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Sociodemographic effect on stage at diagnosis of melanoma patients treated in a public cancer center in Brazil

Efeito sociodemográfico no estágio de diagnóstico de pacientes com melanoma atendidos em um centro oncológico público no Brasil

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ABSTRACT

Introduction: Melanoma is the most aggressive type of skin cancer, with a continuous increase in its incidence worldwide. The prognosis of patients is favorable, and the treatment is relatively simple and inexpensive when diagnosed at an early stage. However, early diagnosis requires easy access to the health system. In a continental and diverse country like Brazil, there is an urgent need to study the access conditions to health services for the development of satisfactory intervention tools. **Objectives:** This study aimed to evaluate the access to the health system for diagnosis, as well as the social, economic, and cultural characteristics of patients with melanoma treated at Barretos Cancer Hospital (BCH). **Methods:** We performed a prospective study where 101 patients were interviewed. Data were collected regarding the time of symptoms until diagnosis, use of the Brazilian public health system or different forms of private medicine, time from diagnosis to care at the hospital, distance, travel time and transportation used, income, educational level, human development index of the municipality and Gini index. Clinical, pathologic, and treatment data were also evaluated. A multivariate analysis was performed to examine the chance of patients being diagnosed with advanced-stage melanoma. The results were analyzed using REDCap and SPSS software. **Results:** The gender, human development index, type of transportation used for displacement to the BCH, and the time elapsed between the appointment and first consultation were associated with staging of the tumors. Males had a higher proportion (55.6%) of advanced cases (p=0.002). Those who lived in cities with medium human development index represented 77.8% of advanced tumors (p=0.037). For patients who used public transportation, 77.8% arrived with advanced disease (p=0.025). Finally, 66.7% of the patients consulted after one month of scheduling presented advanced tumors (p=0.017). **Conclusion:** Socioeconomic and demographic factors of patients with melanoma influence the diagnosis and, consequently, treatment conditions.

Keywords: Diagnosis; Melanoma; Health care quality; Access, and evaluation; Demography; Public health.

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RESUMO

Introdução: O melanoma é o tipo de câncer de pele mais agressivo, com aumento contínuo de sua incidência em todo o mundo. O prognóstico dos pacientes é favorável e o tratamento é relativamente simples e barato quando diagnosticado precocemente. Contudo, o diagnóstico precoce requer fácil acesso ao sistema de saúde. Em um país continental e diversificado como o Brasil, há necessidade urgente de estudar as condições de acesso aos serviços de saúde para o desenvolvimento de ferramentas de intervenção satisfatórias. **Objetivos:** Este estudo teve como objetivo avaliar o acesso ao sistema de saúde para diagnóstico, bem como as características sociais, econômicas e culturais de pacientes com melanoma atendidos no Hospital do Câncer de Barretos (HCB). **Métodos:** Foi realizado um estudo prospectivo onde foram entrevistados 101 pacientes. Foram coletados dados referentes ao tempo dos sintomas até o diagnóstico, uso do sistema público de saúde brasileiro ou diferentes formas de medicina privada, tempo desde o diagnóstico até o atendimento no hospital, distância, tempo de viagem e transporte utilizado, renda, escolaridade, índice de desenvolvimento humano do município e índice de Gini. Dados clínicos, patológicos e de tratamento também foram avaliados. Uma análise multivariada foi realizada para examinar a chance de pacientes serem diagnosticados com melanoma em estágio avançado. Os resultados foram analisados utilizando os softwares REDCap e SPSS. **Resultados:** O sexo, o índice de desenvolvimento humano, o tipo de transporte utilizado para deslocamento até o HCB e o tempo decorrido entre o agendamento e a primeira consulta estiveram associados ao estadiamento dos tumores. O sexo masculino apresentou maior proporção (55,6%) de casos avançados (*p*=0,002). Aqueles que residiam em cidades com índice de desenvolvimento humano médio representaram 77,8% dos tumores avançados (*p*=0,037). Dos pacientes que utilizavam transporte público, 77,8% chegaram com doença avançada (*p*=0,025). Por fim, 66,7% dos pacientes consultados após um mês de agendamento apresentavam tumores avançados (*p*=0,017). **Conclusão:** Fatores socioeconômicos e demográficos dos pacientes com melanoma influenciam no diagnóstico e, consequentemente, nas condições de tratamento.

Descritores: Diagnóstico; Melanoma; Qualidade dos cuidados de saúde; Acesso e avaliação; Demografia; Saúde pública.

INTRODUCTION

Melanoma is the most aggressive type of skin cancer, with a continuous increase in its incidence worldwide, with an estimated 324,635 new cases in 2020.[1] In addition, 75% of deaths related to skin cancer are due to melanoma.[2] In Brazil, for the years 2023-2025, 8,980 new cases were estimated annually.[3]

The highest frequency of cutaneous melanoma is in individuals between 40 and 60 years. However, this is one of the most frequently diagnosed neoplasms in young adults (20-29 years of age) and therefore a relatively important cause of years of life lost during productive ages.[4] The most relevant modifiable risk factor for skin cancer is excessive exposure to ultraviolet radiation.[5] The prognosis of patients with melanoma is considered favorable if the tumors are diagnosed and treated appropriately in their early stages. Nevertheless, when diagnosed in more advanced stages, especially with the presence of metastases, the prognosis is markedly worse.[3,6]

