

Factors Associated with Sleep Problems in Women with Cancer According to the National Health Survey

Fatores Associados aos Problemas de Sono em Mulheres com Cânceres Segundo Pesquisa Nacional de Saúde
Factores Asociados a los Problemas de Sueño en Mujeres con Cáncer Según la Encuesta Nacional de Salud

RESUMO

Essa pesquisa busca identificar fatores associados a problemas no sono em mulheres com câncer, segundo a PNS 2019. Trata-se de um estudo transversal com dados da PNS 2019, incluindo mulheres que relataram pelo menos um dos cinco cânceres mais prevalentes. A variável dependente foi a presença de problemas no sono nas duas últimas semanas. Variáveis independentes incluíram características sociodemográficas, uso de serviços de saúde, limitação de atividades, percepção de saúde, estilo de vida e estado de saúde. Utilizou-se estatística descritiva e teste Qui-quadrado de Pearson ($p < 0,05$). A prevalência de problemas no sono foi de 44,5%, maior entre usuárias do SUS e com percepção de saúde ruim. Entre as que não usaram medicação para dormir, 65,4% relataram alteração no ciclo sono-vigília, cansaço e percepção negativa de saúde (61,5%). Evidenciaram-se associações significativas entre problemas no sono, uso de serviços, cansaço e percepção de saúde, sugerindo cuidados ampliados.

DESCRIPTORES: Transtornos do Sono-Vigília, Fatores de Risco, Saúde da Mulher, Neoplasias, Qualidade de Vida.

ABSTRACT

This study aims to identify factors associated with sleep problems in women with cancer, based on data from the 2019 National Health Survey (PNS). It is a cross-sectional study including women who reported at least one of the five most prevalent types of cancer. The dependent variable was the presence of sleep problems in the two weeks prior to the survey. Independent variables included sociodemographic characteristics, use of health services, activity limitations, health perception, lifestyle, and health status. Descriptive statistics and Pearson's Chi-square test ($p < 0.05$) were used. The prevalence of sleep problems was 44.5%, higher among users of the Brazilian Unified Health System (SUS) and those with poor health perception. Among those who did not use medication to sleep, 65.4% reported altered sleep-wake cycles, fatigue, and a negative perception of their health (61.5%). Significant associations were found between sleep problems, use of health services, fatigue, and health perception, suggesting the need for comprehensive care.

DESCRIPTORS: Sleep Wake Disorders, Risk Factors, Women's Health, Neoplasms, Quality of Life.

RESUMEN

Esta investigación busca identificar los factores asociados a los problemas de sueño en mujeres con cáncer, según los datos de la Encuesta Nacional de Salud (PNS) 2019. Se trata de un estudio transversal que incluyó a mujeres que declararon al menos uno de los cinco tipos de cáncer más prevalentes. La variable dependiente fue la presencia de problemas de sueño en las dos semanas anteriores a la encuesta. Las variables independientes incluyeron características sociodemográficas, uso de servicios de salud, limitación de actividades, percepción de la salud, estilo de vida y estado de salud. Se utilizó estadística descriptiva y la prueba de Chi-cuadrado de Pearson ($p < 0,05$). La prevalencia de problemas de sueño fue del 44,5%, mayor entre usuarias del SUS y con percepción negativa de la salud. Entre quienes no usaron medicamentos para dormir, el 65,4% refirió alteración del ciclo sueño-vigilia, cansancio y percepción negativa de su salud (61,5%). Se evidenciaron asociaciones significativas entre los problemas de sueño, el uso de servicios, el cansancio y la percepción de salud, lo que sugiere la necesidad de cuidados integrales.

DESCRIPTORES: Trastornos del Sueño-Vigilia, Factores de Riesgo, Salud de la Mujer, Neoplasias, Calidad de Vida

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INTRODUCTION

Cancer is the second leading cause of death worldwide and a serious public health problem that has significant physical, emotional, and financial impacts on society¹. In 2020, 19.3 million new cases of cancer were reported worldwide, with an incidence of between 104 and 335 cases per 100,000 inhabitants, and more than 9 million of these cases occurring in women¹. The five most common types in women are breast, colorectal, lung, cervical, and thyroid, with the highest mortality rates observed in breast, lung, and colorectal cancers^{2,3}.

