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ORIGINAL ARTICLE

Social inequalities in supportive care needs and quality of patient-centered care of cancer patients in Mexico

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Abstract

Purpose To evaluate educational and health insurance–related inequalities in supportive care (SC) needs and quality of patient-centered care (PCC) for cancer patients in Mexico.

Methods We conducted a cross-sectional survey in one Mexican Institute of Social Security (IMSS) and one Ministry of Health (MoH) oncology hospital in Mexico City. Formal labor market workers and their families have access to social health insurance that IMSS provides, while unemployed and informal workers receive care at the MoH. The study population comprised breast, colorectal, prostate, and hematologic cancer patients, aged ≥ 18 years, who attended outpatient consultations. Patients responded a short-form SC-needs questionnaire and a quality of PCC questionnaire. We used multiple logistic regression models to determine the independent association between educational attainment and high SC-needs and quality of PCC after controlling for sociodemographic and clinical covariates.

Results We included 1058 IMSS and 606 MoH cancer patients. MoH patients perceived higher SC-needs and lower quality of PCC than IMSS patients. MoH patients with low education had a greater probability of high psychological and health system SC needs and lower likelihood of being informed for treatment decision-making and care for their biopsychosocial needs. IMSS patients with low educational levels had lower probability of receiving timely care and clarity of information than those with high education. Receiving high-quality PCC was associated with decreased SC needs.

Conclusion Uninsured cancer patients with low educational attainment have higher SC-needs and receive lower quality of PCC than their counterparts. Health services should face these challenges to reduce inequalities in Mexico.

Keywords Social inequalities · Supportive care needs · Quality of patient-centered care · Mexico

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Introduction

Growing cancer morbidity and mortality are overburdening healthcare systems in low- and middle-income countries (LMICs) [1]. In 2018, nearly 60% of new cancer cases and 70% of cancer-related deaths occurred in adults ≥ 20 years of age in LMICs [2]. Physical and psychological complications and treatment side effects negatively affect day-to-day functioning, social life, and well-being of cancer patients, requiring supportive care to address their needs and ensure optimal experiences and outcomes [3, 4]. However, most patients do not receive proper supportive care (SC) to cope with their physical, psychosocial, and information needs [3].

Additionally, LMICs have wide inequalities in cancer incidence and mortality, with shorter survival rates and lower quality of life among socially disadvantaged cancer patients in contrast with those who are better off [5]. Social inequalities are systematic disparities in the health status of groups with underlying social disadvantages. Social inequalities in health behaviors (e.g., smoking) and in cancer mortality are widely recognized. In contrast, the evidence on social inequalities in SC-needs and quality of cancer care in LMICs is scarce [5–7].

Although social inequalities arise outside the health system, healthcare is a significant determinant of health able to bridge social disparities by providing access to affordable, patient-centered, and high-quality care sensitive to the social needs of vulnerable groups [5, 6]. Patient-centered care (PCC) aims at meeting needs, expectations, and preferences of patients through respectful, continuous, and coordinated care [8, 9]. Moreover, PCC improves satisfaction and quality of life, reduces healthcare expenditures, and can reduce the supportive care needs of patients [6, 10, 11].

Mexico is an upper-middle-income country with the highest rate of social inequality across OECD countries [12]. In 2017, 30% of people aged ≥ 15 years had not completed elementary school. The widest educational lag is visible in the poor [13]. Besides, the fragmented Mexican healthcare system is inequitable and separates the population according to their employment status without considering their health needs. Formal labor market workers and their families (nearly half of the Mexican population—65 million people) [14] have access to social health insurance through the social security institutes; most are affiliated with the Mexican Institute of Social Security (IMSS). The underprivileged population, informal workers, and the unemployed receive care at the Ministry of Health (MoH) facilities. After the end of Seguro Popular in December 2019, this group lacks health insurance. Disparities are also visible in the health benefits. IMSS affiliates have access to a broader package of healthcare services than people receiving care at the MoH.

In 2018, Mexico reported 183,000 new cancer cases and 81,000 cancer deaths in persons ≥ 20 years of age [2]. Breast, prostate, colorectal, and hematologic cancers were the most common causes of cancer-related morbidity and mortality [2]. Studies in breast and other solid cancers have shown a high proportion of IMSS and MOH patients with unmet SC-needs of health system information and physical and psychological care [15, 16]. However, social inequalities in SC-needs and PCC-quality that cancer patients receive at MoH and IMSS facilities have not been ascertained.

This study had two objectives: (1) to evaluate the educational-related inequalities in SC-needs and PCC-quality for cancer patients with and without social health insurance in Mexico and (2) to assess the association between the PCC-quality and SC-needs.

Methods

We conducted a cross-sectional survey from April 2018 to September 2019 in two of the largest oncology hospitals in Mexico City selected by convenience sampling., one belonging to the MoH and the other to the IMSS.

The study population comprised outpatient cancer patients aged ≥ 18 years with breast, colorectal, prostate, and hematologic cancers (leukemia, lymphoma, or multiple myeloma). We included patients with at least one hospitalization during the last year, ≤ 5 years since diagnosis, and without mental impairment. Four fieldwork-trained nurses interviewed the patients after their medical consultations, after they had met the inclusion criteria, agreed to participate, and signed informed consent forms. Two field coordinators verified patients' diagnosis and treatment in their health records.

Study variables

The study has one independent variable (educational attainment) and two dependent variables (SC-needs and PCC-quality).

We defined educational attainment as the years of completed schooling categorized as completed elementary school or less, secondary school, and high school or higher.

To measure SC-needs, we used the short-form Supportive Care Needs questionnaire (SCNS-SF34) [17] validated in Mexico [15], which consists of 33 items grouped into five domains: (1) psychological needs, (2) health system information needs, (3) physical and daily living needs, (4) sensitivity of healthcare professionals to patient care needs, and (5) sexuality-related SC-needs. Each item has a 5-point Likert response option scale where 1 corresponds to the absence of need and 5 to high need for support. Scores for each domain were calculated according to McElduff et al. recommendations, with standardized scores ranging from 0 (no need) to 100 (high need) [18]. The Mexican SCNS-SF has a five-domain structure that accounts for 59% of total variance; the internal consistency of the factors ranges from 0.78 to 0.90; additionally, the scale has good convergent and discriminative validity [15].

To measure PCC-quality we used a patient-centered quality of cancer care questionnaire (PCQCCQ) [19] validated in Mexico [20]. This questionnaire has 30 items and encompasses five domains: (1) timely care, (2) clarity of information, (3) information for treatment decision-making, (4) care to address biopsychosocial needs, and (5) respectful and coordinated care. The score for each domain was calculated by reversing the response options, adding all subscale items and dividing them by the number of items in each factor with a minimum score of 1 and maximum of 4 per domain. The five domains of the Mexican PCQCCQ account for 96% of total variance; the internal consistency of the scale is 0.90, with Cronbach's alpha values ranging from 0.73 to 0.90 among the domains; the scale can differentiate by "known groups" (e.g., age) [20].

