4. The chosen articles after full-text screening. Note. INS= Identification number of the study

## 4.5 Data extraction

The data extraction protocol was formed to identify relevant data for this review. The data extraction protocol is constated of general information, background information, data collection method information, participant information, the definition for SES used, results and outcomes. The summary of the extraction protocol can be seen in Appendix 2. Results of the studies are presented in the results section, as well as the definition for SES used in each article. Additionally,

a quality assessment was carried out for each included article which is presented in the following chapter.

## 4.6 Quality assessment

The quality assessment, also known as “quality appraisal” or “critical appraisal,” refers to the process of systematically examining research evidence to assess its validity and its relevance. Assessment of the quality of included studies is a vital part of any systematic review (Whiting et al., 2017). For this literature review, a quality assessment tool was adapted from the Evaluation Tool of Quantitative Research Studies (Long, et.al 2002). The quality assessment can be seen in Appendix 1. All articles scored high to medium quality, and no articles were excluded in this stage.

# 5 Results

In the final data analysis, there were 12 articles. The findings from these were analysed to synthesize the results and provide a platform for the discussion. First, the articles' definitions of SES are presented, and the demography information of the participants is presented. This leads to the focus of the review. The main findings of the articles are presented through themes that emerged from the reviewed studies' findings. These findings are further discussed in the next chapter.

## 5.1 SES demographics

First, the definition used in the articles to characterize someone belonging at a disadvantage due to their SES. This is reported to present the measurements that were used in the studies and present further information on the study participants.

Study	Background information on the participants			SES definition used			
	Focus level/target group	If diagnosis/ problem	specific	Education	Income	Employment status	Other
A1 Torssander et al.	Family	cancer and cardiovascular diseases		X	X	X	
A2 Tolkkinen et al.	Family	cancer		X			living arrangements co-habitation status
A3 Savijärvi et al.	Adults	colorectal cancer (CRC)		X		X	
A4 Kivimäki et al.	Adults			X			region of residence
A5 Lumme et al.	Adults			X	X	X	gender, age, region of residence and living arrangements,
A6 Blomgren and Virta	Adults			X	X		Occupational class
A7 Harkko et al.	Adults			X			Occupational class
A8 Acacio-Claro et al.	Child/ youth			X			
A9 Seikkula et al.	Adults	prostate cancer (PCa)		X			
A10 Tiittala et al.	Adults						Immigration status
A11 Toivakka et al.	Adults	type 2 diabetes		X	X	X	
A12 Pankakoskia et al.	Adults						Mother tongue and region of residence

Table 5. Demographics information on the participants

As shown in the table above, most of the examined articles defined income as a determinant for the low-SES position. Notably education level, occupational class, and employment status can have an effect the income level. Overall, almost all the other determents influence income, at least on the household level. Two studies, A9 and A12, used immigration status or mother language as determents of low-SES. A2, A5, and A12 also used the living arrangements examined.

This chapter presents that income is generally used to indicate someone's SES position. Additionally, in most of the studies, it was also described as the most vital link, for example, in differences in mortality. This is discussed further in the following chapters. The next chapter presents the themes emerging from the study findings.

## 5.2 Detected disparities in themes

As this review set out to answer the posed research questions, were the detected disparities in the studies across the health care system identified and reported. There was a detected disparity between the SES groups in screening, hospitalization, or diagnosis in almost all the articles. In all of the studies, the health outcomes were detected to be worse for those at socioeconomic disadvantage. Table 1. provides the themes obtained from the preliminary analysis of the literature. The themes identified from the literature are interesting as the identified problems and barriers were mainly the same in all reviewed articles. This table is quite telling because it presents the many aspects of health care where the disparity can occur, further placing those people at a socioeconomic disadvantage at risk.

