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REVIEW

Rehabilitation and palliative care for socioeconomically disadvantaged patients with advanced cancer: a scoping review

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ABSTRACT

Background: Rehabilitation and palliative care may play an important role in addressing the problems and needs perceived by socioeconomically disadvantaged patients with advanced cancer. However, no study has synthesized existing research on rehabilitation and palliative care for socioeconomically disadvantaged patients with advanced cancer. The study aimed to map existing research of rehabilitation and palliative care for patients with advanced cancer who are socioeconomically disadvantaged.

Material and Methods: A scoping review was conducted in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). A systematic literature search was performed in CINAHL, PubMed and EMBASE. Two reviewers independently assessed abstracts and full-text articles for eligibility and performed data extraction. Both qualitative and quantitative studies published between 2010 and 2019 were included if they addressed rehabilitation or palliative care for socioeconomically disadvantaged (adults $\geq$18 years) patients with advanced cancer. Socioeconomic disadvantage is defined by socioeconomic position (income, educational level and occupational status).

Results: In total, 11 studies were included in this scoping review (138,152 patients and 45 healthcare providers) of which 10 were quantitative studies and 1 was a qualitative study. All included studies investigated the use of and preferences for palliative care, and none focused on rehabilitation. Two studies explored health professionals' perspectives on the delivery of palliative care.

Conclusion: Existing research within this research field is sparse. Future research should focus more on how best to reach and support socioeconomically disadvantaged people with advanced cancer in community-based rehabilitation and palliative care.

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Introduction

Socioeconomically disadvantaged cancer patients are diagnosed later in their disease trajectory [1–7], have worse health outcomes [8] and have lower cancer survival rates than patients in similar disease circumstances that are in socioeconomically better positions [9]. Socioeconomic disadvantage is often defined in the literature by socioeconomic position (SEP) [10], where income, educational level and occupational status are the most commonly used indicators [11–13]. The disparity in diagnostic delay results in disproportionately more patients being diagnosed with cancer in advanced stages with no possibility of curative treatment [14].

A meta-analysis from 2016 found that patients with advanced cancer had the greatest unmet needs within the following domains: informational, patient care and support, physical, psychological, and activities of daily living [15]. Generally, cancer patients with low SEP are more likely to report unmet needs than their better-off counterparts [11]. A variety of studies have shown that rehabilitation and palliative care can improve or maintain function and increase quality of life (QoL) in patients with advanced cancer [16–18]. Initiatives to increase QoL in these patients are usually regarded as palliative care [19]; however, little research has been devoted to the beneficial aspects of rehabilitation aimed at enhancing or maintaining function in these patients [16]. The coordination and integration of rehabilitation and palliative care for patients with advanced cancer are slowly changing, particularly in some countries like England and Denmark [20,21], and is explicitly described in the most recent Danish Cancer Plan [22].

Social inequality in cancer in Denmark has recently been reviewed in a Whitebook from the Danish Cancer Society

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[23]. The Whitebook identified few Danish papers on social inequality in rehabilitation or palliative care for cancer patients [23]. To our knowledge, no study has synthesized existing research on rehabilitation and palliative care for socioeconomically disadvantaged patients with advanced cancer. This research field seems not to be extensively researched, which is why a scoping review is warranted to preliminarily assess the extent and scope of available research literature [24]. This scoping review aimed to map existing research of rehabilitation and palliative care for patients with advanced cancer who are socioeconomically disadvantaged.

Methods

Study design

A scoping review was conducted in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) [25]. The methodological framework developed by Hanneke et al. [24] was also applied. Quality assessment of included studies is beyond the scope of a scoping review [26]. This scoping review will help determine whether a systematic review of the literature is warranted.

Searches and information sources

The literature search was conducted together with an information specialist who helped to select the search terms. The search strings were tailored for each database. The following search terms were used: 'advanced cancer', 'socioeconomically disadvantaged', 'rehabilitation' and 'palliative care'. We then found synonyms for each of these search terms by searching the subject headings of each database. The following filters were used: published in the past 10 years; language: English, Danish, Norwegian, Swedish; adult: 18 +years. The searched databases were CINAHL, PubMed and EMBASE. The reference lists of included studies were assessed, and a citation search was conducted in Web of Science based on the included studies (the full search is available on request).

Eligibility criteria and study selection

Studies were eligible for inclusion if they addressed rehabilitation or palliative care for socioeconomically disadvantaged (one of its synonyms: income, educational level, and occupational status) adults (≥18 years) with advanced cancer. WHO definitions of rehabilitation and palliative care were applied [19,27]. Quantitative and qualitative studies and reviews were included. Eligibility criteria together with the search string tailored for the PubMed database can be seen in Table 1.