Study covariates comprised patient sociodemographic characteristics (gender, age, and marital status), clinical history (time since diagnosis, cancer type and stage, treatment in the last month, and anxiety, depression, and chronic illnesses other than cancer).

We categorized patient age (≤ 45, 46 to 64, and ≥ 65 years), cancer type (breast, colorectal, prostate, and hematological), cancer stage/or risk (early stage (I–II) for solid cancers or low and standard risk for hematological cancers, advanced stage (III–IV) for solid cancers or high and very high risk for hematological cancers), and time since diagnosis (≤ 6 months, 7–12 months, >1 to 5 years).

We measured anxiety and depression using the Hospital Anxiety and Depression Scale (HAD) [21] composed of 14 items previously validated in Mexico with cancer patients [22]. Each item has a 4-point Likert scale response that ranges from 0 to 3. The HAD has two factor structure that explains 48% of the variance, with the internal consistency of 0.79 and 0.80 for each subscale [22]. A cut-off value of ≥ 11 points in each domain was chosen to screen for anxiety and depression as indicated by the authors of the original scale [21].

Sample size and statistical analysis

We included a minimum of 10 participants per covariate in the multiple regression analysis [23].

We performed descriptive and exploratory analyses and found that the dependent variables (SC-needs and PCC-quality domains) did not have a normal distribution. We compared the medians of SC-needs and PCC-quality between MoH and IMSS using the Kruskal–Wallis test.

To determine the association between independent and dependent variables, we dichotomized the variables as high and low SC-needs and PCC-quality by using the 75th percentile of the total sample as a cut-off value. The distribution of variables supported this decision, including the low frequency of patients at 85th, 90th, and 95th percentiles.

First, we created five high SC-needs variables: (1) psychological needs ≥ 60.0 points, (2) health system information needs ≥ 68.2 points, (3) physical and daily living needs ≥ 65.0 points, (4) patient care needs ≥ 35.0 points, and (5) sexuality-related needs ≥ 50.0 points. Then, we built five high PCC-quality variables: (1) timely care = 4.0 points, (2) clarity of information = 4.0 points, (3) information for treatment decision-making ≥ 3.4 points, (4) care for biopsychosocial needs ≥ 2.2 points, and (5) respectful and coordinated care ≥ 3.8 points. Second, we compared participants' characteristics between MoH and IMSS and between those with and without high SC-needs and those with and without high PCC-quality using the chi-square test. Third, we estimated the crude odds ratio (OR) and 95% confidence intervals (95%CI) between the independent variables, covariates, and each dependent variable. Fourth, to determine the association between the independent (educational attainment) and dependent variables (high SC-needs and high PCC-quality domains), we built multiple logistic regression models with simultaneous inclusion of independent variable and all conceptually and clinically relevant covariates, as recommended by VanderWeele [24]. This step allowed controlling for the covariates to provide an unbiased estimate of the educational inequalities.

We chose the covariates through literature review. Previous studies have found that gender (being a woman), age (being younger), specific cancer types, advanced disease stage, short time since diagnosis, and anxiety, depression, and other comorbidities are associated with high SC-needs [3, 16, 25–29]. PCC-quality also affects SC-needs [6]. Therefore, we controlled the analysis of SC-needs including the above-mentioned covariates.

In the case of PCC-quality models, prior research reported that sociodemographic and clinical characteristics such as younger age, residence in poor areas, time since diagnosis, comorbidity, type of cancer, and type of health services were associated with cancer care quality [30]. We used the software Stata 14.0 (Stata Corp, College Station, TX, USA) for the analysis; $p < 0.05$ was set as statistically significant.

Ethics approval

The study was approved by the IMSS National Research and Ethics Committee (registry number R-2017-785-042).

Results

In both institutions a high proportion of eligible cancer patients agreed to participate (IMSS 87.9%; MoH 92.4%). The main reasons for declining to participate were lack of interest in answering the survey, lack of time, and fatigue, weakness, or pain. There were no statistically significant differences between those who accepted or declined to participate in the study regarding sex, age and cancer diagnosis.

More women participated at MoH (65.2%) compared with IMSS (49.2%). Half of IMSS participants had completed high school compared with 25% at MoH, where 74.9% completed only secondary school or less. The average age of participants was higher at IMSS than at MoH (57.8 vs. 50.2 years). Most participants were married (69.9% IMSS; 59.4% MoH) (Table 1).

At IMSS, 31% of participants had hematologic cancers, 23.4% breast or colorectal cancer, and 22.2% prostate cancer. At MoH, 40.8% of participants had breast cancer, 30.9% hematologic cancers, 16.3% colorectal cancer, and 12% prostate cancer. Most participants had been diagnosed with cancer ≤ 6 months prior (IMSS 40.6%; MoH 43.4%) or between 7 and 12 months prior (IMSS 45.2%; MoH 45.4%). In both institutions, most patients with solid cancers were at advanced stages (III–IV) or at high/very high risk in the case of hematologic cancers (67.9% IMSS; 63.4% MoH). More IMSS patients had undergone surgery in the last month (20.5% IMSS; 7.4% MoH), while more MoH patients had been receiving chemotherapy or radiotherapy (61.4% IMSS; 73.9% MoH). Comorbidities were more common in IMSS participants (48.4%) than in MoH participants (28.9%). Less than 20% of patients in both institutions had anxiety (16.5% IMSS; 13.9% MoH) or depression (14% IMSS; 10.9% MoH) (Table 1).

SC-needs were higher among MoH patients. On a 100-point scale, the highest needs were health system and information related (median: MoH 54.5 points; IMSS 34.1 points), followed by physical and daily living needs (MoH and IMSS 40.0 points) and psychological needs (35.0 points MoH; 32.5 points IMSS). Based on the 75th percentile, there were more patients with high health system and information and care SC-needs at MoH compared with IMSS (33.7% MoH; 16.8% IMSS and 34.7% MoH; 22% IMSS, respectively).

The PCC-quality was higher at IMSS than at MoH. On a 4-point scale, the respectful and coordinated care domain got the highest quality score (3.5 points IMSS; 3.3 points MoH), and the lowest was for care to address biopsychosocial needs (1.6 points IMSS; 1.4 points MoH). Based on the 75th percentile, more IMSS patients perceived high PCC-quality related to the clarity of information (IMSS 42.2%, MoH 29.4%), and fewer patients experienced high PCC-quality that addressed their biopsychosocial needs (IMSS 24.1%; MoH 18.5%) (Table 1).

High SC-needs varied significantly by schooling, gender, age, and other participant characteristics (Table 2). Compared with men, women at IMSS reported psychological and physical SC-needs more often, while men reiterated high sexuality SC-needs. In both institutions, participants with elementary schooling had more physical and daily living SC-needs than their counterparts. IMSS participants with secondary education reported psychological SC-needs more often, and those with high school reported sexuality SC-needs. Younger IMSS participants reported higher psychological, health system, and care needs compared with their counterparts. In both institutions, younger and married participants expressed high sexuality SC-needs.

