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Association of demographic, economic and clinical variables in daily activities and symptoms presented by patients in cancer treatment

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ABSTRACT

Objective: To investigate the association between demographic, economic and clinical variables, cancer symptoms, and daily life interference in patients receiving cancer treatment in Brazil.

Methods: In this cross-sectional study, 268 patients were assessed. A questionnaire was used to collect data on demographic, economic and clinical variables, and the M.D. Anderson Symptom Inventory was used to assess cancer symptoms. Data were analyzed using bivariate and multivariate descriptive statistics.

Findings: The following variables were associated with higher symptom scores: female sex (prevalence ratio [PR]=1.28; 95% confidence interval [95% CI] 1.06-1.53), illiteracy or ≤ 9 years of formal education (PR=1.40; 95% CI 1.08-1.82), clinical equipment or situations that requiring nursing care (PR=1.23; 95% CI 1.03-1.46), and family history of cancer (PR=1.23; 95% CI 1.04-1.45). Daily life interference was associated with female sex (PR=1.40; 95% CI 1.12-1.75), secondary tumour (PR=1.42; 95% CI 1.16-1.74) and radiotherapy (PR=1.24; 95% CI 1.01-1.51).

Conclusion: Management of cancer patients requires multidisciplinary knowledge, taking into consideration all the subjective dimensions of the patients. Knowing the profile of patients most strongly affected by symptoms will help them face the limitations and consequences of the disease and its treatment.

Key words: symptoms, neoplasms, social condition

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INTRODUCTION AND PURPOSE

At present, non-communicable chronic diseases, including malignant neoplasms, have been considered a major cause of morbidity and mortality, accounting for loss of quality of life and having effects on the patients' lives in terms of physical and psychological limitations, as well as economic impacts on families (Brasil, 2011). Cancer patients often report symptoms such as pain, fatigue, shortness of breath, dry mouth, tingling, sleepiness, nausea and vomiting, as well as emotional symptoms that are often associated with physical symptoms, but rarely treated (Reilly et al., 2013).

The presence and worsening of signs and symptoms depends on the stage of cancer, on the variety of treatments received (surgical and/or clinical), on the patient's sex, education level, working status, marital status (living with a partner or not), and on daily life activity limitations (Zhang et al., 2015). The severity of symptoms may have serious impacts on the daily lives of patients, interfering with their functioning, general activities, work, mood, and ability to enjoy life and relate with other people (Pan et al., 2012).

Knowledge of the prevalence of symptoms in cancer patients can help health professionals to improve clinical practice by anticipating potential problems, planning treatment, managing symptoms, and working together with patients and family members (Abu-Saad, Huijer, Doumit, Abboud, & Dimassi, 2012). In this sense, the recent and increasing use of an instrument specifically designed to measure symptoms, namely the M.D. Anderson Symptom Inventory, has shed light on the prevalence of cancer symptoms and their interference in daily life. Studies have been conducted in countries with very different socioeconomic and cultural profiles, such as Japan, China, Russia, South Korea, Thailand, The Philippines, Saudi Arabia, and Brazil (Cleeland et al., 2000; Okuyama et al., 2003; Mystakidou et al., 2004; Wang et al., 2004; Ivanova et al., 2005; Yun et al., 2006; Lin, Chang, Cleeland, Mendoza, & Wang, 2007; Wang et al., 2010; Guirimand et al., 2010; Kolankiewicz, De Domenico, Lopes, & Magnago, 2014).

Taking into consideration that cancer symptoms limit activities of daily living, biopsychosocial functioning, and productivity, the objective of the present study was to investigate the associations between demographic, economic and clinical variables, cancer symptoms, and symptom interference with daily life in the last 24 hours in patients receiving cancer treatment.

METHODS

Patient Accrual

In this cross-sectional study, cancer patients receiving outpatient treatment at a cancer referral service at Hospital de Caridade de Ijuí (HCI), state of Rio Grande do Sul, southern Brazil, were assessed. Patients were selected by convenience sampling, according to the appointment schedule. The following inclusion criteria were taken into consideration: having a medical diagnosis of cancer, being under treatment for at least three months, having no psychological and cognitive conditions that would prevent answering the instrument (as per medical record), and residing in the municipality of Ijuí. Patients younger than 18 years were excluded.