Study selection

Two reviewers (MSP and HKR) independently assessed titles and abstracts for eligibility using the pre-determined inclusion criteria. Any disagreement was discussed and if necessary, a third reviewer (KlC) was involved to achieve consensus. The Rayyan© online data management software was used to select articles in the title/abstracts phase [28]. The software removes duplicates and assists with title/abstract screening, including the possibility of registering reasons for the exclusion of articles [28]. The articles selected based on their title/abstracts were transferred and stored in an Endnote© reference library [29]. The full-text articles were then assessed independently by two reviewers (MSP and HKR). Consensus between the two reviewers was reached, and reasons for excluding articles were registered.

Data charting process

One investigator performed data extraction using a study-specific data extraction form. The following data were extracted: country, sample characteristics (number, diagnosis, age and gender), study aim, study design, determinants of SEP, and findings regarding socioeconomically disadvantaged patients with advanced cancer and rehabilitation/palliative care. A second reviewer verified the extracted data. The findings were synthesized using a narrative summary.

Results

Selection of sources of evidence

Eleven articles were included in the review [30–40], nine of which represented a total of 138,152 patients and 45 healthcare providers [30–33,35,36,38–40]. In two studies, the number of patients was not accounted for [30,31]. The database search produced 1401 potential articles; 80 articles were full-text screened and 10 articles were included for reviewing. After assessing reference lists of the included studies and a citation search, one additional article was included. A PRISMA flow chart (see Figure 1) outlines the selection process, including reasons for the exclusion of the articles.

Characteristics of included studies

Table 2 presents the extracted data from the 11 included articles [30–40]. Eight articles were published between 2017 and 2019 [30–32,36–40]. Eight originated from USA [30–34,36–38], two from Canada [35,39] and one from the Netherlands [40]. Six studies were register-based studies, all of which were conducted in North America [30–32,34,35,37]; two were cohort studies [33,36]; one was a cross-sectional study [38]; one was a secondary analysis of data from a cluster-randomised controlled trial [40]; and one was a qualitative study [39]. Ten studies involved patients or hospitalizations [30–38,40]; and two studies included healthcare providers [33,39], one of which included both patients and healthcare providers [33]. The population age spanned from 21 to ≥65 years. Men and women were almost equally represented in the studies, except in the study by Rosenfeld et al., which only included gynaecological cancer [37]. The most prevalent cancer types across the articles were as follows: six articles with mixed cancer types [30,31,33,36,38,39],

Table 1. Search strategy for the scoping review.