INS	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
Screening		X				X	X		X	X	X	X
Diagnoses	X	X	X	X		X	X		X	X	X	X
Hospitalization	X			X				X				
Outcome	X	X	X	X	X	X	X	X	X	X	X	X

Table 6. Summarized visualization of the themes

A3 and A9 identified differing associations between low SES and more disease incidents, and men with higher education reported a higher incidence of disease (colon cancer and prostate cancer). However, the study findings stated that the survival was detected higher in men with higher SES status and that men in low-SES positions' disease incidents grew through the decades in both studies. This disparity highlights the importance of early screening as early-stage conditions are more accessible to treat than later-stage ones. Moreover, inaccessibility to the same screenings was evident in A2, A6, A7, A9, A10, A11, and A12.

A1, A4, and A8 presented strong associations between preceding cumulative social disadvantage and hospitalizations due to the conditions studied. People in socioeconomic disadvantage use more acute hospital care and less primary care than patients with high socioeconomic status. A6 and A7 outlining the underuse of health care services due to lower SES.

A1 and A2 identified an association between family members' (parent and spouse) SES and patient mortality. In both studies, higher SES was associated with lower mortality. Additionally, A1 presented a higher decrease in incident and hospitalization related to the partner SES position. A2 findings were especially concerning finding that parental SES position to have an impact on child's cancer mortality. A4 found that even after adjustment for lifestyle factors, compared with more advantaged groups, low socioeconomic status was associated with increased risk for 18 (32.1%) of the 56 conditions examined. In summary, these results show that socioeconomic inequalities in health care in Finland are various.

## 6 Discussion

Health is simultaneously a medical and a social issue. The present research aimed to provide an overview of the studies that examine the association between socioeconomic disadvantage and health in Finland. The reviewed studies outlined health disparities across the health care system in Finland. Consistent with the literature, this review identified several disparities between the different SES groups.

While researchers have demonstrated a solid and long-lasting relationship between SES and health, defining the concrete pathways and mechanisms that link SES to health has proven difficult, posing challenges in designing effective policy interventions to combat health inequalities (Kraft and Kraft, 2021). It is vital to continue generating interventions focused on strengthening health systems to achieve adequate universal health coverage with comprehensive and quality care. SES persists in being a social construct of health in Finland and the experience of health care is different depending on the patients' SES.

In the reviewed studies, a strong socioeconomic gradient was reflected as both overuse of health care in higher socioeconomic groups and underuse in lower socioeconomic groups. This highlights the importance of early screening and the need for sufficient resources to do so. Regarding the FCT, it presents the position of the advantaged and those disadvantaged in the position of health care. These fundamental causes as not participating in the health care system provided to people in the disadvantaged position will suffer further risks to their health, which attend to persist.

According to Sudenkaarne and Blell (2021), as the Nordic welfare states aim to offer universal healthcare, the lack of awareness of social constructs and reluctance to discuss the influence in health care sustains the structural disadvantage in health care. Health care professionals prefer to think they operate from a purely medical perspective. This is later associated with the

reasoning that social issues are outside medical interests and allegedly cannot be resolved. As the Nordic paradox raises questions about social support and health, it is essential to consider that healthcare professionals increasingly would consider SES's influence on individuals' health.

The A2 Tolkkinen et al. (2018) findings were especially concerning as they detected parents' high education and income to be factored in lowering childhood cancer mortality. In addition to economic inequality, the findings emphasized the difference in health literacy and competence. Even though the public sector is comprehensive, some express difficulty navigating the health care system and getting the right kind of health treatment at the right time. Furthermore, to reduce socioeconomic inequalities in health, the underlining social inequalities should ultimately be addressed.

This study establishes the difficulty and complexity of studying a subject like this. It is, by its nature, difficult to describe and identify in a meaningful context. There were several limitations in the conducted systematic review that are further discussed in the next chapter. Despite these limitations and the generality of the current results, the present study has enhanced our understanding of socioeconomic health inequalities. The hope is that the current research will stimulate further investigation of this crucial area.

## 7 Limitations

There were several limitations in the conducted systematic review. Mainly due to the posed limitations of the studied subject. First the methodology limitations are discussed, and the next section will highlight the main limitations identified regarding the studies included in this review.