The hospital provided a list of 790 cancer patients registered at the service and residing in the town. Following application of inclusion and exclusion criteria, 471 were excluded, resulting in a total of 319 eligible patients. Of these, 46 (14.4%) died during the period of data collection, 3 (0.9%) did not attend the appointments to receive endocrine therapy (were restricted to bed at their homes), and 2 (0.6%) refused to participate in the study—a total of 51 (16%) patients lost.

The number of patients required for statistical representativeness in the study was assessed using the following criteria: estimated proportion of 50%, sample error of 5%, and a significance level of 5%. Sample size calculation resulted in needing a minimum of 176 patients for this study. The study was approved by the Research Ethics Committee of Universidade Federal de São Paulo (UNIFESP; protocol no. 47215/2012). All patients signed an informed consent form prior to their inclusion in the study.

Data were collected from July to December 2012. Patients were invited to join the study during their scheduled visits to the unit for consultation or to receive a treatment. Data collection was performed by one of the authors, a doctoral student during this period, and also by previously trained nursing students. A pilot study was conducted with 10 patients in order to test the instrument, but these individuals were excluded from the study.

Data Collection Tools

An instrument developed by the research team specifically for this study was used to collect demographic and economic data (i.e., sex, age, skin colour, education level, family income, marital status, and current working status), as well as clinical data (i.e., primary or secondary tumour, cancer stage, current adjuvant and neoadjuvant therapy, surgery, use of medical devices such as drains, probes, catheters, and cannulas, presence of stomata, and family history of cancer).
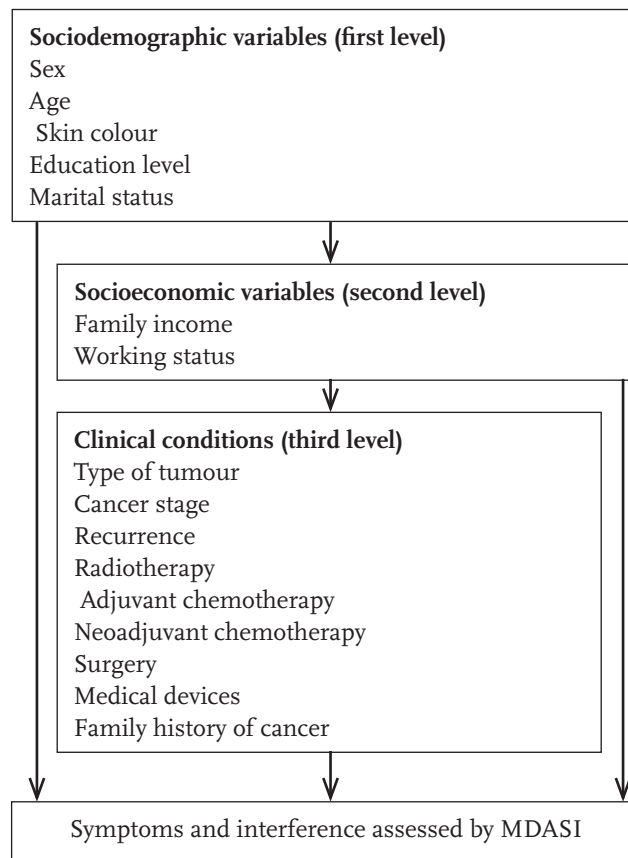
In addition, the M.D. Anderson Symptom Inventory (core MDASI) was used to assess symptoms and daily life interference in the past 24 hours of life. The version employed was translated into Brazilian Portuguese by Ferreira et al. (2008) and has been validated for use in the Brazilian population (Kolankiewicz et al., 2014). However, it was important to conduct this study in Brazil, given that there are no data using this instrument in the Brazilian population. This instrument assesses the severity of symptoms (i.e., pain, fatigue, nausea, disturbed sleep, emotional distress, shortness of breath, lack of appetite, drowsiness, dry mouth, sadness, vomiting, difficulty remembering, and numbness or tingling) (Cleeland et al., 2000) and symptom interference with daily life (i.e., general activity, mood, walking ability, normal work, relations with other people, and enjoyment of life). Every symptom or interference item is scored according to a 10-point scale (0-10) to indicate the presence and severity of symptoms. Zero means "not present/did not interfere" and 10 means "as bad as you can imagine/interfered completely". All symptoms were scored in consideration of their worst moment in the last 24 hours (Cleeland et al., 2000). The use of the core MDASI was authorized by The University of Texas MD Anderson Cancer Center.