As for the clinical characteristics, IMSS participants with colorectal cancer reported psychological needs more often, while patients with hematologic malignancy reported more health system and physical SC-needs. In both institutions, participants with prostate cancer expressed high sexuality SC-needs. Also, IMSS participants with ≤ 6 months since diagnosis and those who underwent surgery reported higher physical SC-needs than their counterparts. MoH patients at early cancer stages reported health system SC-needs more often.

At both institutions, patients with anxiety and depression reported high SC-needs more often than their counterparts in all domains. Patients with chronic comorbidities at IMSS reported higher physical SC-needs but fewer sexuality SC-needs. Generally, patients with high PCC-quality reported fewer SC-needs.

Table 3 shows patient perception of PCC-quality according to their characteristics. Compared with women, men at MoH reported timely care less often. In both institutions, participants with elementary schooling reported less timely care, clarity of information, and care that addressed their biopsychosocial needs compared with those with higher education. Furthermore, MoH participants with elementary schooling reported receiving less information for treatment decision-making, and married patients experienced less high-quality care that addressed their biopsychosocial needs.

Compared with other cancers, IMSS participants with colorectal cancer and MoH participants with prostate cancer reported timely care less frequently, while in both institutions, prostate cancer patients experienced high-quality care that addressed their biopsychosocial needs less often. Moreover, IMSS participants with ≤ 6 months since diagnosis reported less clarity of information and care that addressed their biopsychosocial needs, while in both institutions, these participants received less information for treatment decision-making. MoH participants at early cancer stages (III–IV) reported clarity of information and care that addressed their biopsychosocial needs less frequently. Moreover, those with surgery in the last month experienced timely care more frequently, while those with chemotherapy did not.

At IMSS, patients with anxiety and depression perceived high PCC-quality less often in almost all domains. At MoH, there were no statistically significant differences in high PCC-quality between patients with and without depression, but patients with anxiety reported timely care, respectful and coordinated care, and attention to their biopsychosocial needs less

Table 1 Characteristics of the study population

Variable	Participant with social security-IMSS ($n = 1058$)	Participant without social security-MoH ($n = 606$)
Sociodemographic characteristics	%	%
Women***	49.2	65.2
Education***		
Elementary school or less	25.5	37.1
Secondary school	24.3	37.8
High-school or higher	50.2	25.1
Age, mean (SD)*** (min-max)	57.8 (14.3) (18–88)	50.2 (14.8) (18–89)
≤ 45 years	17.4	35.2
> 46 and < 65 years	45.6	47.8
≥ 65 years	37.0	17.0
Married or free union***	69.9	59.4
Clinical history		
Primary cancer site*		
Breast	23.4	40.8
Colorectal	23.4	16.3
Prostate	22.2	12.0
Hematologic	31.0	30.9
Time since cancer diagnosis		
≤ 6 months	40.6	43.4
7–12 months	45.2	45.4
> 1 and ≤ 5 years	14.2	11.2
Advanced stage/ high risk	67.9	63.4
Surgery in the last month***	20.5	7.4
Chemotherapy and/or radiotherapy in the last month***	61.4	73.9
Comorbidities***	48.4	28.9
Anxiety	16.5	13.9
Depression	14.0	10.9
Supportive care needs	Median (percentile 25th, 75th)	Median (percentile 25th, 75th)
Psychological**	32.5 (10.0, 60.0)	35.0 (17.5, 62.5)
Health systems and information***	34.1 (13.6, 59.1)	54.5 (34.1, 77.3)
Physical and daily living	40.0 (20.0, 65.0)	40.0 (25.0, 60.0)
Care ***	10.0 (0, 30.0)	25.0 (10.0, 40.0)
Sexuality	0 (0, 50.0)	0 (0, 37.5)
High supportive care needs	%	%
Psychological*	25.5	28.4
Health systems and information***	16.8	33.7
Physical and daily living	27.3	23.1
Care ***	22.0	34.7
Sexuality*	28.5	23.8
Quality of patient-centered health care	Median (percentile 25th, 75th)	Median (percentile 25th, 75th)
Timely care***	3.0 (2.3, 4.0)	3.3 (3.0, 4.0)
Clarity of the information*	3.3 (3.0, 4.0)	3.3 (3.0, 4.0)
Information for treatment decision-making*	3.0 (2.2, 3.6)	2.8 (2.0, 3.4)
Addressing biopsychosocial needs***	1.6 (1.2, 2.2)	1.4 (1.2, 1.9)
Respectful and coordinated care***	3.5 (3.0, 3.8)	3.3 (2.8, 3.7)
High-quality of patient-centered health care	%	%
Timely care	31.7	34.6
Clarity of the information***	42.2	29.4
Information for treatment decision-making	34.0	29.5
Addressing biopsychosocial needs*	24.1	18.5
Respectful and coordinated care***	35.7	20.9

*$p < 0.05$; **$p < 0.001$; **$p < 0.0001$

often. There were no differences in PCC-quality reported by patients with and without other comorbidities.

The results of the multivariate analyses assessing association between education and high PCC-quality with SC-needs

Table 2 Cancer patients with high supportive care needs by participant sociodemographic and clinical characteristics

