









# Prevalence of diagnosis and types of cancer in the elderly: data from National Health Survey 2013

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## Abstract

**Objective:** Estimate the prevalence of medical diagnosis of cancer in the elderly, describe the types of cancer, limitations in daily activities, health self-assessment, and the relationship between cancer and chronic diseases/conditions. **Methods:** Cross-sectional population-based study using data from the elderly (n=11,177) who participated in the National Health Survey (PNS/2013). Prevalence and 95% confidence intervals were estimated. **Results:** The mean age was 69.8 years (CI<sub>95%</sub>:69.5-70.1) and 56.4% (CI<sub>95%</sub>:54.8-58.0) were women. The diagnosis of cancer was mentioned by 5.6% (CI<sub>95%</sub>:5.0-6.4) of the elderly, is higher for men (7.1%) than in woman (4.7%; p<0.001). The three main types of cancer were, in men: prostate (52.4%; CI<sub>95%</sub>:43.5-61.2), skin (13.9%; CI<sub>95%</sub>:9.1-20.6) and intestine (10.6%; CI<sub>95%</sub>:4.9-21.5); in women: breast (46.9%; CI<sub>95%</sub>:40.6-53.3), skin (17.3%; CI<sub>95%</sub>:14.2-20.8) and intestine (9.8%; CI<sub>95%</sub>:6.5-14.5). About 67% were diagnosed after age 60, 33.0% reported some limitations due to the disease and 16.8% (CI<sub>95%</sub>:12.4-22.4) rated their health as bad/very bad. The presence of limitation was about 31% higher in those with a more recent diagnosis and self-perceived health was worse in those with a diagnosis of fewer than 5 years. In the elderly with cancer, there was a higher prevalence of hypertension, heart disease, depression, and chronic respiratory diseases (p<0.05). **Conclusion:** The findings show the prevalence of cancer in the Brazilian elderly, with differences between genders, and the distribution of the main types and the age of the first diagnosis. The importance of hypertension, heart disease, depression, and respiratory diseases is highlighted, as well as other living and health conditions of the elderly in oncogeriatric care.

**Keywords:** Health of the Elderly. Neoplasms. Chronic Disease. Health Surveys. Prevalence. Brazil.

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## INTRODUCTION

Cancer is a multicausal disease and its relationship with environmental, cultural, socioeconomic risk factors, lifestyles (mainly obesity, smoking, alcohol consumption, physical inactivity and unhealthy diet), in addition to genetic factors and population aging, is known<sup>1-3</sup>.

Globally, demographic and epidemiological transitions signal the growing importance of cancer in the coming decades<sup>1,4,5</sup>. As a cause of death, in most countries<sup>6</sup>, and in Brazil<sup>7</sup>, it is supplanted only by cardiovascular diseases. It is estimated that in 2025, the cancer burden will increase by 50% due to an aging population and an increase in lifestyle risk factors<sup>3</sup>.

Considering the distribution of deaths by type of cancer according to gender in the elderly, for the period 1996-2016, the main among men corresponded to malignant neoplasm of the prostate (18%), followed by malignant neoplasm of trachea, bronchi and lungs (12%). In women, malignant breast neoplasms accounted for 12% and trachea, bronchi and lungs accounted for 11%<sup>7</sup>. Estimates of cancer incidence in Brazil, carried out by the National Cancer Institute (INCA), point to a total of 625 thousand new cases for each year of the 2020-2022 triennium, with a higher incidence for non-melanoma skin cancer (177 thousand), followed by breast and prostate cancers (66 thousand each)<sup>8</sup>.

Data from the National Household Sample Survey (PNAD) of 2008 showed that the prevalence of cancer in the ages between 60 and 69 years, 70 to 79 and 80 years or more, were 1.93%, 3.11% and 3.57%, respectively<sup>9</sup>. In addition to investments in prevention policies and the necessary assistance to cancer patients<sup>3,10,11</sup>, with the aging of the population there is also a demand for the expansion of training for oncogeriatric care<sup>12</sup>.

A previous study conducted with data from the National Health Survey (PNS 2013)<sup>13</sup> presented estimates for individuals diagnosed with cancer in Brazil (age  $\geq 18$  years), disaggregating the elderly population. However, in relation to the type of cancer and average age for the first diagnosis, the data refer to the group of adults<sup>13</sup>. Specific information for

the elderly, and according to gender, would make it possible to better estimate the demand for care in this subgroup, since most elderly people have concomitant diseases that can hinder cancer treatment. Therefore, the aim of the present study was to estimate the prevalence of medical diagnosis of cancer in the elderly, describe the types of cancer, limitations in daily activities, self-perceived health and the relationship with chronic diseases / conditions.