Sleep problems are common among cancer patients, being reported in 95% of cases from diagnosis, during treatment, and even 10 years after survival⁴. In women, these problems are influenced by factors such as occupation, number of children, and low income. In addition, there is a strong association between high levels of depression, anxiety, and sleep-wake cycle problems in this population⁵. In the case of breast cancer, one in three women has pathological anxiety, reinforcing the relationship between sleep problems and their

associated factors⁵.

Insomnia is the most common manifestation of sleep problems, with a prevalence ranging from 19% to 63%, characterized by difficulty initiating or maintaining sleep, often manifested by frequent awakenings^{6,7}. In addition to typical symptoms, these changes can negatively impact the therapeutic effect and mental and physical health of cancer patients. Among the most common effects are reduced immune system function, lower pain tolerance, and a diminished ability to fight cancer itself⁸. In addition, the presence of sleep problems may be associated with the risk of developing new cancers or be a possible early sign of carcinogenesis in already developing oncological processes. Patients with insomnia, for example, have a 24% higher risk of future cancer incidence, especially if the disorder persists for more than 10 years⁹.

The most common therapies for cancer treatment, such as chemotherapy and radiotherapy, can exacerbate or trigger existing sleep problems¹⁰. In studies of breast cancer patients, the prevalence of sleep problems increased from 27% before chemotherapy to 39.2% after treatment¹¹. Given these

effects, many cancer patients require sleep-inducing medications or adjunctive therapies. However, during chemotherapy, only 8.6% to 15.5% of patients report using these medications due to fear of side effects and dependence^{11,12}. Thus, it is essential to seek personalized treatments that ensure the mental and physical health of patients⁶.

Although there are data in the literature on the prevalence of sleep problems in cancer patients and the biological particularities manifested in females, there is a lack of studies associating sociodemographic factors such as age, color or race, education, and use of health services with sleep-wake cycle problems in women with cancer. Thus, there is a clear need for further research to describe the presence and magnitude of these factors in greater depth, contributing to the information and health of the population analyzed. Therefore, the present study aims to identify the factors associated with sleep problems in women with cancer according to the 2019 National Health Survey.

METHOD

This is a cross-sectional study with

secondary data obtained from the 2019 National Health Survey (PNS 2019), conducted by the Brazilian Institute of Geography and Statistics (IBGE). The PNS sample was representative of individuals from households in urban and rural areas in the five geographical regions of Brazil, as well as states, metropolitan areas, and capitals. An individual questionnaire was answered by residents aged 18 years or older. Information was collected on sociodemographic characteristics, health conditions, health-related behaviors, access to health services, among other aspects relevant to understanding the health situation of the Brazilian population. The PNS 2019 database and questionnaire modules are available for public access and use on the survey website (<https://www.pns.icict.fiocruz.br>).

Sample and variables collected

For the present study, women over 18 years of age who had already been diagnosed with one of the five most common types of cancer according to questions Q120: "Has a doctor ever diagnosed you with cancer?" and Q121c: "Do you have or have you ever had a diagnosis of another cancer?" were included. (012104 Lung; 012105 Colon and rectum (intestine); 012107 Breast; 012108 Cervix; 0121015 Thyroid). No exclusion criteria were applied.

For the outcome variable, sleep problems in the last two weeks were considered through question N010: "In the last two weeks, how often have you had sleep problems, such as difficulty falling asleep, waking up frequently at night, or sleeping more than usual?"; dichotomized into yes and no.

The independent variables for the study were defined based on the questions and adapted through groupings to allow for better understanding and analysis of the data. From this, the following were described: age in age groups of 22 to 34, 35 to 59, and over 60; education (up to 4 years from 1 to

8, 5 to 8 years from 9 to 11, and over 8 years from 12 to 15); color or race: White and others (Black, Asian, Hispanic, Native American); income (in minimum wages): less than 1, between 1 and 3, and greater than 3; use of services (public and private); self-perceived health (Very good/Good, Fair, Poor/Very poor); limitation of professional or usual activities due to cancer (No limitation and A little/Moderately/Intensely/Very intensely; guidance on diet, hygiene, and sleep (Definitely not/Probably not/Don't remember and Probably yes/Definitely yes); Guidance on physical exercise (Definitely not/Probably not/Don't remember and Probably yes/Definitely yes); In the last two weeks, how often did you feel tired, without energy: None of the days and Less than half of the days/More than half of the days/Almost every day); use of any medication to induce sleep: Yes and No; have you entered menopause: Yes, No, and Don't know; Have you undergone or are you undergoing hormone treatment to relieve menopausal symptoms: Yes, currently, Yes, but no longer, No, never.