## 7.1 Methodological issues

The study design of systematic review poses its limitations. The major limitation was this was conducted by only one researcher, posing a possible researcher bias could have affected the results. The researcher aimed to minimize bias by analysing the databases separately and using the PICO and the inclusion and exclusion criteria, with direction from the full-text extraction form. In general, these reviews are much larger, which reduces the danger of bias in the selection process while increasing the number of papers that may be analysed.

For example, because it was out of the research scope, the cross-national studies had to be excluded from the review. These studies could have strengthened the review, providing more information on the phenomenon. However, as the study focused on the SES determinants' effects on health in the Finnish social and economic context, evaluating the differences between different countries' contexts could not be efficiently done in this review. In the next chapter, the limitation regarding the studied subject is discussed further.

## 7.2 Limitations

Limitations regarding the human experience due to the studies method no perspective of the participants. As registries are increasingly being used for research purposes even when initially developed for clinical purposes, and thus it is suggested that in all cases, consideration should be given to the informed consent issues (Gliklich, Dreyer and Leavy, 2014). The researcher bias in the studied subject is high. Interpretation of study results can be clouded by hypothesis being low SES equals bad health.

Limitations in register-based epidemiology overall are generalization, necessary information might not be available, the researcher did not collect the used data, confounder information is lacking, information on data quality is missing, truncation at the start of follow-up makes distinguishing between prevalent and incident cases difficult, and the risk of data dredging (Thygesen and Ersbøll,

2014). People experience low-SES very differently as it is so related to the setting and individual situation.

Overall, the studied subject poses its complexities and issues regarding the reliability and consistency of the results. SES is as stated notoriously difficult to define and measure. One's SES position cannot be described as stagnant as it changes variables with different factors influencing it. In the first part of the result where the demographics are presented this difficulty can be perceived.

Additionally, there is a possibility that relevant articles were excluded due to the search words used and the language chosen to be English rather than Finnish or Swedish.

## **8 Future research and implications for practice**

Several questions remain to be answered. For future research there are specific takeaways from this systematic literature review that should be considered in future studies. Even though people in the low-SES position are recognized as a vulnerable group, they are a complex target group to study, highlighting the need for further research. Especially as they are at risk of being trapped in an intergenerational cycle of poverty and suffering a variety of physical and psychological problems, unnecessarily burdening the health care systems, there should be a closer investigation of the currently provided support and intervention methods.

People at a disadvantage due to their SES are difficult to reach the target population, highlighting the importance of research. A research gap became apparent even during the early stages of the review.

## 9 Conclusion

Examination of the differences in care outcomes by socioeconomic status (SES) is beneficial for both the efficient targeting of health care services and decreasing health inequalities (Toivakka et al., 2018). The definition of SES varies in the literature, and there is terminological confusion. Additionally, there are various issues with data collection and interpretation.

To make true advantages in public health must, the health care systems be inclusive for all and provide additional support for everyone to participate in it equally. These can be accomplished either by reducing disparities in socioeconomic resources themselves or by developing interventions that are more equally distributed across SES groups. The quality of health care systems ultimately suffers as the socioeconomic factors are ignored, and patients are treated only on a medical basis, ignoring the need for support, intervention, multiple risk factors, and conditions. Ultimately to reduce health inequalities, the underlying societal issues posed by SES must be tackled to have meaningful improvements in individual and public health.

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**Appendix 1. Quality assessment protocol**

Study	Type of studies	Research questions/hypothesis	Selection process	Sample size	Results	Definition of SES	Score and overall rating
A1 Torssander et al.	1	2	2	2	2	2	11 high quality
A2 Tolkkinen et al.	2	1	2	2	2	2	11 high quality
A3 Savijärvi et al.	2	1	2	2	1	2	10 high quality
A4 Kivimäki et al.	0	2	2	2	2	2	10 high quality
A5 Lumme et al.	2	1	2	2	2	2	11 high quality
A6 Blomgren and Virta	1	2	2	2	2	2	12 high quality
A7 Harkko et al.	2	2	2	2	2	2	12 high quality
A8 Acacio-Claro et al.	2	2	2	2	1	1	10 high quality