Variables	IMSS (*n* = 1058)					MoH (*n* = 606)				
	High supportive care needs					High supportive care needs				
	Psychological *n* = 270	Health systems and information *n* = 178	Physical and daily living *n* = 289	Care *n* = 233	Sexuality *n* = 302	Psychological *n* = 172	Health systems and information *n* = 204	Physical and daily living *n* = 140	Care *n* = 210	Sexuality *n* = 144
Gender	%	%	%	%	%	%	%	%	%	%
Women	31.7***	19.0	32.5***	23.5	22.1	30.6	32.7	22.3	36.2	18.5
Men	19.5	14.7	22.3	20.6	34.8***	24.2	35.6	24.6	31.8	33.7***
Education										
Elementary school or less	25.2	16.3	32.2*	20.0	17.0	32.0	39.1*	29.3*	35.6	24.9
Secondary school	31.5*	15.2	30.3	22.2	31.2	28.8	35.8	18.3	32.8	23.6
High-school or higher	22.8	17.9	23.3	23.0	33.2*	22.4	22.4	21.1	36.2	22.4
Age										
≤ 45 years	33.7***	22.3*	25.5	27.7**	32.6	26.8	31.9	21.1	37.6	23.5
> 45 and < 65 years	29.2	18.6	28.6	24.8	33.5***	31.0	33.8	24.8	35.2	24.8
≥ 65 years	17.1	12.0	26.6	15.9	20.5	24.3	36.9	22.3	27.2	21.4
Marital status										
Married or free union	25.0	15.8	26.2	22.2	33.1***	29.4	35.6	23.6	33.9	31.7***
Single/divorced/widowed	26.7	19.2	29.9	21.7	17.9	26.8	30.9	22.4	35.8	12.2
Clinical history										
Primary cancer site										
Breast	29.4	18.9	27.8	23.0	27.0	25.5	30.4	19.4	36.0	15.4
Colorectal	29.8*	16.5	31.0	22.6	23.8	32.3	31.3	24.2	32.3	27.3
Prostate	16.2	10.7	17.5	19.2	42.3***	21.9	39.7	23.3	26.0	38.4***
Hematologic	25.9	19.8*	31.1**	22.9	23.5	32.6	36.9	27.3	37.4	27.3
Time since cancer diagnosis										
≤ 6 months	30.7*	19.5	33.0*	25.1	28.4	27.4	38.4	22.0	33.8	26.6
7–12 months	23.0	15.7	22.4	21.1	27.6	30.2	30.6	21.8	35.3	20.0
> 1 and ≤ 5 years	18.7	12.7	26.7	16.0	32.0	25.0	27.9	32.3	35.3	27.9
Cancer stage/or risk										
Early stage or low/standard risk	23.8	16.2	25.3	22.1	28.2	28.8	41.0*	23.4	39.2	25.7
Advanced stage/high risk	26.3	17.1	28.3	22.0	28.7	28.1	29.4	22.9	32.0	22.7
Cancer treatment in the last month										
Surgery										
Yes	27.7	18.4	38.2***	25.3	29.5	28.9	33.3	26.7	37.8	24.4
No	25.0	16.4	24.5	21.2	28.3	28.3	33.7	22.8	34.4	23.7
Chemotherapy and/or radiotherapy										
Yes	26.8	17.7	27.1	21.8	27.2	30.4	35.7	23.9	35.9	23.4
No	23.5	15.4	27.7	22.3	30.6	22.8	27.9	20.9	31.0	24.7
Anxiety										
Yes	72.6***	40.0***	50.9***	47.4***	40.0***	73.8***	51.2***	50.0***	57.1***	40.5***
No	16.2	12.2	22.7	17.0	26.3	21.1	30.8	18.8	31.0	21.0
Depression										
Yes	64.9***	29.1***	59.5***	41.2***	35.8*	69.7***	51.5**	51.5***	51.5*	28.8

Table 2 (continued)

Variables	IMSS (*n* = 1058)					MoH (*n* = 606)				
	High supportive care needs					High supportive care needs				
	Psychological *n* = 270	Health systems and information *n* = 178	Physical and daily living *n* = 289	Care *n* = 233	Sexuality *n* = 302	Psychological *n* = 172	Health systems and information *n* = 204	Physical and daily living *n* = 140	Care *n* = 210	Sexuality *n* = 144
No	19.1	14.8	22.1	18.9	27.4	23.3	31.5	19.6	32.6	23.1
Comorbidities										
Yes	27.3	15.8	27.3**	22.1	25.6	26.9	29.7	26.9	30.9	25.1
No	23.8	17.8	23.8	21.9	31.2*	29.0	35.3	29.0	36.2	23.2
High-quality health care										
Timely care										
Yes	20.0	12.5	28.4	13.4	26.3	23.3	28.1	18.6	27.1	21.4
No	28.1*	18.8*	26.8	26.0***	29.6	31.1*	36.6*	25.5*	38.6*	25.0
Clarity of information										
Yes	17.4	7.6	21.5	10.3	26.6	22.5	19.7	18.0	25.8	21.3
No	31.4***	23.6***	31.6***	30.6***	29.9	30.8*	39.5***	25.2*	38.3*	24.8
Information for treatment decision-making										
Yes	15.3	8.3	22.5	8.6	26.7	24.0	15.1	16.8	23.5	21.8
No	30.8***	21.2***	29.8*	28.9***	29.5	30.2	41.5***	25.8*	39.3***	24.6
Addressing biopsychosocial needs										
Yes	16.5	5.1	14.5	8.6	22.3	22.3	9.8	13.4	15.2	10.7
No	28.4***	20.5***	31.4***	26.3***	30.5*	29.8	39.1***	25.3*	39.1***	26.7***
Respectful and coordinated care										
Yes	15.9	8.7	33.9***	8.2	27.0	19.7	13.4	15.0	18.1	21.3
No	30.9***	21.3***	23.7	29.7***	29.4	30.7*	39.0***	25.3*	39.0***	24.4

*$p < 0.05$; **$p \leq 0.001$; ***$p < 0.0001$

(Table 4) show that compared with cancer patients with a high school education, elementary school patients at MoH had increased probability of psychological SC-needs (aOR1.95, 95%CI 1.09; 3.47), whereas patients with both elementary and secondary school had high health system and information SC-needs (aOR 1.87, 95%CI 1.09; 3.19; and aOR 1.92, 95%CI 1.14; 3.23, respectively). IMSS elementary school participants had low probability of sexuality SC-needs (aOR 0.41, 95%CI 0.27; 0.62). In both institutions, perceived clarity of information, respectful and coordinated care, and care for biopsychosocial needs reduced the likelihood of high SC-needs. These associations were independent of other sociodemographic and clinical covariates.

We present the information on the magnitude of the association of covariates with SC-needs in Electronic Supplementary Material 1. Briefly, compared with men, women at IMSS had a low probability of high sexuality SC-needs, while women at MoH had elevated probability of psychological SC-needs. Being single or divorced decreased the likelihood of sexuality SC-needs for both IMSS and MoH patients. Moreover, compared with participants ≥ 65 years of age, younger IMSS patients had a higher probability of health system, care, and sexuality SC-needs. Clinical covariates significantly associated with high SC-needs were cancer type, time since diagnosis, cancer stage, surgery, comorbidity, anxiety, and depression. For instance, hematologic cancer was associated with an elevated probability of physical SC-needs among IMSS patients. Hematologic and colorectal malignancies were associated with decreased sexuality SC-needs at IMSS. At MoH, having breast cancer was associated with lower sexuality SC-needs. Shorter time since cancer diagnosis was associated with decreased physical SC-needs in MoH patients. Being at an advanced cancer stage was associated with a high probability of physical SC-needs in IMSS patients and reduced probability of health system SC-needs in MoH patients. Having surgery was associated with higher physical SC-needs among IMSS patients. In both institutions, anxiety and

Table 3 High quality of patient-centered health care by participant sociodemographic and clinical characteristics