Statistical analysis

The data collected were presented in contingency tables according to descriptive and analytical statistics. Associations between dichotomous outcomes and exploratory variables were tested using Pearson's chi-square test, as well as between outcomes and variables of activity limitation due to cancer, self-perceived health, and fatigue in the last 2 weeks, controlled for non-use of sleep medication. Statistical significance was set at $p < 0.05$. The data collected were tabulated using Excel. Data analysis was performed using Stata version¹³.

The 2019 National Health Survey (PNS 2019) was approved by the National Research Ethics Commission (CONEP) and the National Health Council under opinion No. 3,529,376.

RESULTS

The present study identified 1,411 women who reported the five main cancers. The prevalence of sleep problems was 45.0% (95% CI 41.9; 47.1). Most of the sample consisted of women aged 60 years or older and of white race. When assessed for educational attainment, more than 95% had completed 5 or more years of schooling. Regarding family income, slightly more than half of the sample had an income of less than 1 minimum wage, and only 13.2% had an income greater than 3 minimum wages. The highest prevalence of health service use was in the public sector, representing 59.8% of the total (Table 1).

When assessing their perception of their health status, 85% of the sample considered it at least fair, with 45% considering it very good or good. About 68.5% consider that cancer does not limit their professional and usual activities to any degree. However, slightly more than half of the sample felt tired in the 2 weeks prior to the survey. In addition, when analyzing the use of sleep-inducing medications in the previous two weeks, it was observed that approximately 80% of women did not use this resource. The vast majority of women report having already gone through menopause, with less than ¼ undergoing or having undergone some form of hormone treatment (Table 1).

Regarding guidance on diet, hygiene, and sleep, approximately ¾ of the sample reported having received this information at some point. When assessing physical activity, 65.8% reported not having the habit of exercising, although 70% of women had received guidance on the subject (Table 1).

Table 1. Description of the proportion of sleep disorders, sociodemographic factors, and lifestyle habits in women diagnosed with cancer, according to the 2019 National Health Survey (n=1411).

Variable	n	%	CI 95%
Sleep disorder (n=1411)			
Yes	628	44,5	41,9;47,1
No	783	55,5	52,9;58,0
Age (n=1411)			
22-34	57	4,1	3,1; 5,2
35-59	583	41,3	38,8;43,9
60 years or older	771	54,6	52,0;57,2
Education (complete years) (n=1280)			
Up to 4 years	33	2,6	1,8;3,6
5-8	575	44,9	42,2;47,7
8 years or older	672	52,5	49,8;55,2
Race (n=1411)			
White	781	55,4	52,7;57,9
Black/Brown/Yellow/Indigenous	630	44,6	42,1;47,3
Family income in reais (n=481)			
Less than 1 minimum wage	259	53,9	49,4;58,3
1 to 3 minimum wages	158	32,9	28,8;37,2
More than 3 minimum wages	64	13,2	10,5;16,7
Use of health services (n=1334)			
Public	678	59,8	56,9;62,6
Private	456	40,2	37,4;43,1
Self-perceived health (n=1411)			
Very good or good	607	43,1	40,5;45,6
Average	576	40,8	38,3;43,4
Poor or very poor	228	16,1	14,3;18,2
Activity limitation due to cancer (n=1278)			
No limitation	875	68,5	65,9;71,0
Limits to some degree	403	31,5	29,0;34,1
Received guidance on diet, hygiene, and sleep (n=179)			
Yes	130	72,6	65,6;78,7
No	49	27,4	21,3;34,4
Received guidance on physical exercise (n=179)			
Yes	125	69,8	62,6;76,2
No	54	30,2	23,8;37,4
Physical activities (n=1411)			
Yes	483	34,2	31,8;36,8
No	928	65,8	63,2;68,2
Felt tired in the last 2 weeks (n=1411)			
No fatigue	659	46,7	44,1;49,3
Some tiredness	752	53,3	50,7;55,9
Use of medication to induce sleep in 2 weeks (n=1411)			
Yes	317	22,5	20,4;24,7
No	1094	77,5	75,3;79,6