Data Analysis

All data were entered into Epi-Info® version 6.04, with double entry. Following correction of errors and inconsistencies, statistical analyses were performed in the Statistical Package for the Social Sciences (SPSS) version 18.0 for Windows.

Figure 1: Hierarchical conceptual model used in the multivariate analysis. MDASI = M.D. Anderson Symptom Inventory.

Sociodemographic variables (first level)
Sex
Age
 Skin colour
Education level
Marital status

Socioeconomic variables (second level)
Family income
Working status

Clinical conditions (third level)
Type of tumour
Cancer stage
Recurrence
Radiotherapy
 Adjuvant chemotherapy
Neoadjuvant chemotherapy
Surgery
Medical devices
Family history of cancer

Symptoms and interference assessed by MDASI

In the analysis of variables, at first, descriptive statistics were used (mean, median, standard deviation, minimum and maximum, absolute and relative frequencies) according to type of variable and normality of distribution (Kolmogorov-Smirnov test). Subsequently, bivariate analyses were used to test the association between exposure (demographic, economic, and clinical variables) and the outcomes (symptoms and daily life interference), using the Chi-square test or Fisher's exact test, as appropriate. Significance was set at 5%.

In the multivariate analysis, a hierarchical model was used in which sex, age, skin colour, education level, and marital status were considered to determine demographic conditions (first level); family income and working status were considered to determine socioeconomic conditions (second level); and level 3, in turn, determined clinical conditions (type of tumour, cancer stage, recurrence, type of treatment, use of medical devices, and family history of cancer) (third level) (Figure 1). These categories were considered to determine the outcomes of interest (symptoms and daily life interference).

Variables showing $p < 0.25$ were considered to be confounding factors and were, therefore, included in the multivariate analysis, using adjusted Poisson regression with robust variance, which allows to estimate prevalence ratios (PR). Association measures were expressed as PR and 95% confidence intervals (95% CI). Associations showing $p < 0.05$ were considered statistically significant.

Results

The sample included 268 cancer patients. The ages ranged from 18 to 106 years (mean: 61.5±14.9 years). There was a predominance of females (64.2%), married patients or patients living with partners (61.2%), incomplete primary education (53.7%), and per capita family income of < US$ 301.21, equivalent to one minimum salary (59.3%). One hundred and three patients (38.4%) reported consanguineous family history of cancer; of these, 45 (43.7%) reported a history of first-degree relatives, 35 (34.1%) second-degree, 21 (20.4%) third-degree, and 2 (1.9%) fourth-degree relatives.

Of the total sample, 28.4% were receiving treatment for a secondary tumour, and 51.8% were in stage III/IV. In relation to the therapies received or currently ongoing, 77.6% received surgery, 48.1% radiotherapy, 70.5% adjuvant chemotherapy, and 33.2% neoadjuvant chemotherapy.

With regard to tumour location, the results were as follows: breast 117 (43.7%), prostate 39 (14.6), colon 20 (7.5%), head and neck 13 (4.9%), skin 9 (3.35%), anus 8 (3.0%), lung 8 (3.0%), chronic myeloid leukemia 7 (2.6%), bladder 4 (1.5%), esophagus 4 (1.5%), cervix uteri 6 (2.2%), ovary 4 (1.5%), endometrium 3 (1.1%), testicle 3 (1.1%), pancreas 3 (1.1%), and other locations 8 (3.5%).