Variable	IMSS (n = 1058)					MoH (n = 606)				
	High-quality health care					High-quality health care				
	Timely care n = 335	Clarity of the information n = 447	Information for treatment decision-making n = 360	Addressing biopsychosocial needs n = 255	Respectful and coordinated care n = 378	Timely care n = 210	Clarity of the information n = 178	Information for treatment decision-making n = 179	Addressing biopsychosocial needs n = 112	Respectful and coordinated care n = 127
Gender	%	%	%	%	%	%	%	%	%	%
Women	33.9	41.1	32.5	26.4	34.0	37.9	29.1	33.2	20.0	20.2
Men	29.6	43.3	35.5	21.9	37.4	28.4*	29.9	22.7*	15.6	22.3
Education										
Elementary school or less	25.6*	30.4***	28.5	18.5*	34.4	27.6*	22.2*	22.2*	14.2**	20.9
Secondary school	29.2	45.5	35.4	29.6	36.2	40.2	33.2	32.8	16.2	19.2
High-school or higher	36.0	46.7	36.2	24.3	36.2	36.8	34.2	35.5	28.3	23.7
Age										
≤ 45 years	39.7	42.4	37.0	27.2	33.7	33.3	32.9	32.9	22.5	18.8
> 45 and < 65 years	30.2	43.9	35.0	26.1	33.8	40.3	28.3	29.3	16.9	21.0
≥ 65 years	29.7*	40.1	31.5	20.2	39.1	21.4*	25.2	23.3	14.6	25.2
Marital status										
Married or free union	32.6	43.4	35.5	24.3	35.5	37.2	31.4	31.4	15.8*	19.7
Single/divorced/widowed	29.6	39.6	30.5	23.6	36.2	30.9	26.4	26.8	22.4	22.8
Clinical history										
Primary cancer site										
Breast	43.6	46.4	36.3	30.7	35.1	43.7	30.4	32.8	17.8	22.7
Colorectal	26.2*	41.9	31.4	30.7	29.4	31.3	27.3	26.3	18.2	20.2
Prostate	29.1	43.2	33.8	17.5***	38.9	24.7**	24.7	21.9	6.9*	19.2
Hematologic	28.7	38.7	34.4	18.9	38.7	28.3	31.0	29.9	24.1	19.8
Time since cancer diagnosis										
≤ 6 months	31.9	37.4*	27.4**	18.8***	34.2	36.1	31.2	23.6*	14.8	19.0
7–12 months	29.1	44.3	39.1	28.2	35.6	31.6	25.4	34.2	22.2	21.8
> 1 and ≤ 5 years	39.3	49.3	36.7	26.0	40.7	41.2	38.2	33.8	17.7	25.0
Cancer stage/or risk										
Early stage or low/standard risk	33.2	42.7	34.1	25.9	36.5	36.9	28.4	27.9	13.1*	21.6
Advanced stage/high risk	30.9	42.1	34.0	23.3	35.4	33.3	29.9	30.5	21.6	20.6
Cancer treatment in the last month										
Surgery										
Yes	34.1	45.6	30.9	22.6	35.9	48.9*	35.6	28.9	15.6	20.0
No	31.0	41.4	34.8	24.5	35.7	33.5	28.9	29.6	18.7	21.0
Chemotherapy and/or radiotherapy										
Yes	31.7	40.6	33.9	23.9	35.7	31.0**	28.1	27.5	19.4	19.9
No	31.6	44.9	34.3	24.5	35.8	44.9	32.9	35.4	15.8	24.0
Anxiety										
Yes	25.7	32.6**	18.3***	10.9***	22.9***	19.1***	26.2	23.8	10.7*	10.7*

Table 3 (continued)

Variable	IMSS ($n = 1058$)					MoH ($n = 606$)				
	High-quality health care					High-quality health care				
	Timely care	Clarity of the information	Information for treatment decision-making	Addressing biopsychosocial needs	Respectful and coordinated care	Timely care	Clarity of the information	Information for treatment decision-making	Addressing biopsychosocial needs	Respectful and coordinated care
	$n = 335$	$n = 447$	$n = 360$	$n = 255$	$n = 378$	$n = 210$	$n = 178$	$n = 179$	$n = 112$	$n = 127$
No	32.8	44.2	37.2	26.7	38.3	37.2	29.9	30.5	19.7	22.6
Depression										
Yes	24.3*	24.3***	21.0***	11.5***	29.1	27.3	24.2	27.3	16.7	15.2
No	32.9	45.2	36.2	26.2	36.8	35.6	30.0	29.8	18.7	21.7
Comorbidities										
Yes	31.5	42.2	33.2	22.7	35.0	33.7	30.3	29.1	13.7	24.6
No	31.9	42.3	34.8	25.5	36.5	35.0	29.0	29.7	20.4	19.5

*$p < 0.05$; **$p \leq 0.001$; ***$p < 0.0001$

depression were associated with an increased probability of high SC-needs in most domains.

Table 5 depicts the results of the multivariate analyses evaluating education-related inequalities in high PCC-quality independent of other covariates. Having elementary schooling or less was associated with a decreased probability of timely care at IMSS (aOR 0.70, 95%CI 0.49; 0.99), clarity of information received in both institutions (aOR 0.50, 95%CI 0.36; 0.69 at IMSS and aOR 0.53, 95%CI 0.32; 0.86 at MoH), quality of information for treatment decision-making at MoH (aOR 0.53, 95%CI 0.32; 0.86), and care for biopsychosocial needs at MoH in patients with elementary (aOR 0.44, 95%CI 0.25; 0.78) and secondary schooling (aOR 0.51, 95%CI 0.30; 0.86).

Electronic Supplementary Material 2 displays the information on the magnitude of the association of covariates with PCC-quality. There were no differences in high PCC-quality due to other sociodemographic covariates. In both institutions, having breast cancer was associated with a higher probability of timely care; moreover, at IMSS it was associated with care for biopsychosocial needs and at MoH, with respectful and coordinated care. However, recent diagnosis (≤ 6 months), anxiety, and depression were statistically significant clinical covariates associated with decreased probability of high PCC-quality in most quality of care domains.

Discussion

This study contributes to gaining an in-depth understanding of the inequalities of cancer care in Mexico. First, it reveals the magnitude of existing educational and health insurance-related disparities in SC-needs and PCC-quality. Second, it identifies that high PCC-quality reduces the likelihood of high SC-needs. This positive effect happens when providers address biopsychosocial needs, deliver precise information, and provide respectful and coordinated care.