Menopause (n=762)			
Yes	699	91,7	89,5;93,5
No	39	5,1	3,8;6,9
Don't know	24	3,2	2,1;4,7
Hormone therapy (n=699)			
Currently undergoing	24	3,5	2,3;5,1
Has done so, but no longer does	131	18,7	16,0;21,8
Never	544	77,8	74,6;80,8

When considering the association between sleep problems and health service use in the sample of women with cancer, it was significantly found that of the women who use public health services, 60% (95% CI 55.4;

62.8) have sleep problems, while in the private service, the same response represents 49.8% (95% CI 47.2;56.3) of service users (Table 2).

Regarding the use of medication to induce sleep, 100% of women who use

this method report having some sleep problems, while among those who do not use this resource, about 40% (95% CI 39.7;45.6) have changes in their sleep cycle (Table 2).

Table 2. Association between sociodemographic factors and lifestyle habits with the presence of sleep disorders in women diagnosed with cancer, according to the 2019 National Health Survey (n=1411).

Variable	Sleep disorder				P value
	No		Yes		
	n(%)	CI 95%	n(%)	CI 95%	
Age (n=1411)					
22-34	31 (54,4)	41,3;66,8	26 (45,6)	33,1;58,6	0,188
35-59	248 (42,5)	38,5;46,5	335 (57,5)	53,4;61,4	
Continuation of Table 2					
60 years or older	349 (45,3)	41,7;48,8	422 (54,7)	51,1;58,2	
Education (years completed) (n=1280)					
Up to 4 years	14 (42,4)	26,7;59,7	19 (57,6)	40,2;73,2	0,473
5	244 (42,4)	38,4;46,5	331 (57,6)	53,5;61,6	
8 years or older	308 (45,8)	42,0;49,6	364 (54,2)	50,4;57,9	
Race (n=1411)					
White	359 (46,0)	42,5;49,5	422 (54,0)	50,5;57,5	0,219
Black/Brown/Yellow/Indigenous	269 (42,7)	38,9;46,6	361 (57,3)	53,4;61,1	
Family income in reais (n=481)					
Less than 1 minimum wage	120 (46,3)	40,3;52,5	139 (53,7)	47,5;59,7	0,169
1 to 3 minimum wages	87 (55,1)	47,2;62,7	71 (44,9)	37,3;52,8	
More than 3 minimum wages	35 (54,7)	42,3;66,5	29 (45,3)	33,5;57,7	
Use of health services (n=1334)					
Public	277 (40,9)	37,2;44,6	401 (59,1)	55,4;62,8	0,014
Private	220 (48,2)	43,7;52,8	236 (51,8)	47,2;56,3	
Received guidance on nutrition, hygiene, and sleep (n=179)					
Yes	50 (38,5)	30,4;47,2	80 (61,5)	52,8;69,6	0,832
No	18 (36,7)	24,3;51,2	31 (63,3)	48,8;75,7	
Received guidance on physical exercise (n=179)					
Yes	51 (41,6)	33,2;50,5	73 (58,4)	49,5;66,8	0,130
No	16 (29,6)	18,9;43,3	38 (70,4)	56,7;81,1	

Physical activities (n=1411)					
Yes	220 (45,5)	41,1;50,0	263 (54,5)	50,0;58,9	0,570
No	408 (44,0)	40,8;47,2	520 (56,0)	52,8;59,2	
Use of medication to induce sleep in 2 weeks (n=1411)					
Yes	---	---	317 (100)	---	<0,001
No	628 (57,4)	54,4;60,3	466 (42,6)	39,7;45,6	
Menopause (n=762)					
Yes	327 (46,8)	43,1;50,5	372 (53,2)	49,5;56,9	0,261
No	13 (33,3)	20,3;49,6	26 (66,7)	50,4;79,7	
Don't know	11 (45,8)	27,1;65,8	411 (54,2)	34,2;72,9	
Hormone therapy (n=699)					
Currently undergoing	11 (45,9)	27,1;65,8	13 (54,1)	34,2;72,9	0,465
Did, but no longer does	55 (42,0)	33,8;50,6	76 (58,0)	49,4;66,2	
Never	261 (48,0)	43,8;52,2	283 (52,0)	47,8;56,2	

When considering only women in the sample who did not use sleep-inducing medication in the last 2 weeks, a significant association was found between sleep problems and reports of limitations in professional or usual activities. Among women who reported no limitations, 60% (95% CI 56.3;63.6) also reported no sleep problems. In addition, among women who reported daily limitations, 51% (95% CI 45.3;56.7) also denied having

changes in their sleep cycle (Table 3).