## METHODS

Cross-sectional population-based study, conducted with public domain data of elderly people (age  $\geq 60$  years) who participated in the National Health Survey (PNS), a survey conducted by the Ministry of Health in partnership with the Brazilian Institute of Geography and Statistics (IBGE) in 2013. The survey's micro data are available on the website: <https://www.ibge.gov.br>. PNS used cluster sampling in three stages, with census sectors as the primary unit, and households as secondary units. Households and residents were selected by simple random sampling<sup>14</sup>.

The questionnaire applied by the PNS is divided into three parts: data on the household; information related to all residents, provided by a selected resident (proxy); and information about this resident, answered by himself (adults aged  $\geq 18$  years). Detailed descriptions of the sampling process and weightings are available in previous publications<sup>14</sup>.

For the present study, all research participants aged  $\geq 60$  years who answered the question of interest for this study, from the block on chronic diseases, were selected: "Has any doctor ever given you a diagnosis of cancer?" (yes or no) (n = 11,177), according to gender (male, female) and age groups (60-69; 70-79 and  $\geq 80$ ). If so, the following question was asked: "In the first cancer diagnosis, what type of cancer do you have or have you had?" (lung, intestine, stomach, skin, breast and cervix - only for women, prostate - only for men, and others), their age at the time of diagnosis (used to estimate the time elapsed from the first diagnosis), and the limitation through the question: "In general, to what degree does cancer or any problem caused by cancer limit your usual activities (such as working, doing household chores,

*etc.?)”* (does not limit, a little, moderately, intensely and very intensely).

Health self-assessment (very good / good, regular, bad / very bad) and information regarding the presence of other chronic diseases / conditions were also considered, through medical diagnosis referred by the interviewee about: arterial hypertension, diabetes mellitus, heart disease, stroke, asthma, arthritis or rheumatism, chronic kidney failure, chronic back problem (such as chronic back or neck pain, low back pain, sciatica, vertebrae or disc problems), depression, lung disease or chronic obstructive pulmonary disease - COPD (pulmonary emphysema, chronic bronchitis or other). In particular, chronic back pain was self-reported and depression considered a previous diagnosis by a doctor / mental health professional (psychiatrist or psychologist).

The prevalence and the respective 95% confidence intervals were estimated, as well as the projection of the absolute number of cancer cases, by expanding the sample to the total of the elderly Brazilian population. The percentage distribution of the types of cancer was described by the relative point frequencies and by interval (weighted). Proportion comparison tests (Pearson's chi-square with Rao-Scott correction; significance level of 5%) were performed and prevalence ratios were estimated by Poisson regression, adjusted for gender and age.

All analyzes were performed on Stata 14.0 (StataCorp LP, College Station, USA). The PNS was approved by the National Commission of Ethics in Research for Human Beings, of the Ministry of Health, under opinion No. 328.159, of June 26, 2013.

## RESULTS

The average age of the elderly was 69.8 years (IC<sub>95%</sub>: 69.5-70.1) and 56.4% (CI<sub>95%</sub>: 54.8-58.0) were women. The prevalence of cancer (in life) in the elderly population was 5.6% (CI<sub>95%</sub>:5.0-6.4), which

corresponds, in absolute number, to approximately 1,473,727 elderly people in the Brazilian population. Among the elderly who reported a medical diagnosis of cancer, the prevalence limited to the time of diagnosis in the last 5 years was 45.2% (CI<sub>95%</sub>:38.9-51.5). For the group of elderly people who reported the disease, the mean age was 71.6 years (CI<sub>95%</sub>:70.6-72.5). There was a statistical difference between genders (7.1% in men and 4.7% in women;  $p < 0.001$ ).

Regarding the sociodemographic characteristics of the elderly who reported a diagnosis of cancer, the majority were male (54.3%), white (71.7%), lived with a spouse (58.0%), without education or with incomplete primary education (62.0%), did not have a health plan (54.7%), was diagnosed with the disease aged 60 or over (66.7%) and did not report any limitation in habitual activities resulting from the disease or related to it (67.0%). Only 16.8% (CI<sub>95%</sub>:12.4-22.4) of the elderly considered their health poor or very bad at the time of the research. Among the elderly aged 60 to 69 years, 77.7% (CI<sub>95%</sub>:70.3-83.7) reported medical diagnosis of cancer before age 60. In those aged  $\geq 70$  years, 62.8% (CI<sub>95%</sub>:55.9-69.2) reported a diagnosis  $\geq 60$  years old ( $p < 0.001$ ) (Table 1).