## Appendix 1

A9	2	2	2	2	2	1	11
Seikkula et al.							high quality
A10	1	1	2	2	2	0	8
Tiittala et al.							medium quality
A11	1	1	2	2	1	2	9
Toivakka et al.							medium quality
A12	1	1	2	2	2	2	10
Pankakoskia et al.							high quality

Type of study: Cross-sectional (1) Cohort study (2) / Research questions/hypothesis: Clear (2), Unclear (1), Unspecified (0) / Selection process: Clear (2), Unclear (1), Unspecified (0) / Sample size: >500 (2), 200-500 (1), <200 (0) / Results: Were the findings consistent? (0,1) Generalizability of results? (0,1) / Definition for SES: Clear (2), Unclear (1), Unspecified (0) / Total score 0-7 (Low quality). Total score 7–9 (medium quality). Total score 10-12 (high quality)

)

## Appendix 2. General and background information of the selected studies

Study	Journal	Aim/purpose	The data collection period	The data source	Number of participants
A1 Torssander et al.	SSM - Population Health	"To examine if SES of one partner is associated with the other partner's health and mortality."	1995-2003	The National Hospital Discharge Register and StatFin	200,000
A2 Tolkkinen et al.	Acta Oncol	"To investigate the associations between parental socioeconomic status, family characteristics and childhood cancer mortality."	1990-2009	FCR and StatFin	4437
A3 Savijärvi et al.	Acta Oncol	"To investigate if the incidence of colorectal cancer (CRC) is associated with education and socioeconomic status (SES) in Finland."	1976-2014	FCR and StatFin	77,614
A4 Kivimäki et al.	Lancet Health Public	"To examine the association between socioeconomic status and temporal sequences in the development of 56 common diseases and health conditions."	1998-2016	The Health and Social Support (HeSSup) study and the Finnish Public Sector (FPS) study	109,246
A5 Lumme et al.	BMJ Open	"To study the interplay between several indicators of social disadvantage and hospitalisations due to ambulatory care-sensitive conditions (ACSC)."	2011-2013	The Care Register for Health Care and StatFin	2457,549
A6 Blomgren and Virta	PLoS One	"To analyse how the probability of using health care organized by the three schemes differed by socioeconomic status in a working-age population."	2013	The Social Insurance Institution of Finland and StatFin	194,000

A7 Harkko et al.	Int J Environ Res Public Health	"To investigated whether socioeconomic differences in the utilization of OHS predict sickness absence (SA) due to mental disorders."	2009–2014	Occupational health service of Helsinki city and StatFin	21,741
A8 Acacio-Claro et al.	BMC Public Health	"To determine if family SES in adolescence predicts later mortality."	1985-95	Adolescent Health and Lifestyle Surveys and StatFin	41,833
A9 Seikkula et al.	Int J Cancer	"To assess the possible inequality of different SES groups in terms of PCa-specific survival (PCSS) and mortality (PCSM)"	1985–2014	FCR and StatFin	95,076
A10 Tiittala et al.	BMC Infectious Diseases	"To assess the prevalence, burden of disease and risk factors for a missed diagnosis of hepatitis B and C, HIV and syphilis in a migrant population"	2010-2012	Interviews and the National Infectious Diseases Register	1000
A11 Toivakka et al.	BMC Public Health	"To compare the predictive values of patients' individual SES variables with the respective SES variables of postal code areas on the treatment outcomes of type 2 diabetes patients."	2012	Regional electronic patient database and StatFin	10,204
A12 Pankakoskia et al.	Preventive Medicine	"To examine the coverage of cervical tests by age, socioeconomic status, ethnicity and municipality type within and outside the organized screening program."	2010-2014	The Mass Screening Registry, pathology laboratories, the health insurance reimbursement registry and StatFin	2,298,499

StatFin= Statistics Finland FCR= The Finnish Cancer Registry