The absence of sleep problems was significantly associated with the absence of fatigue in the two weeks prior to the study, with 78.9% (95% CI 75.3;82.0) of participants who denied having sleep problems also reporting no fatigue. In addition, among women with cancer who reported changes in their sleep-wake cycle, more than 65% (95% CI 61.2;69.3) mentioned some degree of fatigue (Table 3). When as-

sessing self-perceived health among women, more than half of those who considered their health to be very good or good denied having sleep problems (67.0% and 95% CI 62.9;71.0). On the other hand, among women who considered their health to be poor or very poor, 61.5% (95% CI 53.3;69.2) reported sleep problems in the survey (Table 3).

Table 3. Association between activity limitation, fatigue in the last 2 weeks, and self-perceived health with the presence of sleep disorders in women diagnosed with cancer who did not use sleep-inducing medication during the period, according to the 2019 National Health Survey.

Variable	Sleep disorder				P value
	No		Yes		
	n(%)	CI 95%	n(%)	CI 95%	
Activity limitation due to cancer (n=993)					
No limitation	417 (60,0)	56,3;63,6	278 (40,0)	36,4;43,7	0,009
Limited to some degree	152 (51,0)	45,3;56,7	146 (49,0)	43,3;54,7	
Felt tired in the last 2 weeks (n=1094)					
No fatigue	444 (78,9)	75,3;82,0	119 (21,1)	18,0;24,7	<0,001
Some tiredness	184 (35,6)	30,7;38,8	347(65,4)	61,2;69,3	
Self-perceived health (n = 1094)					
Very good or good	346 (67,0)	62,9;71,0	170 (33,0)	29,0;37,1	<0,001
Fair	227 (52,2)	47,5;56,9	208 (47,8)	43,1;52,5	
Poor or very poor	55 (38,5)	30,8;46,7	88 (61,5)	53,3;69,2	

DISCUSSION

The main findings of this study indicate that a significant proportion of women diagnosed with cancer reported sleep problems, predominantly observed in women aged 60 years or older, white, with more than five years of schooling, and low family income. Among women who depended on public services, the majority of the sample, the prevalence of sleep problems was higher compared to users of private services. Women without activity limitations reported fewer sleep problems. Most women who reported fatigue in the weeks prior to the study had sleep problems, which reinforces the link between fatigue and sleep-wake cycle problems. Self-perceived health was an important associated factor, as women who rated their health as very good or good had a lower prevalence of sleep problems, while those who considered their health poor or very poor reported a higher occurrence of sleep problems.

The profile of women diagnosed with the most prevalent cancers in this study is an average age of 56 years, with more than half having more than 8 years of schooling and about 60% being users of public health services. When analyzing the sociodemographic profile found in the literature, similarities are found with the profile observed in this study^{13,14}. Authors analyzed the prevalence and predictors of sleep problems in Australian women diagnosed with cancer, where the average age was 55 years, similar to the average observed in this study¹³. The age group in the present study converged with another Brazilian study focusing on women with breast cancer and sleep problems. However, that study revealed a higher proportion of women with higher levels of education, contrasting with the moderate educational profile found in the present study¹⁴.

The use of the public health sector was associated with a higher report of sleep problems in women with cancer.

A retrospective cohort study conducted in Minas Gerais showed that 60% of patients were dependent on the public health system, since cancer investigation and treatment are usually long-term and high-cost, making it impossible to cover them solely through private insurance. Another Brazilian article from 2023 identified that 55% of cancer diagnoses and treatments were performed by private clinics. However, when looking at how these services were accessed, 100% of appointments were offered by the Unified Health System (SUS). Although most women treated by the SUS for cancer belong to socially vulnerable groups, the coverage offered by the public system covers the entire population^{15,16}. This reinforces the essential role of the SUS in ensuring universal access to cancer diagnosis and treatment, regardless of socioeconomic status.