Inclusion criteria	• Publication years 2009–2019 • Peer-reviewed publication • Studies of any design • English, Danish, Norwegian or Swedish language • Adults (>18 years of age) diagnosed with advanced cancer (metastatic cancer, incurable cancer or cancer stage III and IV) • "Socioeconomically vulnerable" defined by low socioeconomic status/position (income, educational level, occupational status) • Rehabilitation/palliative care (e.g., physical training, psycho-educative interventions, self-management, special aids)
Exclusion criteria	• Gray literature, editorials/commentaries, guidelines, letters, conference abstracts • Socially vulnerable defined by race/ethnicity, age, comorbidity, etc. • Medical, surgical or invasive technology interventions
PubMed search string (final version)	(((Malignancy[Title/Abstract]) OR Malignancies[Title/Abstract]) OR Malignant[Title/Abstract]) OR Malign[Title/Abstract]) OR metastatic[Title/Abstract]) OR metastas*[Title/Abstract]) OR Incurable cancer*[Title/Abstract]) OR Advanced cancer*[Title/Abstract]) OR Advanced neoplasm*[Title/Abstract]) OR Chronic Cancer*[Title/Abstract]) OR Stage 3 cancer*[Title/Abstract]) OR Stage III Cancer*[Title/Abstract]) OR Stage 4 Cancer*[Title/Abstract]) OR Stage IV Cancer*[Title/Abstract] AND (((Socioeconomic factors[Mesh]) OR Economic Status*[Title/Abstract]) OR Social Class*[Title/Abstract]) OR Social mobilit*[Title/Abstract]) OR Health Literac*[Title/Abstract]) OR Unemploy*[Title/Abstract]) OR Employment Status*[Title/Abstract]) OR Social Conditions[Mesh]) OR Social Condition*[Title/Abstract]) OR Low-Income*[Title/Abstract]) OR Inequalit*[Title/Abstract]) OR Equalit*[Title/Abstract]) OR Socio-economic factor*[Title/Abstract]) OR Socioeconomic factor*[Title/Abstract]) OR Social Marginalization[Mesh]) OR Social Marginalization[Title/Abstract]) OR Equity[Title/Abstract]) OR Inequit*[Title/Abstract]) OR Healthcare Disparit*[Title/Abstract]) OR Healthcare Disparities[Mesh]) OR Vulnerable populations[mesh]) OR health status disparities[mesh]) OR underserved patient*[Title/Abstract]) OR Health disparit*[Title/Abstract]) OR Family Health[MeSH]) OR Cohabitation*[Title/Abstract]) OR Low education*[Title/Abstract]) OR Lower education*[Title/abstract]) OR Family characteristics[MeSH] OR Living Alone[Title/Abstract]) OR Civil Status[Title/Abstract] AND (((Rehabilitation Research[Mesh]) OR Rehabilitation[Mesh]) OR Rehabilitation[Title/Abstract]) OR Rehabilitations[Title/Abstract]) OR Exercise Therapy[Title/Abstract]) OR Exercise Therapies[Title/Abstract]) OR Rehabilitative[Title/Abstract]) OR Aftercare[Mesh:noexp]) OR After Care[Title/Abstract]) OR After-Treatment*[Title/Abstract]) OR Follow-Up Care*[Title/Abstract]) OR Recovery of Function[MeSH]) OR Function Recover*[Title/Abstract]) OR Survivorship[Mesh]) OR Health Education[Mesh]) OR Patient Education*[Title/Abstract]) OR Late-effect[Title/Abstract]) OR Late-effects[Title/Abstract] OR Cancer rehabilitation[Title/Abstract] OR (((Hospices[Mesh]) OR Hospice[Title/Abstract]) OR Hospices[Title/Abstract]) OR Palliative Care[Mesh]) OR (Hospice and Palliative Care Nursing[Mesh])) OR Long-Term Care[Mesh]) OR Long Term Care[Title/Abstract]) OR Terminal Care[Mesh]) OR Terminal Care[Title/Abstract]) OR End of Life[Title/Abstract]) OR Palliation[Title/Abstract]) OR Palliative[Title/Abstract]) OR Palliative Medicine[Mesh]) OR Terminal ill*[Title/Abstract]) OR Terminally ill[Title/Abstract] OR Home health nursing[Mesh] OR Advanced home care[Title/Abstract]

two with colorectal cancer [35,40], one with lung cancer [34], one with malignant glioma [32] and one with gynaecological cancer [37].

Synthesis of results

All studies reported on palliative care for patients with advanced cancer [30–40]. The studies did not describe the palliative care interventions in detail, viz. the specific content, duration and delivery method [30–40]. In the included studies, SEP was mainly conceptualized by income in eight studies [30–35,37,38], while four studies used education [32,36,38,40] and only one study conceptualized SEP by occupation [40].

Two themes emerged from the study results: (1) Socioeconomic factors influence the use of and preferences for palliative care and (2) Health professionals' perspectives on delivery of palliative care to socioeconomically disadvantaged patients with advanced cancer.

Socioeconomic factors influence the use of and preferences for palliative care and rehabilitation

Income

Eight studies reported varying results regarding the association between income and palliative care [30–35,37,39]. Three studies found low income to be associated with lower likelihood of receiving palliative care [31,34,35]. Mack et al. investigated the use of hospice among patients insured by Medicaid and Medicare [34], reporting that mainly older, low-income patients utilized hospice less often than older, high-income patients [34]. Similarly, Maddison et al. reported that low-income patients with advanced colorectal cancer are at higher risk of not receiving palliative care than high-income patients [35]. Rubens et al. [31] found patients in the lowest income quartile were less likely to receive palliative care consultations than patients in the highest income quartile. In contrast to these findings, three studies found no association between low income and utilization of palliative care [30,32,37]. Two of these studies reported no statistically significant difference in the use of palliative care over income quartiles [30,37]. The third study found that those with a higher income were less likely to utilize hospice than low-income patients [32]. Furthermore, two studies investigated health professionals' perspectives on income as a predictor for use of palliative care [33,39]. One of the two studies found that health professionals overestimated low income as a barrier for the utilization of palliative care compared to patients [33]. The other reported that lack of financial resources affected patients' abilities to deal with symptoms, and that low income and financial constraints were perceived as barriers to utilizing palliative care [39].