Mexico has a highly fragmented healthcare sector that ties the right to healthcare to employment status, thus having separate providers for people working in the formal labor market that are affiliated with social security institutes, such as IMSS, and for those underprivileged and working in the informal labor market that lack health insurance and are cared for by the MoH. Over the last two decades, Mexico had made important progress towards universal health coverage for people without social security; however, recent changes in Mexican health policies, such as the end of Seguro Popular, create uncertainty regarding the goal of reducing inequities. This study signals that healthcare-related inequalities persist. Our study found that cancer patients without social security treated at a MoH oncology hospital perceived high SC-needs and low PCC-quality more often than patients with social security health insurance treated at IMSS. This finding is similar to a study from the USA that found insurance related disparities in

Table 4 Association of education and high quality of patient-centered care with supportive care needs of cancer patients

Variables	IMSS (n = 1058)					MoH (n = 606)				
	Psycho-logical aOR (95%CI)	Health systems and information aOR (95%CI)	Physical and daily living aOR (95%CI)	Care aOR (95%CI)	Sexuality aOR (95%CI)	Psychological aOR (95%CI)	Health systems and information aOR (95%CI)	Physical and daily living aOR (95%CI)	Care aOR (95%CI)	Sexuality aOR (95%CI)
Education-related inequalities										
Elementary school or less	1.15 (0.74; 1.78)	0.83 (0.53; 1.31)	1.27 (0.86; 1.87)	0.75 (0.49; 1.16)	*0.41*** (0.27; 0.62)*	*1.95* (1.09; 3.47)*	*1.87* (1.09; 3.19)*	1.53 (0.88; 2.66)	0.95 (0.58; 1.55)	0.86 (0.49; 1.51)
Secondary school	1.48 (0.98; 2.24)	0.71 (0.45; 1.12)	1.26 (0.86; 1.84)	0.82 (0.54; 1.24)	0.82 (0.58; 1.17)	1.56 (0.89; 2.72)	*1.92* (1.14; 3.23)*	0.74 (0.42; 1.30)	0.76 (0.47; 1.21)	0.80(0.46; 1.37)
High PCC-quality										
Timely care	0.86 (0.58; 1.29)	0.87 (0.56; 1.34)	1.07 (0.75; 1.51)	0.67 (0.44; 1.02)	0.78 (0.56; 1.10)	1.01 (0.64; 1.61)	1.08 (0.69; 1.67)	0.96 (0.60; 1.55)	0.76 (0.51; 1.16)	0.95 (0.60; 1.51)
Clarity of the information	*0.66* (0.45; 0.99)*	*0.37* (0.23; 0.57)*	*0.64* (0.45; 0.91)*	*0.41*** (0.28; 0.62)*	0.80 (0.57; 1.11)	0.79 (0.47; 1.32)	0.64 (0.39; 1.04)	0.85 (0.50; 1.42)	0.86 (0.55; 1.35)	0.80 (0.48; 1.31)
Information for treatment decision-making	0.75 (0.48; 1.15)	0.81 (0.50; 1.31)	1.02 (0.70; 1.48)	*0.51* (0.32; 0.81)*	0.97 (0.68; 1.39)	0.93 (0.55; 1.55)	*0.40** (0.24; 0.68)*	0.86 (0.50; 1.48)	0.71 (0.44; 1.13)	1.27 (0.76; 2.13)
Addressing biopsychosocial needs	0.82 (0.52; 1.29)	*0.33** (0.18; 0.62)*	*0.41*** (0.26; 0.63)*	*0.45* (0.27; 0.76)*	0.69 (0.47; 1.02)	0.86 (0.47; 1.57)	*0.29** (0.14; 0.58)*	0.53 (0.27; 1.03)	*0.34*** (0.18; 0.61)*	*0.37* (0.18; 0.76)*
Respectful and coordinated care	*0.65* (0.43; 0.97)*	*0.57* (0.36; 0.89)*	*2.72*** (1.92; 3.87)*	*0.34*** (0.22; 0.54)*	1.07 (0.78; 1.51)	0.83 (0.47; 1.46)	*0.40* (0.22; 0.73)*	0.74 (0.41; 1.34)	*0.53* (0.31; 0.90)*	1.30 (0.74; 2.27)

*$p < 0.05$; **$p \leq 0.001$; ***$p < 0.0001$. Reference categories: high school or higher, low PCC-quality for each domain. The model was adjusted by sex, age marital status, and time since diagnosis; cancer type and stage; type of treatment in the last month; and anxiety, depression, and chronic comorbidities. The values in italics highlight the statistically significant aOR

aOR adjusted odds ratio, *95%CI* 95% confidence interval

Table 5 Education-related inequalities in quality of patient-centered cancer care

Variables	IMSS ($n = 1058$)					MoH ($n = 606$)				
	Timely care	Clarity of the information	Information for treatment decision-making	Addressing biopsychosocial needs	Respectful and coordinated care	Timely care	Clarity of the information	Information for treatment decision-making	Addressing biopsychosocial needs	Respectful and coordinated care
	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)
Education-related inequalities										
Elementary school or less	*0.70* (0.49; 0.99)*	*0.50*** (0.36; 0.69)*	0.77 (0.55; 1.09)	0.80 (0.54; 1.20)	0.90 (0.64; 1.25)	0.66 (0.41; 1.07)	*0.53* (0.32; 0.86)*	*0.53* (0.32; 0.86)*	*0.44* (0.25; 0.78)*	0.77 (0.46; 1.31)
Secondary school	0.80 (0.57; 1.21)	0.98 (0.72; 1.34)	1.02 (0.73; 1.41)	*1.50* (1.05; 2.14)*	1.04 (0.75; 1.43)	1.08 (0.69; 1.69)	0.88 (0.57; 1.38)	0.88 (0.56; 1.38)	*0.51* (0.30; 0.86)*	0.79 (0.47; 1.31)

$^*p < 0.05$; $^{**}p \leq 0.001$; $^{***}p < 0.0001$. Reference category: high school or higher. The model was adjusted by sex, age marital status, time since diagnosis; cancer type and stage; type of treatment in the last month; and anxiety, depression, and chronic comorbidities. The values in italics highlight the statistically significant aOR

aOR adjusted odds ratio, *95%CI* 95% confidence interval

SC-needs among lung cancer patients, due to the fragmentation of the health sector [31].

PCC-quality is a challenge for oncology healthcare services within the resource constraints of the Mexican health system, where the model of care and services is designed without the necessary personnel and processes to satisfy SC-needs properly. Previous studies comparing the quality at IMSS and MoH that reported inconsistent results signal the necessity to improve governance of quality of care among these institutions. For instance, one study found better quality of reproductive services for adolescents at social security institutes than at the MoH [32], while another study reported higher quality diabetes care at *MoH facilities* compared with social security institutes [33].

Social inequalities are beyond the control of the health system; however, properly designed comprehensive and high-quality oncology services are helpful to mitigate such inequities. In our study, lower levels of education were associated with increased risk of high psychological and health system and information SC-needs and with a low likelihood of high PCC-quality. Several studies from high-income countries (HICs) have found that the educational level of cancer patients do not have much impact on their experiences with patient-centered care [34, 35]. Meanwhile, high PCC-quality in our study was associated with a decrease in SC-needs, especially when providers address patients' biopsychosocial needs, communicate information clearly, and provide respectful and coordinated care. These results signal the relevance of focusing interventions on improving PCC-quality and decreasing SC-needs in cancer patients with low education in Mexico.

Cancer patients with low education have shorter survival and poorer quality of life than those with higher schooling [5, 7, 36, 37]. Moreover, studies in HICs have identified pro-rich and pro-educated inequities in specialist care utilization [38, 39], clinical process quality, and patient experiences with public healthcare services [40]. These findings signal the interconnections among patient education, PCC-quality, and SC-needs that might explain education-related survival inequalities. Consequently, high PCC-quality that addresses SC-needs is an essential attribute of comprehensive cancer care [41].