In assessing the distribution of any cancer diagnosis according to gender and age group, a higher percentage was observed for men aged 80 years or older ( $p < 0.009$ ) (Figure 1).

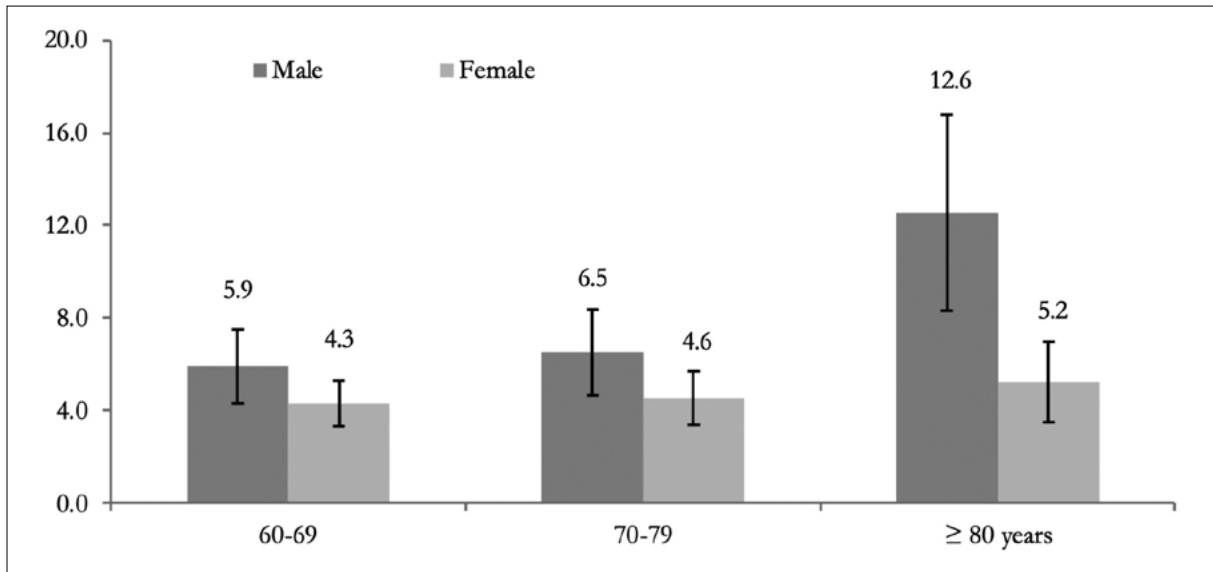
Considering the specific types of cancer, in men, the three main ones were: prostate (52.4%; CI<sub>95%</sub>: 43.5-61.2), skin (13.9%; CI<sub>95%</sub>: 9.1- 20.6) and intestine (10.6%; CI<sub>95%</sub>: 4.9-21.5); in women, breast (46.9%; CI<sub>95%</sub>: 40.6-53.3), skin (17.3%; CI<sub>95%</sub>: 14.2-20.8) and intestine (9.8%; CI<sub>95%</sub>: 6.5-14.5) (Figure 2).

On average, cancer was identified 10.8 years ago (CI<sub>95%</sub>: 9.4-12.2) in women and 7.4 years ago (CI<sub>95%</sub>: 6.5-8.4) in men. For lung, bowel, stomach, skin and other cancers, there was no statistical difference according to gender ( $p > 0.05$ ) (Figure 3).