Of all the patients assessed, 66 (24.6%) had clinical equipment or situations requiring nursing care. Of these, 33 (13.2%) had a port-a-cath, 14 (5.6%) intestinal stoma, 8 (3.2%) surgical

Table 1: Bivariate and multivariate analysis testing the association between cancer symptoms as measured by MDASI and demographic, economic, and clinical variables (Brazil, 2012)

Variables	Mean	SD	cPR	95%CI	P	aPR	95%CI	P
Level 1 - Demographic variables*								
Sex					0.008			0.010
Male	25.86	19.42	1			1		
Female	33.07	22.42	1.28	1.07-1.54		1.28	1.06-1.53	
Age (years)					0.312			
18-39	35.69	28.45	1					
40-59	31.03	22.04	0.78	0.54-1.14				
≥ 60	29.15	19.91	0.75	0.52-1.09				
Skin color/race					0.363			
Indigenous	39.75	14.63	1					
White	29.96	20.83	0.76	0.55-1.09				
Black	34.50	18.88	0.87	0.52-1.44				
Brown	31.51	26.82	0.79	0.53-1.19				
Education level					0.045			0.036
Illiteracy/primary education	31.77	22.93	1.36	1.07-1.73		1.40	1.08-1.82	
Secondary education	30.08	20.37	1.29	0.97-1.71		1.25	0.94-1.67	
Undergraduate/graduate	23.40	14.46	1			1		
Marital status					0.400			
Single/no partner	30.67	20.20	1.08	0.91-1.28				
Married	29.92	21.90	1					

Level 2 - Socioeconomic variables*								
Family income (dollars‡)					0.530			
< 301.21	37.13	23.53	1.36	0.99-1.86				
301.21-1204.84	28.86	19.93	1.08	0.81-1.43				
> 1204.84	27.00	22.39	1					
Current work					0.265			
No	30.88	21.51	1					
Yes	27.37	19.91	0.88	0.70-1.10				
Level 3 - Clinical conditions†								
Tumour					0.440			
Primary	29.41	23.13	1					
Secondary	32.16	18.63	1.07	0.90-1.27				
Stage					0.949			
I	30.03	24.03	1					
II	29.11	19.30	1.02	0.75-1.40				
III	30.98	22.91	1.03	0.75-1.43				
IV	30.73	20.59	0.97	0.71-1.32				
Recurrence					0.397			
No	26.89	21.24	1					
Yes	30.83	21.21	1.12	0.87-1.44				
Radiotherapy					0.715			
No	26.89	21.24	1					
Yes	29.47	22.34	1.03	0.87-1.23				
Adjuvant chemotherapy					0.411			
No	32.02	20.78	1					
Yes	29.59	21.39	0.93	0.77-1.11				
Neoadjuvant chemotherapy					0.278			
No	29.02	20.78	1					
Yes	32.88	22.09	1.11	0.92-1.32				
Surgery					0.958			
No	29.43	23.13	1					
Yes	30.41	20.76	1.00	0.80-1.26				
Medical devices					0.042			0.020
No	28.44	20.99	1			1		
Yes	35.19	21.24	1.20	1.01-1.44		1.23	1.03-1.46	
Family history					0.010			0.015
No	27.96	20.93	1			1		
Yes	33.91	21.28	1.25	1.06-1.48		1.23	1.04-1.45	

MDASI = M.D. Anderson Symptom Inventory; cPR = crude prevalence ratio; aPR = adjusted prevalence ratio.

* Level 2: prevalence ratio adjusted for sex, age, education level, and family income.

† Level 3: prevalence ratio adjusted for sex, age, education level, family income, type of tumour, surgery, recurrence, radiotherapy, neoadjuvant chemotherapy, adjuvant chemotherapy, medical devices, cancer stage, and family history.

‡ The exchange rate in December 2012 was US$ 1.00 = R$ 3.21.

wound dressing, 2 (0.8%) nasoenteric tube, 2 (0.8%) nasogastric tube, 2 (0.8%) nasoenteric tube and port-a-cath, 2 (0.8%) intestinal stoma and port-a-cath, 1 (0.4%) gastrostomy, surgical wound, and penrose drain, 1 (0.4%) oncological wound, and 1 (0.4%) pace maker.

In symptom assessment, 50% of the patients assigned a score of 4 to fatigue (range: 0 to 10) and a score of 2 to emotional distress and dry mouth. The symptoms most frequently reported were fatigue (63.1%), difficulty remembering (56.2%), emotional distress (54.5%), and dry mouth (54.5%). These were also the symptoms with the highest mean scores: 3.52±3.26, 3.11±3.37, 3.36±3.64, and 3.34±3.63 respectively.