Patients with low education are less prepared to interpret health information—this negatively affects their ability to navigate the health system and adhere to treatment recommendations [42]. Therefore, the health system and health providers must be prepared to effectively communicate with people with low education and inadequate health literacy [42]. Clarity of information is central to effective patient-provider communication. Poor communication negatively affects patient trust, satisfaction with care [41], pain control [43], commitment to treatment decisions [44], and caregiver burden [45]. Providing thorough and jargon-free explanations, verifying understanding, and encouraging patients to express their concerns reduce anxiety and enhance patient–provider communication [46]. Moreover, patient-centered cancer care should comprise an integrated approach to fully address the complexity of cancer [47].

The study has several strengths and limitations. First, this was a cross-sectional study that does not allow for making causal inferences or identifying the direction of association between study variables. Second, the sample included patients from two oncology hospitals in the country, limiting its generalizability. The study's strengths include having a large sample of cancer patients from two major healthcare providers in Mexico, using validated questionnaires, and addressing education and health insurance-related inequalities in SC-needs and PCC-quality for cancer patients—a poorly assessed issue in LMICs.

Conclusion

Cancer patients with low education and without social security-based health insurance have high supportive care needs and receive substandard quality of patient-centered care. Health services should face these challenges to reduce inequalities in Mexico.

Code availability Not applicable.

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Data availability The data that support the findings of this study are not publicly available due to ethical restrictions of the IMSS National Research and Ethics Committee. The authors agree to provide the journal with the data to review it if requested.

Compliance with ethical standards

Conflicts of interest The authors declare that they have no competing interests.

Ethics approval The study was approved by the IMSS National Research and Ethics Committee (registry number R-2017-785-042).

Consent to participate All patients signed consent form prior to their participation.

Consent for publication Not required.

References

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A (2018) Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 68(6):394–424
2. The Global Cancer Observatory (2019) Cancer today. Publishing WHOweb. https://gco.iarc.fr Accessed 25 april 2019
3. Okediji PT, Salako O, Fatiregun OO (2017) Pattern and predictors of unmet supportive care needs in cancer patients. Cureus 9(5): e1234. https://doi.org/10.7759/cureus.1234
4. Doubova SV, Casales-Hernández MG, Pérez-Cuevas R (2018) Supportive care needs and association with quality of life of Mexican adults with solid cancers. Cancer Nurs 41(2):E1–12
5. Vaccarella S, Lortet-Tieulent J, Saracci R, Conway DI, Straif K, Wild CP (eds) (2019) Reducing social inequalities in cancer: evidence and priorities for research (IARC Scientific Publication No. 168). International Agency for Research on Cancer, Lyon Available from: http://publications.iarc.fr/580
6. Kruk ME, Gage AD, Arsenault C, Jordan K, Leslie HH, Roder-DeWan S, Adeyi O, Barker P, Daelmans B, Doubova SV, English M, Elorrio EG, Guanais F, Gureje O, Hirschhorn LR, Jiang L, Kelley E, Lemango ET, Liljestrand J, Malata A, Marchant T, Matsoso MP, Meara JG, Mohanan M, Ndiaye Y, Norheim OF, Reddy KS, Rowe AK, Salomon JA, Thapa G, Twum-Danso NAY, Pate M (2018) High-quality health systems in the sustainable development goals era: time for a revolution. Lancet Glob Health 6(11):e1196–e1252
7. Ashley L, Lawrie I (2016) Tackling inequalities in cancer care and outcomes: psychosocial mechanisms and targets for change. Psychooncology. 25(10):1122–1126
8. Institute of Medicine (2001) A new health system for the 21st century. In Committee on Quality of Healthcare in America. Crossing the Quality Chasm. Academy Press, Whashington, DC. Publishing http://www.nap.edu/openbook.php?isbn=0309072808
9. Bibby J, Gershlick B (2014) The hidden inequality: what can person-centred care tell us about present and future inequalities in cancer care? In: The dividing line in cancer care for 2030. Publishing, Exploring the effect of inequalities on four million lives. Macmillan Cancer Support. https://www.macmillan.org.uk/documents/aboutus/research/inclusionprojects/the-dividing-line-in-cancer-care-for-2030.pdf
10. Liang H, Tao L, Ford EW, Beydoun MA, Eid SM (2018) The patient-centered oncology care on health care utilization and cost: a systematic review and meta-analysis. Health Care Manag Rev:1. https://doi.org/10.1097/HMR.0000000000000226
11. An J, Lau A (2018) Economic evaluation of patient-centered care among long-term cancer survivors. Am J Manag Care 24(9):e292–e299
12. Organization For Economic Cooperation and Development (2008) Growing unequal? Income distribution and poverty in OECD. Publishing OECDweb, Countries http://www.oecd.org/mexico/41527666.pdf
13. Instituto Nacional de Estadística y Geografía (México) (2018) Mujeres y hombres en México 2018. Publishing Instituto Nacional de Estadística y Geografía. México (INEGI) web http://cedoc.inmujeres.gob.mx/documentos_download/MHM_2018.pdf
14. Instituto Mexicano del Seguro Social (2018) Reporte al Ejecutivo Federal y al Congreso de la Unión de la situación financiera y los riesgos del Instituto Mexicano del Seguro Social (2017-2018) Report to the Federal Executive and the Congress of the Union on the financial situation and risks of the Mexican Institute of Social Security 2017-2018. Mexico. Publishing IMSSweb http://www.imss.gob.mx/sites/all/statics/pdf/informes/20172018/21-InformeCompleto.pdf
15. Doubova SV, Aguirre-Hernandez R, Gutierrez De la Barrera M, Infante-Castañeda C, Pérez-Cuevas R (2015) Supportive care needs of Mexican adult cancer patients: validation of the Mexican version of the Short-Form Supportive Care Needs Questionnaire (SCNS-SFM). Support Care Cancer 23(9):2711–2719