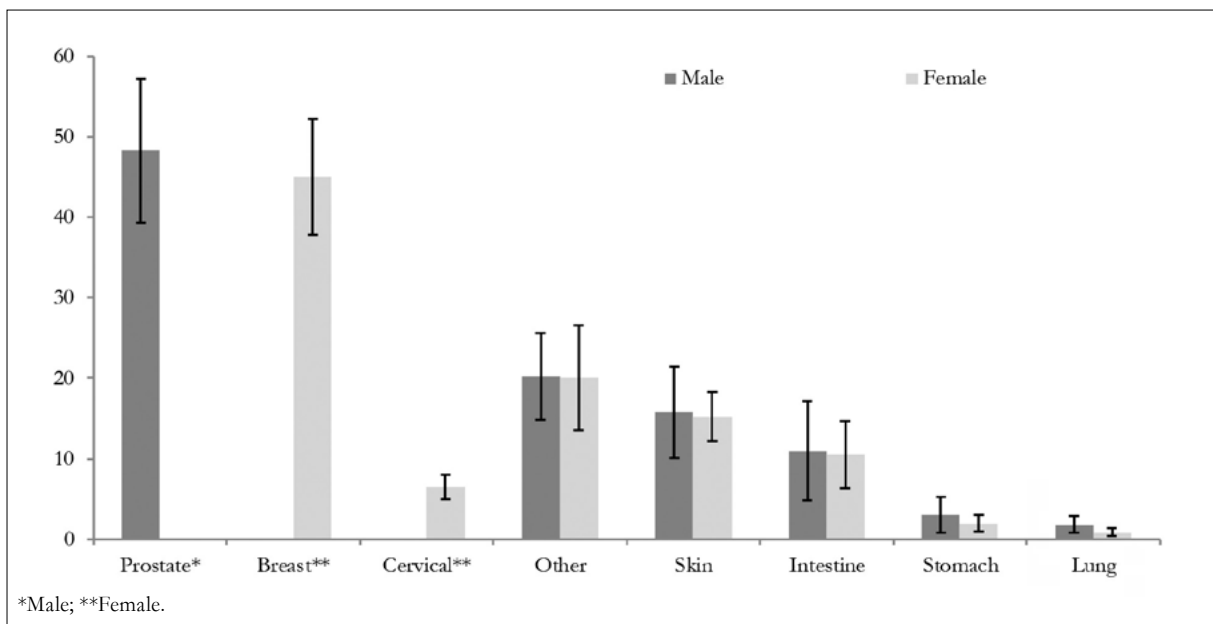
**Table 1.** Distribution of sociodemographic and health-related characteristics of the elderly, according to age groups. National Health Survey, 2013.

Variables	Total (n=542) n (%)	60-69 years (n=260) % (CI <sub>95%</sub> )	≥70 years (n = 282) % (CI <sub>95%</sub> )	<i>p</i>
<b>Gender</b>				
Male	238 (54.3)	48.0 (39.6 - 56.5)	52.0 (43.4 - 60.4)	0.330
Female	304 (45.7)	53.8 (46.6 - 60.9)	46.2 (39.1 - 53.4)	
<b>Color</b>				
White	369 (71.7)	49.3 (42.2 - 56.5)	50.7 (43.5 - 57.8)	0.439
Not white	173 (28.3)	54.1 (44.9 - 63.0)	45.9 (37.0 - 55.1)	
<b>Lives with spouse or partner*</b>				
Yes	239 (58.0)	57.1 (48.2 - 65.5)	42.9 (34.4 - 51.8)	0.015
No	303 (42.0)	41.8 (34.9 - 49.1)	58.2 (50.9 - 65.1)	
<b>Highest education level reached*</b>				
Uneducated and Incomplete Elementary	298 (62.0)	43.3 (36.0 - 50.9)	56.7 (49.1 - 64.0)	0.001
Complete Elementary to Middle Complete / Higher Incomplete / Complete	244 (38.0)	62.7 (54.7 - 70.0)	37.3 (30.0 - 45.3)	
<b>Health Plan</b>				
No	252 (54.7)	50.6 (43.4 - 57.7)	49.4 (42.3 - 56.6)	0.980
Yes	290 (45.3)	50.8 (40.8 - 60.6)	49.2 (39.3 - 59.2)	
<b>Age (years) at first diagnosis*</b>				
Less than 60	190 (33.3)	77.7 (70.3 - 83.7)	22.3 (16.3 - 29.7)	<0.001
60 or more	352 (66.7)	37.2 (30.7 - 44.1)	62.8 (55.9 - 69.2)	
<b>Health self-assessment</b>				
Very good / good	220 (40.7)	51.5 (42.6 - 60.3)	48.5 (39.7 - 57.4)	0.894
Regular	235 (42.5)	51.1 (43.4 - 58.7)	48.9 (41.3 - 56.6)	
Bad / very bad	87 (16.8)	47.6 (32.4 - 63.2)	52.4 (36.8 - 67.6)	
<b>Limitation of usual activities</b>				
No	364 (67.0)	52.8 (45.0 - 60.5)	47.2 (39.5 - 54.9)	0.313
Yes	178 (33.0)	46.2 (37.7 - 55.0)	53.8 (45.0 - 62.3)	
<b>Time (years) after the first diagnosis</b>				
Up to 5	247 (45.2)	53.4 (44.3 - 62.2)	46.6 (37.7 - 55.6)	0.449
Six or more	295 (54.8)	48.4 (40.6 - 56.3)	51.6 (43.6 - 59.4)	