Symptom interference with daily life was reported more frequently for general activities (59.7%), work (54.9%), and walking ability (49.3%), with the following mean scores: 3.97±3.77, 3.77±3.87, and 3.21±3.77 respectively. The median score for daily life interference in 50% of the participants was 4 for general activities and 3 for work.

Even after adjustment, the following variables remained significantly associated with the outcome, i.e., with higher cancer symptom scores: female sex (PR = 1.28; 95% CI 1.06-1.53), illiteracy or ≤ 9 years of formal education (PR = 1.40; 95% CI 1.08-1.82), use of clinical equipment (PR = 1.23; 95% CI 1.03-1.46), and family history of cancer (PR = 1.23; 95% CI 1.04-1.45). These data are presented in Table 1. Likewise, following adjustment, daily life interference in the last 24 hours in cancer patients was significantly associated with female sex (PR = 1.40; 95% CI 1.12-1.75), having a secondary tumour (PR = 1.42; 95% CI 1.16-1.74), and being on radiotherapy (PR = 1.24; 95% CI 1.01-1.51). These data are shown in Table 2.

DISCUSSION

The present study was designed to investigate the association between demographic, economic and clinical variables, cancer symptoms, and daily life interference in patients receiving cancer treatment in Brazil. The findings showed that cancer symptoms interfered with the patients' lives, especially in the performance of general and work activities as well as their walking ability. It was also observed that illiterate patients and those with a low education level had 40% more symptoms when compared with patients with more years of formal education. These data raise the consideration that for patients with low education, the practice in oncology should adapt the monitoring system for signs and symptoms so that it is through face to face medical and nursing consultations more frequently, or by telephone, to ensure early identification of signs and symptoms and adoption of supportive measures (Halverson et al., 2015).

Patients with clinical artifacts or situations requiring nursing care reported 23% more symptoms when compared with patients without them, and patients with a family history of cancer reported 23% more symptoms. Female patients, those with fewer years of formal education, with a family history of cancer, and with clinical equipment or situations requiring nursing care showed higher symptom scores. Daily life interference was statistically associated with female sex, having a secondary tumour, and being on radiotherapy.

Treatment of cancer patients may include performing various procedures that require specific care including catheterization, wounds (surgical or oncological), stomata and drains. Certainly such care can lead to physical and emotional discomforts, as well as require a caregiver, family or not, to help in the realization of care. As most of our sample were women and, usually, the person appointed to be the family caregiver, we may presume that many of these patients were responsible for their own care. This may explain the increased awareness of symptoms and limitations for the activities of daily living (64.2%). Another analytical perspective is that women may have a more accurate perception of signs and symptoms, as a result of their familiarity with disease processes and their abilities acquired while in the role of family caregiver (Araújo, Araújo, Souto, & Oliveira, 2009).

Many patients of our sample had a low income and a poor education level (or no formal education at all). In a previous study involving Jewish women with breast cancer, higher education level was associated with a perception of symptoms as less severe (Prigozin, Uziely, & Musgrave, 2010). Also, higher prevalence rates of chronic diseases have been reported in populations with low education and income levels (Wang, Schmitz, & Dewa, 2010). This could be explained by a higher exposure of these populations to risk factors, combined with limited access to health care (Brasil, 2016).

The data in this study reinforce the need for intensive monitoring of signs and symptoms, as well as the comprehensive care of cancer patients, emphasizing the importance of professional nursing and social work. The cancer patient who has low per capita income, lower education levels and, as a consequence, may be less able to understand the risks and difficulties or be able to acquire skills for the management of care and control of signs and symptoms. These individuals should be identified early and have joint interdisciplinary action.

In Brazil, despite the existence of the Unified Health System (Sistema Único de Saúde, SUS), available for free and throughout the country, disease has a strong economic impact on patients and their families. This is especially the case in terms of decreasing the per capita family income and incurring expenses related to transport to appropriate healthcare centres, not to mention other sources of financial burden resulting from chronic disease processes (Brasil, 2011).