16. Pérez-Fortis A, Fleer J, Sánchez-Sosa JJ, Veloz-Martínez MG, Alanís-López P, Schroevers MJ, Ranchor AV (2017) Prevalence and factors associated with supportive care needs among newly diagnosed Mexican breast cancer patients. Support Care Cancer 25(10):3273–3280
17. Boyes A, Girgis A, Lecathelinais C (2009) Brief assessment of adult cancer patients' perceived needs: development and validation of the 34-item Supportive Care Need Survey (SCNS-SF34). J Eval Clin Pract 15:602–606
18. McElduff P, Boyes A, Zucca A, Girgis A (2004) Supportive care needs survey: a guide to administration, scoring and analysis. Centre for Health Research & Psycho-oncology. Publishing, ewcastle https://swscs.med.unsw.edu.au/publication/supportive-care-needs-survey-guide-administration-scoring-and-analysis
19. Tzelepis F, Sanson-Fisher RW, Hall AE, Carey ML, Paul CL, Clinton-McHarg T (2015) Development and psychometric evaluation of the quality of patient-centered cancer care measure with hematological cancer survivors. Cancer 121:2383–2392
20. Doubova SV, Martínez-Vega IP, Gutiérrez-De-la-Barrera M, Infante-Castañeda C, Aranda-Flores CE, Monroy A et al (2020) Psychometric validation of a patient-centered quality of cancer care questionnaire in Mexico. BMJ open:e033114. https://doi.org/10.1136/bmjopen-2019-033114
21. Zigmond A, Snaith RP (1983) The hospital anxiety and depression scale. Acta Psychiatr Scand 67:361–370
22. Galindo Vázquez O, Benjet C, Juárez García F, Rojas Castillo E, Riveros Rosas A, Aguilar Ponce JL et al (2015) Psychometric properties of the Hospital Anxiety and Depression Scale (HADS) in a Mexican population of cancer patients. Salud Mental 38(4):253–258
23. Wilson-VanVoorhis CR, Morgan BL (2007) Understanding power and rules of thumb for determining sample sizes. Tutor Quant Methods Psychol 3:43–50
24. VanderWeele TJ, Shpitser I (2011) A new criterion for confounder selection. Biometrics 67(4):1406–1413
25. Liao MN, Chen SC, Chen SC, Lin YC, Hsu YH, Hung HC et al (2012) Changes and predictors of unmet supportive care needs in Taiwanese women with newly diagnosed breast cancer. Oncol Nurs Forum 39(5):380–389
26. Smith AB, King M, Butow P, Luckett T, Grimison P, Toner GC et al (2013) The prevalence and correlates of supportive care needs in testicular cancer survivors: a cross-sectional study. Psychooncology 22(11):2557–2564
27. Fiszer C, Dolbeault S, Sultan S, Brédart A (2014) Prevalence, intensity, and predictors of the supportive care needs of women diagnosed with breast cancer: a systematic review. Psychooncology 23(4):361–374
28. Sutherland G, Hill D, Morand M, Pruden M, McLachlan SA (2009) Assessing the unmet supportive care needs of newly diagnosed patients with cancer. Eur J Cancer Care (Engl) 18(6):577–584
29. Hall A, D'Este C, Tzelepis F, Lynagh M, Sanson-Fisher R (2014) Factors associated with haematological cancer survivors experiencing a high level of unmet need across multiple items of supportive care: a cross-sectional survey study. Support Care Cancer 22(11):2899–2909
30. Burmeister EA, O'Connell DL, Jordan SJ, Goldstein D, Merrett N, Wyld DK, Beesley VL, Gooden HM, Janda M, Neale RE (2016) Factors associated with quality of care for patients with pancreatic cancer in Australia. Med J Aust 205(10):459–465
31. John DA, Kawachi I, Lathan CS, Ayanian JZ (2014) Disparities in perceived unmet need for supportive services among patients with lung cancer in the Cancer Care Outcomes Research and Surveillance Consortium. Cancer 120:3178–3191
32. Villalobos A, Allen-Leigh B, Salazar-Alberto J, De Castro F, Barrientos-Gutiérrez T, Leyva-López A et al (2017) Quality of reproductive healthcare for adolescents: a nationally representative survey of providers in Mexico. PLoS One 12(3):e0173342. https://doi.org/10.1371/journal.pone.0173342
33. Flores-Hernández S, Saturno-Hernández PJ, Reyes-Morales H, Barrientos-Gutiérrez T4, Villalpando S, Hernández-Ávila M (2015) Quality of diabetes care: the challenges of an increasing epidemic in Mexico. Results from two national health surveys (2006 and 2012). PLoS One 10(7):e0133958. https://doi.org/10.1371/journal.pone.0133958
34. Suhonen R, Stolt M, Berg A, Katajisto J, Lemonidou C, Patiraki E, Sjövall K, Charalambous A (2018) Cancer patients' perceptions of quality-of-care attributes—associations with age, perceived health status, gender and education. J Clin Nurs 27:306–316
35. Rademakers J, Delnoij D, Nijman J, de Boer D (2012) Educational inequalities in patient-centred care: patients' preferences and experiences. BMC Health Serv Res 12:261. https://doi.org/10.1186/1472-6963-12-261
36. Hussain SK, Lenner P, Sundquist J, Hemminki K (2008) Influence of education level on cancer survival in Sweden. Ann Oncol 19(1):156–162
37. Aarts MJ, Kamphuis CB, Louwman MJ, Coebergh JW, Mackenbach JP, van Lenthe FJ (2013) Educational inequalities in cancer survival: a role for comorbidities and health behaviours? J Epidemiol Community Health 67(4):365–373
38. Vikum E, Krokstad S, Westin S (2012) Socioeconomic inequalities in health care utilisation in Norway: the population-based HUNT3 survey. Int J Equity Health 11:48. https://doi.org/10.1186/1475-9276-11-48
39. Bago d'Uva T, Jones MA (2009) Health care utilisation in Europe: new evidence from the ECHP. J Health Econ 28:265–279
40. Cookson R, Propper C, Asaria M, Raine R (2016) Socio-economic inequalities in health Care in England. Fisc Stud 37:371–403
41. Venetis MK, Robinson JD, Turkiewicz KL, Allen M (2009) An evidence base for patient-centered cancer care: a meta-analysis of studies of observed communication between cancer specialists and their patients. Patient Educ Couns 77(3):379–383
42. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K (2011) Low health literacy and health outcomes: an updated systematic review. Ann Intern Med 155(2):97–107
43. Street RL Jr, Tancredi DJ, Slee C, Kalauokalani DK, Dean DE, Franks P, Kravitz RL (2014) A pathway linking patient participation in cancer consultations to pain control. Psychooncology 23:1111–1117
44. Kahn KL, Schneider EC, Malin JL, Adams JL, Epstein AM (2007) Patient centered experiences in breast cancer: predicting long-term adherence to tamoxifen use. Med Care 45:431–439
45. Van Ryn M, Sanders S, Kahn K, van Houtven C, Griffin JM, Martin M et al (2011) Objective burden, resources, and other stressors among informal cancer caregivers: a hidden quality issue? Psychooncology 20:44–52
46. Epstein RM, Street RL Jr (2007) Patient-centered communication in Cancer care: promoting healing and reducing suffering. National Cancer Institute. NIH publication no. 07-6225. Bethesda, MD. Publishing. https://pubs.cancer.gov/ncipl/detail.aspx?prodid=T099
47. Institute of Medicine (IOM) (2008) Cancer care for whole patient: meeting pshychosocial health needs. The National Academies Press, Washington, DC. Publishing https://pubmed.ncbi.nlm.nih.gov/20669419-cancer-care-for-the-whole-patient-meeting-psychosocial-health-needs/