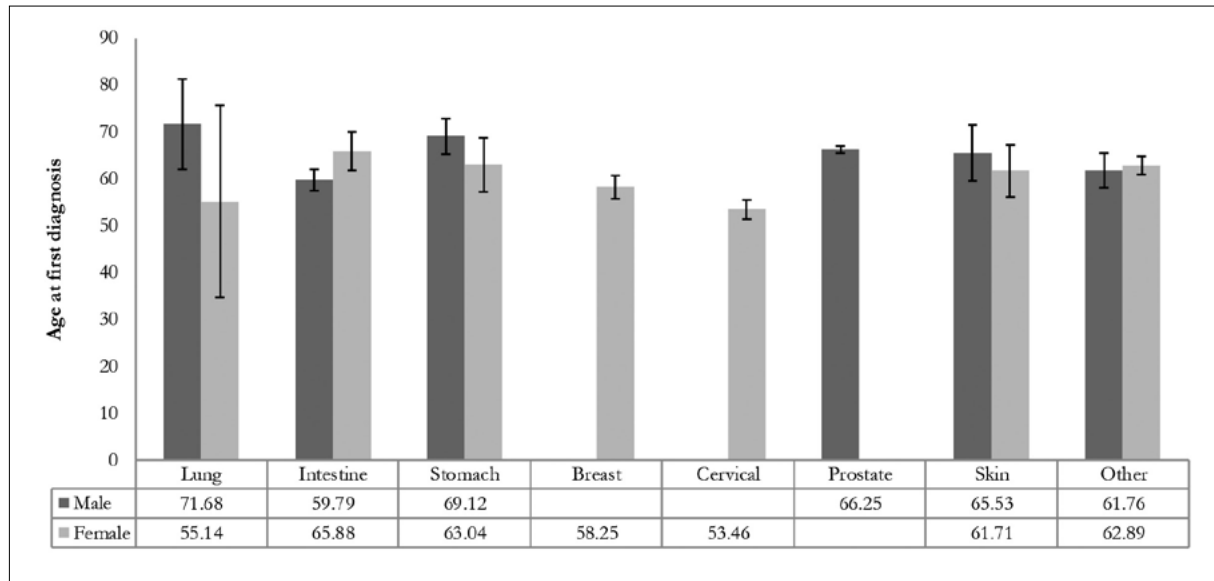
CI<sub>95%</sub>: Confidence Interval ( $\alpha=0.05$ ); \*P values obtained by the Chi-square test (Rao-Scott);



**Figure 1.** Distribution in age groups (proportion and 95% confidence interval) of the elderly who reported a medical diagnosis of cancer. National Health Survey, 2013.



**Figure 2.** Distribution (proportion and indication of the 95% confidence interval) of the types of cancer reported by the elderly in the first diagnosis. National Health Survey, 2013.



**Figure 3.** Average age reported in the first cancer diagnosis, by type of cancer, according to gender. National Health Survey, 2013.

As for the limitation due to the disease or problem resulting from it for carrying out usual activities, 34.9% of men and 30.7% of women reported some limitation ( $p > 0.05$ ). In the analysis stratified by the time elapsed from diagnosis ( $< 5$  years and  $\geq 5$  years) adjusted for gender, age and number of chronic diseases, the occurrence of some limitation was about 31% higher in those most recently diagnosed (RP=1,31; IC<sub>95%</sub>:1,02-1,70;  $p=0,037$ ). Likewise, self-perceived health status was worse in the elderly with a diagnosis time of

less than 5 years (PR = 1.65; IC<sub>95%</sub>: 1.13-2.41;  $p = 0.010$ ), regardless of gender, age and the presence of other chronic diseases.

The prevalence of hypertension, heart disease (heart attack, angina, heart failure or other), depression and lung disease or Chronic Obstructive Pulmonary Disease-COPD (pulmonary emphysema, chronic bronchitis or other) was higher in the elderly diagnosed with cancer, even after adjusting for gender and age (Table 2).

**Table 2.** Chronic diseases and health conditions in the elderly, according to medical diagnosis of cancer (n=11,177). National Health Survey, 2013.