Education

Five studies reported on associations between educational level and palliative care [32,36,38–40]. Three studies analyzed the influence of education on the likelihood of (1) hospice enrollment [32], (2) referral to palliative care [36] and (3)

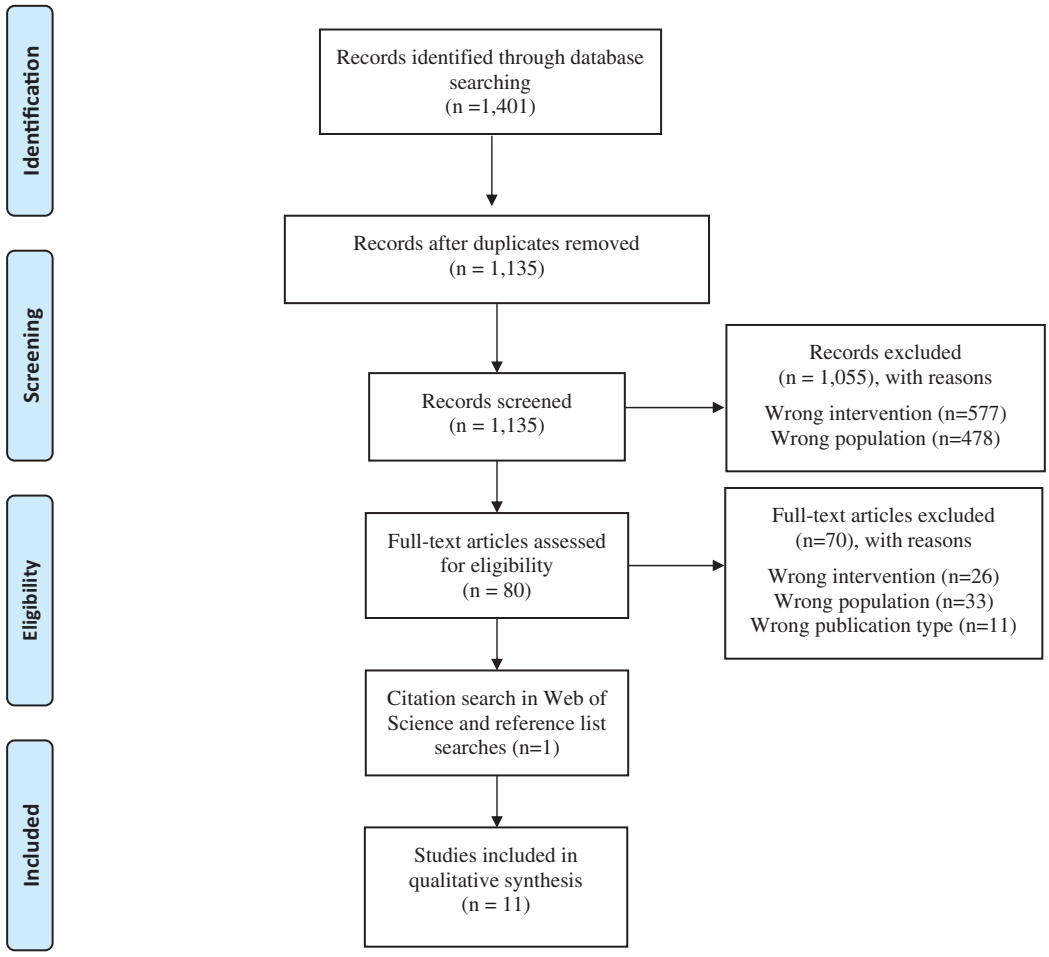

Figure 1. Flowchart of included and excluded articles.

palliative care preferences [38]. Forst et al. found higher educational level to be associated with hospice enrollment [32]. The other two studies found no significant association between educational level and referral to or preferences for palliative care [36,38]. However, Schuurhuizen et al. [40] showed that higher educational level was associated with a higher likelihood of use of palliative care. In the qualitative study by Santos Salas et al., health professionals found low educational level to negatively impact patients' ability to deal with and understand symptom control; low educational level was also found to contribute to symptom complexity [39].

Occupational status

A single study investigated the influence of employment [40]. The study found no association between employment and use of palliative care.

Health professionals' perspectives on delivery of palliative care to socioeconomically disadvantaged patients with advanced cancer

Two studies explored aspects of health professionals' perspectives on how to deliver palliative care to socioeconomically disadvantaged patients with advanced cancer. Lyckholm et al. reported a discrepancy in the perception of having discussed hospice, where providers thought hospice was discussed more often than did low-income patients (>90% of providers vs. 57% of patients). The authors concluded that it is imperative to ask each patient specifically about barriers to adequate palliative care [33]. In the other study, Santos Salas et al. found that health professionals faced challenges when trying to relieve the suffering of socioeconomically disadvantaged patients with advanced cancer. They also had a secondary aim of outlining practice strategies when working with populations with social disparities. However, they omitted these results in their paper because of word limitations in the published journal [39].