Along the same line, the planning of interventions and of the entire treatment process may fail, as a result of the patient's life conditions, especially poverty and low education level (Menezes, Camargo, Guedes, & Alcântara, 2007). The care offered to cancer patients in these circumstances is a challenge to health practitioners. The actions necessary to treat the disease involve all levels of the healthcare system and require technological, diagnostic, and therapeutic resources that are not always available to populations from a lower socioeconomic background (Menezes et al., 2007). In addition to these characteristics of vulnerability of our population, signs and symptoms that are inherent to cancer may cause social problems that interfere with daily life and decrease the patients' ability to work and to relate with friends and family members. They may also cause psychological problems (Somjaaivong, Thanasilp, Preechawong, & Sloan, 2011).

Table 2: Bivariate and multivariate analysis testing the association between daily life interference and demographic, economic, and clinical variables (Brazil, 2012)

Variables	Mean	SD	cPR	95%CI	p	aPR	95%CI	p
Level 1 - Demographic variables*								
Sex					0.016			0.003
Male	14.20	14.13	1			1		
Female	18.46	15.40	1.33	1.06-1.68		1.40	1.12-1.75	
Age (years)					0.251			
18-39	18.80	17.21	1					
40-59	18.76	14.97	0.88	0.57-1.36				
≥ 60	15.56	14.85	0.21	0.49-1.16				
Skin colour/race					0.380			
Indigenous	28.50	21.44	1					
White	17.02	14.99	0.60	0.31-1.14				
Black	20.67	20.02	0.73	0.28-1.88				
Brown	15.83	13.93	0.56	0.28-1.11				
Education level					0.948			
Illiteracy/primary education	16.95	15.37	0.95	0.69-1.30				
Secondary education	17.37	14.30	0.96	0.67-1.38				
Undergraduate/graduate	17.50	14.79	1					
Marital status					0.876			
Single/no partner	16.15	15.50	1					
Married	17.38	14.82	1.02	0.82-1.27				
Level 2 - Socioeconomic variables*								
Family income (dollars‡)					0.271			0.110
< 301.21	20.00	17.50	1.26	0.86-1.84		1.32	0.93-1.89	
301.21-1204.84	16.17	14.06	1.02	0.74-1.41		1.06	0.79-1.44	
> 1204.84	16.22	15.90	1			1		
Current work					0.760			
No	17.74	15.24	1					
Yes	13.40	13.90	0.75	0.55-1.03				
Level 3 - Clinical conditions†								
Tumour					0.029			0.001
Primary	15.77	15.09	1			1		
Secondary	19.65	14.71	1.26	1.02-1.56		1.42	1.16-1.74	

			cPR		p-value*	aPR		p-value†
Stage					0.211			
I	13.22	15.50	1					
II	17.38	14.82	1.27	0.85-1.90				
III	15.83	15.12	1.19	0.79-1.82				
IV	19.55	16.02	1.48	0.99-2.19				
Recurrence					0.658			
No	15.46	14.30	1					
Yes	17.16	15.22	1.07	0.80-1.44				
Radiotherapy					0.043			0.039
No	14.91	13.36	1			1		
Yes	18.86	16.37	1.24	1.01-1.53		1.24	1.01-1.52	
Adjuvant chemotherapy					0.278			
No	19.30	15.67	1					
Yes	16.12	14.81	0.89	0.71-1.10				
Neoadjuvant chemotherapy					0.804			
No	16.47	14.80	1					
Yes	17.87	15.68	1.02	0.82-1.28				
Surgery					0.824			
No	16.76	14.79	1					
Yes	16.95	15.16	1.03	0.80-1.32				
Medical devices					0.347			
No	16.46	15.41	1					
Yes	18.22	14.01	1.11	0.89-1.38				
Family history					0.016			0.147
No	15.11	14.23	1			1		
Yes	19.86	15.97	1.29	1.04-1.59		1.18	0.95-1.46	

cPR = crude prevalence ratio; aPR = adjusted prevalence ratio.
* Level 2: prevalence ratio adjusted for sex, age, education level, and family income.
† Level 3: prevalence ratio adjusted for type of tumour, surgery, recurrence, radiotherapy, neoadjuvant chemotherapy, adjuvant chemotherapy, medical devices, cancer stage, and family history.
‡ The exchange rate in December 2012 was US$ 1.00 = R$ 3.21.

In the present study, for many individuals the diagnosis of cancer was established at an advanced stage. It is important to highlight that the diagnosis of advanced-stage cancer is associated with increased morbidity and mortality rates. Moreover, sometimes the lack of knowledge on the part of patients hinders early diagnosis, often resulting in functional and esthetic sequela and death (Herr et al., 2013).