Chronic diseases	Cancer		<i>p</i>	RP <sub>adjusted</sub> (CI <sub>95%</sub> )
	Yes (n=542) % (CI <sub>95%</sub> )	No (n=10.635) % (CI <sub>95%</sub> )		
Arterial hypertension				
No	41.6 (35.5 - 47.8)	49.2 (47.4 - 50.9)	0.020	1.00
Yes	58.4 (52.2 - 64.4)	50.8 (49.1 - 52.6)		<b>1.16 (1.04 - 1.29)</b>
Diabetes				
No	81.7 (75.6 - 86.6)	80.9 (79.6 - 82.1)	0.762	1.00
Yes	18.3 (13.4 - 24.4)	19.1 (17.9 - 20.4)		0.96 (0.71 - 1.30)
High cholesterol				
No	72.2 (65.2 - 78.2)	74.2 (72.6 - 75.7)	0.550	1.00
Yes	27.8 (21.8 - 34.8)	25.8 (24.3 - 27.4)		1.17 (0.92 - 1.50)
Heart disease				
No	80.7 (74.6 - 85.6)	89.0 (87.8 - 90.1)	<0.001	1.00
Yes	19.3 (14.4 - 25.4)	10.9 (9.8 - 12.2)		1.69 (1.26 - 2.25)
Stroke				
No	92.6 (87.2 - 95.8)	95.2 (94.5 - 95.9)	0.139	1.00
Yes	7.4 (4.2 - 12.8)	4.8 (4.1 - 5.5)		1.36 (0.78 - 2.37)
Asthma (or asthmatic bronchitis)				
No	93.3 (88.5 - 96.2)	95.4 (94.6 - 96.0)	0.222	1.00
Yes	6.7 (3.8 - 11.5)	4.6 (4.0 - 5.4)		1.49 (0.83 - 2.66)
Arthritis or rheumatism				
No	82.9 (77.4 - 87.3)	83.6 (82.3 - 84.8)	0.785	1.00
Yes	17.1 (12.7 - 22.6)	16.4 (15.2 - 17.7)		1.11 (0.82 - 1.50)
Chronic spine problem**				
No	66.8 (59.9 - 73.1)	72.2 (70.6 - 73.7)	0.103	1.00
Yes	33.2 (26.9 - 40.1)	27.8 (26.3 - 29.4)		1.22 (1.00 - 1.50)
Depressão				
No	88.3 (83.9 - 91.7)	90.6 (89.5 - 91.6)	0.236	1.00
Yes	11.7 (8.3 - 16.1)	9.4 (8.42 - 10.5)		1.44 (1.02 - 2.03)
Lung disease or COPD***				
No	92.6 (87.8 - 95.6)	96.4 (95.6 - 97.0)	0.011	1.00
Yes	7.4 (4.4 - 12.2)	3.6 (3.0 - 4.4)		<b>1.93 (1.12 - 3.33)</b>
Chronic kidney failure				
No	94.2 (88.4 - 97.2)	97.4 (96.8 - 97.9)	0.035	1.00
Yes	5.8 (2.8 - 3.4)	2.6 (2.1 - 3.2)		2.05 (0.99 - 4.23)

CI<sub>95%</sub>: Confidence Interval ( $\alpha = 0.05$ ); RP<sub>adjusted</sub>: by gender and age; \*\*Chronic spine problem: chronic back or neck pain, low back pain, sciatica, vertebrae or disc problems; \*\*\*COPD: Chronic Obstructive Pulmonary Disease (pulmonary emphysema, chronic bronchitis or other).



## DISCUSSION

This study estimated the percentage of elderly Brazilians diagnosed with cancer and found a difference between genders. The diagnosis occurred mainly after the age of 60, and about 1/3 of the elderly referred to some limitation for daily activities. Worse subjective health assessment was associated with the most recent identification of the disease. The prevalence of arterial hypertension, cardiovascular disease, depression and lung disease were higher in the elderly with a previous diagnosis of cancer.

Cancer is a disease that mainly affects the elderly, as more than 60% of new cases occur above 60 years of age, as observed in this study. Of all cancer cases in the world, about 70% occur after age 65<sup>1,5,10</sup>. In Brasil, incidence<sup>15</sup> and prevalence<sup>13</sup> rates for all types of cancer are three or four times higher in the elderly compared to adults.

With the increase in the proportion of elderly people in the population, it is expected that a greater number of elderly individuals will be diagnosed with cancer<sup>1,5</sup>. It is noteworthy that both early detection and new forms of treatment increase the survival of people with this condition<sup>4,16</sup>. For the group of elderly Brazilians, on average, the identification of the disease occurred about nine years ago.

In this study, 33% of the elderly reported that cancer, or some problem caused by it, caused a limitation in their usual activities, such as working, doing household chores, among others. Systematic review and meta-analysis on inability to perform daily activities in adults with cancer, comprising 19,246 patients (mostly elderly), revealed that, in general, 36.7% and 54.6% of patients reported disability, respectively related to basic and instrumental activities of daily living<sup>17</sup>. A study on the relationship between disability and cancer factors in the oldest elderly ( $n = 290$ ; mean age 80.6 years) with various types of cancer, participants in the prospective cohort study The Physical Frailty in Elderly Cancer (France), found prevalence of 67.6%. No oncological factors (location or extent of cancer) were associated with disability, however, mobility impairment (mobility), worse functional status, depressed mood, cognitive

impairment and poly pharmacy were independently associated with disability<sup>18</sup>.