Discussion

This scoping review shows that current research has focused mainly on access to palliative care in socioeconomically disadvantaged patients with advanced cancer, while none of the studies addressed rehabilitation. The results of the studies were to some extent contradictory. Some showed that patients with advanced cancer of low SEP were less likely to participate in palliative care, while others found no such associations. Most studies investigated the impact of income on receiving palliative care. How to reach and support socioeconomically disadvantaged patients with advanced cancer was not made clear by the review, as none of the studies investigated this aspect.

Table 2. Findings from the included articles ($N = 11$).

First author, year (reference #)	Country	Number	Cancer type	Age (mean)	Female (%)	Study aim	Study design	Determinants of socioeconomic status	Findings related to socioeconomic status and rehabilitation and/or palliative care	Topic (rehabilitation and/or palliative care)
Rubens et al. [31]	USA	389,417 hospitalizations	Mixed advanced cancer types	n/a	54	To explore the characteristics of palliative care utilization among hospitalized patients with advanced cancers using National Inpatient Sample (NIS) data which prove a nationally representable sample. In addition, look for factors associated with palliative care utilization in these patients	Register study	Income: median household income by zip code (quartiles) Education: n/a Occupation: n/a	Estimates related to income: Palliative care consultations were significantly higher in the fourth income quartiles (OR: 1.08; 95% CI: 1.01–1.17) than in the first quartile. They were also higher in the second and third quartiles, though not significantly so Estimates related to education: n/a Estimates related to occupation: n/a Summary: High income was associated with higher palliative care consultations	Palliative care
Santos Salas et al. [39]	Canada	11 palliative care providers, including registered nurses, nurse practitioners, physicians and pharmacists	Mixed cancer types	n/a	n/a	To investigate palliative care practitioners' perspectives on how the Social Determinants of Health affect the symptom experience of populations with advanced cancer, and to outline practice strategies with populations with social disparities to enhance symptom relief	Two sequential qualitative studies	Income: n/a Education: n/a Occupation: n/a The study was informed by the Social Determinants of Health framework (Whitehead and Dahlgren 2006)	Estimates related to income: n/a Estimates related to education: n/a Estimates related to occupation: n/a Summary: Participants' stories revealed the complex interactions of the Social Determinants of Health affecting patients' ability to deal with their symptoms due to lack of financial resources, lack of education or other personal circumstances The impact of income on patients' experiences was acknowledged by participants. They recalled situations where both low and high income affected patients' ability to deal with their illness. Low income and financial constraints were commonly perceived as barriers Participants perceived that both educational level and intellectual issues might affect the patient's ability to understand symptom control. While the degree to which education affects symptom complexity cannot be determined, limited education emerged as a contributing factor No results on the second part of the aim are offered in the article	Palliative care
Schuurhuizen et al. [40]	Netherlands	349 patients	Metastatic colorectal cancer	64.8	37	To identify predictors for the use of psychosocial services in patients with metastatic colorectal cancer (mCRC)	Secondary analysis of data from a prospective cluster-randomized trial	Income: n/a Education: level (low, middle, high) (categorical) Occupation:	Estimates related to income: n/a Estimates related to education: In the univariate analyses, education at baseline was significantly associated	Palliative care

(*continued*)

Table 2. Continued.