Another source of vulnerability in our population was the fact that 25% of the study participants had clinical artifacts or situations requiring nursing care [e.g., catheters, probes (enteric, nasogastric, urinary), stomata, and wounds (surgical and/or oncological)]. Having medical devices requires the patient to develop self-monitoring skills and to adapt in order to maintain activities of daily living (Steel et al., 2014). The specific demands of each of these conditions will require the patient—and often the caregiver—to undergo an educational-caring process to be able to deal with the needs imposed (Fitch, 2012; Wolff et al., 2009; Longacre, 2013). Caregivers are extremely important

players in chronic disease processes and educational investments in their learning are necessary. This education should be planned taking into consideration different teaching strategies, e.g., manuals, pamphlets, video classes, multimedia applications, in addition to multidisciplinary counselling (Nascimento et al., 2015). The process of developing cancer is emotionally, socially, and financially demanding on both the patient and their family. Not rarely, inappropriate management of symptoms may lead to hospital admission, causing additional burden and increasing healthcare costs (Moreira & Turrini, 2011).

In cancer patients, the toxicity associated with treatment and with the disease itself are responsible for a variety of symptoms, which inevitably interfere with daily life (Brateibach et al., 2013; Karabulu, Erci, Ozer, & Ozdemir, 2010). In our sample, all patients had undergone some type of treatment and recurrence had occurred in one-third. Therefore, we have reason to believe that the clinical profile of respondents contributed to the collection of reliable data on their signs and symptoms. The therapies prescribed to these patients (e.g., chemo- and radiotherapy or a combination of both) are known to produce severe symptoms, including fatigue, pain, disturbed sleep, distress, and loss of appetite, which may vary throughout the treatment process. These symptoms may be severe and extremely debilitating (Shi et al., 2010). Moreover, patients undergoing chemo-radiation have been shown to present high rates of symptoms (Park et al., 2009). The burden of symptoms associated with the disease and its treatment reduces the patient's ability to perform activities of daily living (Wang et al., 2004).

Cancer-related fatigue is usually the most frequent, distressing, and difficult-to-treat symptom experienced by cancer patients. Cancer fatigue is an extremely uncomfortable condition, marked by physical, psychological, and emotional symptoms. It is usually described as tiredness that is not relieved by the patient's usual strategies to restore energy. It may vary in terms of duration and severity, and it negatively affects, to a greater or lesser extent, the patient's ability to perform activities of daily living (Mota, Pimenta, & Fitch, 2009; Spichiger et al., 2011). Fatigue is the symptom that most strongly interferes with the daily lives of cancer patients (Park et al., 2009). Moreover, fatigue has been shown to be a strong and independent predictor of decreased personal satisfaction and quality of life (Campos, Hassan, Riechelmann, & del Giglio, 2011). Many factors are related to the occurrence or worsening of this symptom, including having advanced cancer, undergoing different therapies, being female, having a low education level, working regularly, living without a partner, being depressive, and having daily life activity limitations (Mota et al., 2012).

Among the most common causes of fatigue are anemia, increasingly common among patients receiving cancer treatment and showing higher prevalence rates during chemotherapy cycles (Spichiger et al., 2011). The etiology of anemia in cancer patients may be related to tumoural factors (i.e., type of primary tumour, cancer stage, blood loss or bone marrow involvement), patient factors (i.e., age, sex, nutritional status), and treatment factors (i.e., type, duration, intensity, therapy combinations). Regardless of the etiology of anemia, low levels of hemoglobin not only lead to poor quality of life, but they also correlate with poor local control and global survival in cancer patients (Park et al., 2009). Therefore, this symptom has to be safely and effectively managed, so that treatment may continue (total dose, number of cycles), thus increasing the chances of curing or controlling the disease (Campos et al., 2011).