It should be noted that, for the group of elderly Brazilians, Silva et al.<sup>19</sup> found a prevalence of 30.1% of functional limitation, attributed to any difficulty in performing at least one of the basic and instrumental activities considered. Other national population-based studies with representative samples of the elderly carried out in the South and Southeast regions of Brazil, in Pelotas (RS)<sup>20</sup> and Belo Horizonte (MG)<sup>21</sup>, showed similar prevalences. In the present study, a higher prevalence of limitation was observed in those with more recent diagnosis, which may be due to treatment. A study carried out in the Northeast region of Brazil, in Recife (PE)<sup>22</sup>, identified worsening of the physical performance of the elderly after starting chemotherapy, and for those with prostate cancer, there was a worsening of their general condition and quality of life.

Both the state of health and the subjective perception of health vary according to the time elapsed from diagnosis. Among elderly people who reported a diagnosis of cancer, about 17% considered their health bad or very bad at the time of the research, with a higher frequency observed in those with a diagnosis time of less than 5 years (23.5% versus 11.4%), regardless of gender, age and the presence of other chronic diseases. Self-rated health is an indicator that integrates the individual's biological, psychological and social perception, reflecting the presence of functional limitations and quality of life, in addition to being considered a predictor of mortality<sup>23,24</sup>. Still, it is considered an important indicator of the impact of the disease on individual well-being<sup>24</sup>.

Estimates obtained by gender and age groups revealed a higher percentage of older men (age  $\geq 80$  years) with a diagnosis of cancer. Data from the National Health Survey indicated, for the Brazilian adult population ( $\geq 18$  years old), that the average age of the first diagnosis of prostate and breast cancer was 65.7 and 49.0 years, showing the differences in terms of the age at which the highest incidence and prevalence of the main types that affect men and women, respectively<sup>13</sup>. Increased incidence rates of



prostate cancer have been observed in the country due to increased life expectancy, improved diagnostic methods and case records/notification, in addition to greater use of prostate specific antigen (PSA) and digital rectal examination for the diagnosis of neoplasia<sup>15</sup>. Such advances have resulted in a greater proportion of patients cured or surviving longer<sup>25</sup>.

In the trend of age-adjusted prostate cancer mortality rates, Houston et al.<sup>26</sup> observed a rising curve similar to the incidence, but with a lower magnitude, going from 7.44 / 100 thousand men in 1980 to 14.06 / 100 thousand men in 2013. Also, the trend of the proportion of deaths among longest-lived elderly (age  $\geq 80$  years) has grown over the years. From 1996 to 2006, considering the elderly aged  $\geq 60$  years, the percentage of deaths that occurred in the longest-lived age group went from 33% to 46%. Among women, the behavior of this trend is quite different, as the longest-lived elderly women have the lowest percentage of deaths from malignant breast cancer. Over the period (1996 to 2016), for the elderly as a whole, the percentage of deaths in the oldest age group ( $\geq 80$  years) increased from 20% to 28%<sup>7</sup>.

It should be considered that the perception of health needs is related to sociodemographic characteristics - women use health services more<sup>27</sup> - as for behavioral, past experiences, perception of symptoms and severity of the disease, and access to services for diagnosis and treatment. Frequent use of services by women<sup>27</sup> makes them more exposed to actions of promotion and prevention, such as conducting screening tests, enabling an early diagnosis of cancer and better prognosis.

In this study, skin cancer was not the most reported, contrasting data on its incidence and prevalence (in life), as it is the most incident of all cancers<sup>1,8</sup>. It should be noted that the question asked by the National Health Survey to obtain information on the prevalence of skin cancer did not allow identifying, among the positive cases, whether they were melanoma or not melanoma. Thus, some hypotheses must be considered: (a) non-melanoma skin cancer has a high percentage of cure, when detected and treated early<sup>28</sup> and (b) the skin cancer may resemble a mole or spot and other benign lesions that are only recognized as cancer by a doctor,

specialist or by exams<sup>29</sup>. Therefore, it is possible that many individuals do not perform medical evaluation for skin lesions because they neglect non-melanoma skin tumors as non-malignant. Furthermore, this type of cancer is not frequently monitored like other cancers - which makes it difficult to estimate - or even included in cancer statistics publications.<sup>8,28</sup>. Campaigns, informational materials and other strategies, aimed at health promotion and forms of disease prevention, have been used to expand early detection<sup>30</sup>. Therefore, the prevalence observed in this study can be explained, in part, by the use of self-reported information (yes or no). A cross-sectional study that assessed the prevalence and prevention habits of skin cancer in the elderly (n = 820) in rural Pelotas (RS), in the southern region of Brazil, found a prevalence of 4.8%<sup>31</sup>, indicating the non-recognition of this condition, current or even past, by the elderly.