First author, year (reference #)	Country	Number	Cancer type	Age (mean)	Female (%)	Study aim	Study design	Determinants of socioeconomic status	Findings related to socioeconomic status and rehabilitation and/or palliative care	Topic (rehabilitation and/or palliative care)
						receiving first-line chemotherapy enrolled in a prospective cluster-randomized trial (CRT)		working/not working (binary)	with the use of psychosocial support (*p*-value: 0.04). In the logistic regression analysis, use of psychosocial service was significantly associated with a higher educational level (*p*-value: 0.05)*. Estimates related to occupation: Occupation at baseline was not significantly associated with the use of psychosocial support (*p*-value: 0.95). **A 0.10 significance level is applied in the study* Summary: Use of psychosocial services was associated with a higher educational level. There were no differences for employment at baseline	
Forst et al. [32]	USA	12,437 patients	Malignant glioma (brain tumour)	69.9	46	To evaluate the rates and correlates of hospice use among patients with malignant glioma; and to describe the proportion of malignant glioma patients enrolled in hospice and their length of stay in hospice. The authors also aimed to identify predictive factors for overall hospice enrollment and hospice length of stay	Register study	Income: median household income by zip code (continuous variable) Education: Percentage of adults age ≥25 y with a high school education by zip code Occupation: n/a	Estimates related to income: The odds of hospice enrollment were lower with increasing household income (OR: 0.9; 95% CI: 0.85–0.94). Household income was not associated with length of stay in hospice Estimates related to education: The odds of hospice enrollment prior to death were higher for patients who were better educated (OR: 1.20; 95% CI: 1.08–1.23). Education was not associated with length of stay in hospice. Estimates related to occupation: n/a Summary: The odds of hospice enrollment prior to death were higher for patients who were better educated, and lower with increasing household income	Palliative care
Rosenfeld et al. [37]	USA	67,947 patients	Gynecologic cancer	63	100	To determine the factors associated with inpatient palliative care use in patients with metastatic gynecologic cancer	Register study	Income: median household income by zipcode was categorized by socioeconomic status (quartiles) Education: n/a Occupation: n/a	Estimates related to income: Patients of the following socioeconomic status used palliative care: 4.5% of low, low–middle, and middle–high; and 5.1% of high. No significance was found for socioeconomic status as a parameter associated with palliative care (p-values ranged 0.17–0.85) Estimates related to education: n/a Estimates related to	Palliative care

(*continued*)

Table 2. Continued.

First author, year (reference #)	Country	Number	Cancer type	Age (mean)	Female (%)	Study aim	Study design	Determinants of socioeconomic status	Findings related to socioeconomic status and rehabilitation and/or palliative care	Topic (rehabilitation and/or palliative care)
									occupation: n/a Summary: Socioeconomic status was not a statistically significant independent predictor of inpatient palliative care utilization	
Saeed et al. [38]	USA	383 patients	Mixed cancer types	65 years: 50% <65 years: 50% Mean age not provided for subgroup	55	To test the hypothesis that men and those with lower levels of educational attainment have less favorable attitudes toward palliative care.	Cross-sectional study	Income: assessed by two proxies for economic burden: insurance status (Medicaid or no insurance vs. Medicare or private insurance), and perceived financial strain (present or absent) Education: high school vs. some college (binary) Occupation: n/a	Estimates related to income: Economic burden was used to adjust analyses. Estimates related to education: the effect of education on preferences for palliative care was not statistically significant (OR: 0.85; 95% CI: 0.48–1.48). Similar findings were observed in the sensitivity analysis (OR: 0.69; 95% CI: 0.38–1.26) and the ordinal regression model (OR: 1.06; 95% CI: 0.69–1.63). Estimates related to occupation: n/a Summary: The hypothesis about education having an influence of palliative care preferences was not supported. Preferences for palliative care were comparable among participants with a high school education or less and those with more education	Palliative care
Okafor et al. [30]	USA	30,150 hospitalizations	Mixed cancer types	n/a	54	To explore patient- and hospital-level determinants of palliative care utilization among patients hospitalized with metastatic gastrointestinal tract cancer using a national database	Register study	Income: median household income by zip code (quartiles) Education: n/a Occupation: n/a	Estimates related to income: No significant socioeconomic differences in inpatient palliative care utilization were identified (*p*-values across quartiles ranged: 0.38–0.93) Estimates related to education: n/a Estimates related to occupation: n/a Summary: No significant socioeconomic differences in inpatient palliative care utilization were identified	Palliative care
Penrod et al. [36]	USA	3096 patients	Mixed cancer types	60.2	56	To identify characteristics of hospitalized advanced cancer patients that are associated with referral to an interdisciplinary hospital-based palliative care team	Multicenter prospective observational study	Income: n/a Education: more than high school / high school or less (binary) Occupation: n/a	Estimates related to income: n/a Estimates related to education: No significant association between education and likelihood of referral to palliative consultation team (more than high school education (OR: 0.89; 95% CI:0.72–1.10)) Estimates related to occupation: n/a Summary: The study found no evidence	Palliative care

(*continued*)

Table 2. Continued.