Another symptom that showed a high frequency in the present study was dry mouth. Xerostomia is usually caused by impaired functioning of the salivary glands, with changes in the amount or quality of saliva, as a result of cancer treatment (Freitas et al., 2011). A study involving 101 cancer patients receiving palliative care confirmed the presence of dry mouth, both via self-report and microbiologically, in 83 of the patients; the authors related the symptom to the use of sedatives, opioids, anticholinergics and analgesics, and found it to be commonly associated with oral candidiasis (Alt-Epping, Nejad, Jung, Gross, & Nauck, 2012). Xerostomia may become more frequent with age, and it may also be a result of other comorbidities, or the use of analgesics or antidepressants. The condition may have serious impacts, affecting the patient's ability to speak for long periods of time (Tevaarwerk et al., 2013). For all these reasons, dry mouth in cancer patients deserves to be investigated in more detail.

The results obtained in the present study with regard to daily life interference items (general activities, work, and walking ability) and scores are in line with the literature. According to a previous study, when patients with low scores for all symptom items were compared with patients with high symptom scores, the former performed better on the Karnofsky Performance Status Scale, whereas the latter showed worse quality of life scores (Miaskowski, Aouizerat, Dodd, Cooper, 2007). Usually, cancer survivors show difficulties maintaining activities that require physical and cognitive efforts, because of the symptom burden experienced. Moreover, sometimes body changes and depressive symptoms make it difficult for these patients to resume work activities. Chemotherapy and surgeries cause pain, limited extremity mobility, and neuropathy, which may further affect the patients' ability to work (Tevaarwerk et al., 2013).

Symptom severity has serious psychological impacts on the daily lives of cancer patients (Pan et al., 2012; Prigozin et al., 2010). The findings of the present study reinforce this fact, as distress received a mean/median score of 2 in the sample. Indeed, symptoms interfere with the patients' daily lives, including reduction of overall physical and psychological functioning (Pan et al., 2012; Berry, 2011).

In the population assessed in this study, physical and psychological limitations were associated with poor socioeconomic conditions and low education levels, characteristics that resulted in a persistent state of emotional distress. A study conducted in the Brazilian state of São Paulo showed that, among cancer patients under treatment, almost half interrupted daily activities, mostly paid activities, which contributed to decreased family income and increased socioeconomic cost in the country (Martins et al., 2009). Having to stay away from work affects quality of life in this population, negatively affecting the patients' economic stability and social relations (Tevaarwerk et al., 2013). Maintaining work activities can improve treatment outcomes, as well as recovery and healing processes. However, most patients have to stay away from work at some point because of the treatment,

and an advanced stage of disease makes it even more difficult to manage work and treatment at the same time (Martins et al., 2009). A high number of symptoms leads to greater interference with the daily life of cancer patients.

In our sample, mean scores assigned to the different symptoms did not change with age. It is important to highlight that almost two-thirds of the patients were aged 60 years or younger, comprising an economically active group of patients. A previous study conducted at James P. Wilmot Cancer Center, in the United States, and involving 903 cancer patients who were starting or had been receiving radiotherapy showed that fatigue, sleepiness, and distress were symptoms common to both young and older populations. Disturbed sleep and pain, in turn, were more frequent in young populations, and shortness of breath in elderly patients (Mohile et al., 2011).

Once the demands on a specific patient and their family members have been assessed, treatment of symptoms should be planned using an interdisciplinary approach, i.e., combining medical care with strategies from the fields of nursing, nutrition, physiotherapy, occupational therapy, and psychology, among others (Matos, Pires, & Gelbcke, 2012).

Limitations

Some limitations of the present study should be mentioned. First and foremost, we assessed a local sample, living in a small town in southern Brazil. Similar studies should be conducted in other Brazilian regions to allow comparison of data. Second, the socioeconomic and clinical vulnerabilities of the sample described here should be taken into consideration when extrapolating the findings to other population groups.

Implications for practice

- The results can help health practitioners become aware of the populations more vulnerable to cancer symptoms and daily life interference.
- The findings underscore the importance of detecting cancer symptoms as early as possible, in an attempt to maximize the chances of reverting or controlling them.

CONCLUSION

Management of cancer patients requires healthcare professionals to have multidisciplinary theoretical and practical knowledge, but also requires the development of specific skills that take into consideration all the subjective dimensions of the patients, namely, physical, social, economic, and spiritual dimensions. Adopting this approach while caring for cancer patients will bring benefits to this population, decreasing their complaints and helping them face the limitations and consequences of the disease and its treatment.

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