As for diseases and chronic health conditions, there was a higher prevalence of hypertension, heart disease, depression and lung disease in the elderly diagnosed with cancer. It is important to notice that a large part of the elderly population has comorbidities that can hinder cancer treatment, however, the implications and management become increasingly important, due to the aging population and the growing number of elderly people with cancer<sup>32</sup>. It is noteworthy that the temporal relationship of disease occurrence cannot be verified through this (cross-sectional) study, however, the use of health services by the elderly to treat other more frequent chronic conditions can favor the diagnosis of cancer.

In the capital of Pernambuco, arterial hypertension was the most frequent comorbidity in the elderly undergoing chemotherapy for cancer<sup>22</sup>. Between 80% and 90% of cancer cases are related to a set of modifiable risk factors that include changes caused by man himself in the environment, habits and lifestyle<sup>2,3,33</sup>. In Brazil, estimates of the fraction of risk attributable to 25 types of cancer due to exposure to modifiable risk factors (inadequate diet, overweight and obesity, smoking, alcohol consumption, physical inactivity, environmental and occupational agents, among others) pointed out that they would account for 34% and 35% of cancer cases in men and women in 2020, respectively, and 46% of deaths in men and 39% in women<sup>2</sup>.

With regard to the question used for the outcome considered in this study, the research investigated the report of some medical diagnosis of cancer (in life). The prevalence of cancer therefore represents the proportion of people alive at any given time, who have already had a diagnosis of the disease<sup>34</sup>, regardless of how long ago the diagnosis was made, whether the patient is still on treatment, or whether he is “cured”<sup>16,34</sup>. Therefore, “survivor” is understood not only to an individual who has lived for a long period of time after treatment, but also those newly diagnosed, as well as those who are undergoing treatment, have completed treatment or are in remission. In this study, the prevalence limited to the time of diagnosis in the last 5 years was 45.1% among the elderly. It is noteworthy that early diagnosis can provide a better prognosis and increase the likelihood of cure, and the improvement of the treatment offered to cancer patients has increased the frequency of prevalent cases, resulting in an increased demand for medium and high complexity health services.

Among the limitations of the study, it should be considered that the percentage of elderly people with some diagnosis of cancer may be underestimated, since the PNS is a household-based survey that comprised residents of private households, not including those living in special census sectors (barracks, military bases, lodgings, camps, boats, penitentiaries, penal colonies, prisons, jails, asylums, convents and hospitals)<sup>14</sup> and, especially in the elderly population, the percentage of hospitalized individuals and residents in long-term care facilities is higher than in other age groups. Also, the information was reported by the elderly and the specification of the type of cancer, referred to as “other types”, was not available for detailed verification in the database. As for the time elapsed from diagnosis, as it is a disease with a high social and family impact, which requires treatment for a long period of time and frequent evaluations, it can be assumed that the memory bias is negligible, considering the totality of cases.

It is also noteworthy that, the question about a cancer diagnosis (had or has) did not allow to assess

the current condition of the elderly in relation to the disease, therefore, the studied population included the “survivors”, as previously defined. Thus, it is possible that there is a selective survival bias, in which the prevalent cases (sick and cured) may be atypical as to the evolution of the disease or present attenuated risk factors.

In Brazil, with the increase in the elderly population, a greater occurrence of cancer and other chronic diseases is also observed in this subgroup<sup>5,33</sup>. A study carried out in Ibero-America (Spain, Portugal and Spanish-speaking or Portuguese-speaking countries in America) pointed out that the services are not yet adequately prepared to serve the elderly with cancer, mainly due to the lack of resources and geriatric training for health professionals<sup>10</sup>. Comprehensive geriatric assessment<sup>12</sup> becomes increasingly important, as it can contribute to the early identification of elderly people with cancer, promote individual assessment and in its multiple dimensions - considering, among other aspects, comorbidities, functional state, fragility and physiological factors of senescence - to elaborate, in an interdisciplinary way, the best therapeutic care<sup>35</sup> and in a timely manner for the improvement of the quality of life and greater survival.

## CONCLUSION

The findings show that the prevalence of cancer in elderly Brazilians differs between genders, as well as the distribution of the main types and the age of the first diagnosis. The importance of arterial hypertension, heart disease, depression and respiratory diseases is highlighted, in addition to other conditions of life and health of the elderly that must be considered, both in clinical practices and in the formulation of public policies, to ensure the diagnosis and timely treatment, and expanded care aimed at the quality of life of the elderly.

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