First author, year (reference #)	Country	Number	Cancer type	Age (mean)	Female (%)	Study aim	Study design	Determinants of socioeconomic status	Findings related to socioeconomic status and rehabilitation and/or palliative care	Topic (rehabilitation and/or palliative care)
									that education was associated with the likelihood of referral to palliative consultation team. No evidence of socio-demographic differences in palliative care likelihood within sites was found	
Mack et al. [34]	USA	52,710 patients	Lung cancer	Two groups: 1) 21–64 2) ≥ 65 Means not provided for subgroups	46	To evaluate hospice use among patients in Medicaid, which insures younger and indigent patients, relative to those in Medicare	Register study	Income: median household income by zip code (quartiles) Education: n/a Occupation: n/a	Estimates related to income: The odds of hospice use were lower in the older (≥65 years), low-income group than in the older (≥65 years), high-income group when stratifying for location (California and New York) (OR: 0.83; 95% CI: 0.77–0.90) and (OR: 0.82; 95% CI: 0.75–0.90). This was also found in patients between 55 and 74 years old. Here, the high-income group had higher odds for using hospice than the low-income patients when stratifying for location (California and New York) (OR: 1.30; 95% CI: 1.16–1.46) and (OR: 1.25; 95% CI: 1.08–1.45) The odds for using hospice was less clear when comparing the low-income group with the high-income group (reference group) in patients between 21–64 years old when stratifying for location (California and New York) (OR: 1.25; 95% CI: 1.02–1.64) and (OR: 0.99; 95% CI: 0.75–1.33) Estimates related to education: n/a Estimates related to occupation: n/a Summary: Low-income patients had lower odds for using hospice than high-income patients. This primarily included the older age group (≥ 55 years)	Palliative care
Maddison et al. [35]	Canada	1201 patients	Colorectal cancer	72.2	47	To examine inequalities in access to and quality of EOL care by assessing registration in a palliative care program, emergency room visits in the last 30 days of life and location of death among individuals who died	Register study	Income: median household income by zip code (three categories: <$30,000; $30,000–44,999; $45,000+) Education: n/a Occupation: n/a	Estimates related to income: Patients with an annual income of more than $45,000 had 2.74 times greater odds (95 % CI: 1.1–6.9) of registering in a palliative care program than individuals with incomes of under $30,000. This was not statistically significant among those diagnosed with stage IV	Palliative care

(*continued*)

Table 2. Continued.

First author, year (reference #)	Country	Number	Cancer type	Age (mean)	Female (%)	Study aim	Study design	Determinants of socioeconomic status	Findings related to socioeconomic status and rehabilitation and/or palliative care	Topic (rehabilitation and/or palliative care)
						of colorectal cancer in Nova Scotia, Canada, between 2001 and 2008			colorectal cancer. Estimates related to education: n/a Estimates related to occupation: n/a Summary: Patients with low incomes are at a higher likelihood of not registering in a palliative care program, while income appears to be less influential among those diagnosed with stage IV colorectal cancer	
Lyckholm et al. [33]	USA	29 patients 34 healthcare providers	Mixed cancer types	Patients: 56 Healthcare providers: 41	n/a	To identify barriers to good end-of-life care in low-income patients with late stages of cancer	Observational study (pilot) combined with a literature review	Income: low income (undefined) Education: n/a Occupation: n/a	Estimates related to income: n/a Estimates related to education: n/a Estimates related to occupation: n/a Summary: Providers thought hospice was discussed more often than did patients Patients differed considerably from health care providers in their perceptions of barriers to good care. Healthcare providers overestimated the barriers perceived by patients. The particular issues identified by medical personnel as barriers included transportation, insurance, unsafe neighborhood for hospice nurse visits and reluctance to discuss health issues with healthcare providers. None of these were perceived as barriers by the patients Even experienced healthcare providers cannot predict barriers to better care perceived by patients—it is imperative to ask each patient specifically about barriers to adequate palliative care	Palliative care

Another issue emerging from our findings is that none of the included studies explored patients' preferences for a rehabilitation and palliative care intervention. This knowledge is important when developing an intervention [41]. The qualitative study by Santos Salas et al. highlights that future research should address providers' knowledge and patients' preferences for community-based interventions [39]. A qualitative study by Johnston et al. described the development of an intervention aiming at increasing uptake of palliative care services for African American patients with advanced solid organ malignancies [42]. They assessed the views of the patients, their caregivers and community health providers regarding how this could be achieved. Johnston et al. [42] suggested a lay navigation model to increase uptake of palliative care and thereby reduce social disparities. This could indicate that future interventions should focus on cross-sectoral transition from hospital treatment to community-based support and care.