In this study, it was observed that no limitation of daily activities was related to no sleep problems in women with cancer who did not use sleep-inducing medication. Limitations in daily activities caused by sleep problems can profoundly affect a person's ability to perform basic tasks such as self-care, household activities, social interactions, and even returning to work, compromising their independence and quality of life^{14,17}. These limitations are often attributed to factors such as pain, fatigue, and emotional disorders such as depression, and anxiety, which exacerbate even the difficulties faced by these patients^{14,18}. In a study characterizing sleep quality and functionality in women with breast cancer, of the sample that considered sleep quality to be poor, 60% had difficulty with household chores and 16.6% reported impairment in interpersonal relationships. In contrast, when sleep was characterized as satisfactory, only 20% reported difficulty with household chores and 8% with interpersonal relationships, corroborating the findings of the present study¹⁹. The high prevalence of sleep problems

is often associated with poor health, affecting the regulation of immune and inflammatory functions, leading to changes in cognition and memory, emotional instability, and increased appetite²⁰.

When assessing the positive association between women with cancer and changes in the sleep-wake cycle, with the presence of some degree of fatigue, it is observed in the literature that poor sleep quality is strongly associated with higher levels of fatigue in cancer patients²¹. High-impact scientific evidence that evaluated the trajectory of symptoms of fatigue related to breast cancer, sleep problems, and psychological distress from diagnosis to one year after chemotherapy showed that there was a significant increase in fatigue levels and sleep problems, with peak symptoms occurring shortly after the end of chemotherapy. In addition, it has been observed in the literature that approximately 50% of women with persistent symptoms of fatigue, even five years after the end of treatment, and cancer survivors for 10 years, have higher levels of fatigue than the general population²¹. In women with breast cancer, for example, sleep problems are a significant factor in the occurrence of fatigue, with many patients reporting that poor sleep quality worsens their feelings of tiredness²². Furthermore, sleep quality is directly related to social anxiety and daytime fatigue, affecting the overall perception of well-being. As such, women who experience sleep difficulties reported poorer quality of life and increased fatigue, which can intensify negative perceptions of health^{22, 23}. Changes and predictors of fatigue severity in women with breast cancer appear to be associated with younger women with higher levels of education who reported high levels of fatigue²⁴.

The results of this study indicate that self-perceived health is associated with the presence of sleep problems among women with cancer. A Brazilian population-based study found that self-clas-

sification of sleep as poor is more prevalent in women (33.5%) than in men (24.2%), especially those with self-rated poor health and a greater number of health problems²². In addition, the presence of psychological symptoms and cancer-related fatigue, common in cancer patients, can exacerbate sleep problems, creating a vicious cycle that negatively affects the quality of life and, consequently, the self-perceived health of these women²¹.

It is important to consider some limitations of this study. Because it was a cross-sectional study, it was not possible to determine whether sleep problems aggravated the physical and emotional conditions resulting from cancer or whether these conditions contributed to the worsening of sleep quality. Furthermore, data collection was performed using self-reported ques-

tionnaires, which may have introduced memory and interpretation biases. As observed in the tables analyzed in this study, some variables have a reduced number of responses, which may be related to factors such as lack of understanding or abstention from answering the question in the questionnaire used. However, this study offers relevant contributions to understanding the relationship between sleep problems in women with cancer and their associated factors, highlighting the need for longitudinal studies that better elucidate these interactions and address effective interventions aimed at minimizing the impacts on the quality of life of these patients.

CONCLUSION

This study identified significant as-

sociations between sleep problems in women with cancer and variables such as use of services, limitation of daily activities, presence of some degree of fatigue, and poor self-perception of health status, indicating the need for expanded care in the follow-up of these women, such as psychotherapeutic support and drug treatments, especially for those who use only the public health system, in order to mitigate the negative impacts on the patients' quality of life. Longitudinal research is suggested to explore the progression of sleep problems throughout cancer treatment, investigating factors such as cancer type, disease stage, different therapeutic approaches, and risk factors that influence sleep quality.

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