One unanticipated finding was that none of the included studies focused on rehabilitation. However, existing research shows that patients with advanced cancer have unmet rehabilitation needs [15,43–46]. This may be even more prevalent in the group of cancer patients with low SEP [8,11]. Socioeconomically disadvantaged patients with advanced cancer may therefore need rehabilitation in order to enable them to live as independently as possible and secure the best QoL until they die [21]. A possible explanation for this lack of rehabilitation studies may be that rehabilitation is usually not an approach that is provided within the context of palliative care [47]. Palliative care has traditionally been the chosen approach for this group of patients, focusing on improvement of QoL by prevention and relief of suffering [19] rather than focusing on optimizing functioning and reducing the experience of disability [27]. It is well established in a variety of studies that rehabilitation and palliative care can prevent decline and improve function, symptoms, mood and coping, and lead to better independence and QoL in patients with advanced cancer [16,48–50]. In addition, both research and national healthcare plans in Denmark are paying growing attention to the need for coordinating rehabilitation and palliative care [22], which is expected to enhance patients' function and QoL [47]. If these approaches are implemented inclusively, socioeconomically disadvantaged patients with advanced cancer will therefore most likely benefit from both approaches.

We used low SEP to define a disadvantaged person. However, while many scholars in the United States often define disadvantaged people in terms of ethnicity [42,51–54], older age is more commonly applied worldwide [54–57]. Moreover, other modifiable factors like lifestyle [58], health literacy [59] and social support [60] can contribute to social inequality in health. This illustrates the complexity within this field of research. Developing an intervention encompassing all these perspectives is therefore inconceivable. SEP is one of the most used definitions in the literature [11–13] and may also be a proxy for several intermediary factors, e.g., health literacy, life style and general health [10,61]. Thus, using SEP may be an appropriate way of defining a disadvantaged population.

Methodological considerations

This scoping review was meticulously conducted in accordance with the PRISMA-ScR guideline [25]. Nonetheless, it also has its limitations. It was difficult to provide precise search synonyms for the search term 'socioeconomically vulnerable'. For instance, we included synonyms such as cohabitation, family characteristics and living alone in the PubMed database search. However, we were only interested in including disadvantaged patients with advanced cancer, defined by educational level, disposable income and occupational status. Using many search terms of no relevance may have caused an imprecise search with many hits ($N = 1{,}135$ hits); yet may also have lowered the risk of missing relevant literature. We included rehabilitation or palliative care interventions abiding by the WHO definitions, such as physical exercise [19,27]. In our literature search, few search terms addressed physical exercise, and we may have used even more than the ones we chose to use. Gray literature, editorials/commentaries, guidelines, letters and conference abstracts were excluded. In addition, we excluded studies reporting in other languages than English, Danish, Norwegian and Swedish. Altogether, this may have resulted in missed articles and could have affected the findings of the present scoping review. Furthermore, our search strings did not include patients who died from cancer, which can explain the absence of a Danish register-based study by Neergaard et al. [62] that investigates the association of income on access to specialist palliative care in patients where cancer was the cause of death. The purpose of a scoping review is to identify the extent of research evidence within a specific field and identify the need for a systematic review of the available evidence [24,26]. Nevertheless, we searched in three of the largest databases (PubMed, Embase, Cinahl), assessed the reference lists of included studies and did a citation search. This scoping review provides a comprehensive overview of existing research about rehabilitation and palliative care for socioeconomically disadvantaged patients with advanced cancer.

Implications for future research

A national research center has been established in Denmark, the Danish Cancer Society National Center for Optimal Cancer Outcomes for All (COMPAS). The overall goal of COMPAS is to provide optimal cancer treatment to all Danish cancer patients irrespective of their social position, and it will seek to eliminate inequality in cancer treatment by developing and testing interventions [63]. One of the planned interventions will be focusing on social reach in rehabilitation and palliative care, the REHPA Vulnerability Study. The project aims to develop an intervention model that guides community-based rehabilitation and palliative care services for socially vulnerable patients with advanced cancer. Both register-based studies together with qualitative studies involving

patients and health providers will inform the intervention model, whose feasibility will subsequently be tested in the community. The present scoping review serves as the scientific evidence foundation for developing the intervention, particularly it highlights the need for more qualitative studies exploring patients' preferences for a rehabilitation and palliative care intervention.

Overall, very few studies were identified, which could indicate that a systematic review currently is not warranted because the research field is still not mature and needs more primary studies. These studies could very well focus on user involvement and interventions.

Conclusion

For socioeconomically disadvantaged patients with advanced cancer, research concerning access to and need for palliative care is sparse; for rehabilitation, it appears to be non-existent. The research in our scoping review mainly focused on the association of income, educational level and occupational status with receiving palliative care. Based on this scoping review, the field appears to be too immature for a systematic review. Future research should focus more on patients' perspectives and how best to reach and provide rehabilitation and palliative care to socioeconomically disadvantaged patients with advanced cancer.

Disclosure statement

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