In Brazil, the creation of the Unified Health System (SUS) aimed to guarantee and expand the accessibility to health services by the population. However, socioeconomic discrepancies, such as family income, quality of services offered, and travel costs, bring health access disparities.[7] The life expectancy of socioeconomically disadvantaged groups is lower than those with better socioeconomic conditions.[8] Dermatologists play a crucial role in detecting melanomas at an earlier stage, leading to better survival outcomes, while lower socioeconomic status, race/ethnicity, and place of residence are linked to limited access to dermatologists and late-stage melanoma diagnoses, particularly among uninsured and publicly insured individuals.[9] Therefore, a growing interest is in defining and measuring this access to health.[10]

The four main barriers to health access are structural, financial, and personal/cultural.[11] The structural barriers are directly linked to the difficulties in accessing medical care and to the quantity, location, type, and proficiency of health professionals. Related to the financial barrier, its impact is on the condition of individuals to pay for medical care and the discouragement of health professionals and medical centers from treating patients with scarce financial resources. Personal and cultural aspects can inhibit patients from seeking medical help when necessary or even carrying out the recommendations after treatment. The fear of being ill can influence the demand for help and make it difficult to detect the disease early and to better manage it.[11,12]

In this context, we aimed to evaluate the conditions of access to the health system for diagnosis and treatment and the social, economic, and cultural characteristics of melanoma patients treated in a public tertiary hospital.

METHODS

Study design

This was a cross-sectional observational study with a consecutive collection of newly diagnosed cases of melanoma.

Ethics approval

This study followed all ethical standard guidelines and was approved by the Barretos Cancer Hospital internal ethical review board (#1595/2018). All patients signed an informed consent form before answering to the sociodemographic questionnaire.

Casuistry

This study was conducted at Barretos Cancer Hospital (BCH), located in the city of Barretos - São Paulo, Brazil. The BCH is a specialized medical institution dedicated to providing comprehensive and accessible care to cancer patients, including those who rely on Brazil's public healthcare system (SUS). With its multidisciplinary approach, state-of-the-art facilities, and a strong focus on research and innovation, the hospital offers a wide range of services, from diagnosis to treatment and palliative care, and stands as a leading institution in the field of oncology in Brazil, providing vital support to cancer patients within the framework of the SUS.

The data were collected from 101 melanoma patients treated at the Department of Melanoma, Sarcoma, and Mesenchymal Tumors of the BCH, from December 2018 to March 2020. The inclusion criteria were patients over 18 years old, diagnosed with cutaneous melanoma, and registered in the hospital up to 90 days before the inclusion in the study. The time pre-established by the researchers of 90 days after registration is based on the concept of long-term memory,[13] where information can be stored for long periods (months or years) but must be stimulated for its memorization. Therefore, care was taken to determine a short period to conduct the interview, which has some questions that evoke memories related to the onset of the disease, adapting to the outpatient clinic's schedule. Patients without follow-up by the hospital were excluded.

Data collection

Clinical, histopathological, and treatment data were collected directly from the patient's medical records. Patients' tumors were classified into early stage (0, I, and II) and advanced stage (III and IV), using the 8th edition of the AJCC Cancer Staging Manual.[14]

A sociodemographic questionnaire was adapted and applied during an interview with the patient before the medical appointment (Supplementary Form 1).[15-19] Data regarding the time from the onset of symptoms to the diagnosis of cancer, time from diagnosis to care at the hospital, distance from the health unit to the patient's residence, travel time and transportation used, income, educational level, use of the SUS or different forms of private medicine were collected through this interview. A single investigator was responsible for applying the questionnaires, to reduce the risk of bias.

Data related to the Human Development Index (HDI) of the patient's city were obtained through the Atlas of Human Development in Brazil[20,21] and the local Gini Index was collected using the informatics system of the SUS (DATASUS),[22] both using data from 1991, 2000, and 2010 demographic censuses.

All data collected were stored on the REDCap (Research Electronic Data Capture) platform.[23]

Spatial distribution of melanoma cases

Melanoma cases were geocoded by obtaining the geographical coordinates of the subjects' residence addresses, using the BatchGeo platform.[24] To produce the thematic maps, the cartographic base of the Brazilian municipalities was obtained from the Brazilian Institute of Geography and Statistics (IBGE),[25] and of South America from the metadatabase of the National Water Agency (ANA).[26] The analyses were performed using the QGIS 3.10 software.[27]

Statistical analysis

The statistical program SPSS 23.0 was used for data tabulation and analysis. The chi-square or Fisher's test was used to identify possible associations between discrete variables of interest. Multivariate analysis of risk factors was performed according to exploratory findings of univariate analysis, through logistic regression, where all variables with p-value ≤0.2 were included in the model. The dependent variable was tumor staging.

The statistical significance for all analyses was $p \leq 0.05$ and 95% confidence intervals (CI).

RESULTS

Sociodemographic characteristics

One hundred and one patients were included in the study between December 2018 and March 2020.

The mean age of the patients at diagnosis was 54.8. Fifty-two patients came from the state of São Paulo. Table 1 shows the sociodemographic profile of the patients. Among the participants, 52.5% were male and 47.5% female. The majority declared themselves white (74.3%), followed by brown (18.8%) and black (6.9%). Most individuals had their own residence (80.2%), located in urban areas (81.2%), where two to three people lived together (58.4%). The median distance between the patient's residence and BCH was 330 km (1.9-2.404km) and the time spent on the route was between 1-5 hours for 35.6% of the patients. The means of transportation most used for this displacement was that offered by the city hall of origin (46.5%), such as vans, micro-buses, or ambulances, followed by private vehicles (39.6%) and collective land transportation paid with own resources (10.9%). Moreover, most of the patients had elementary education (48.5%) and monthly income between R$ 937.00 and R$ 3,748.00 (42.6%). Twenty patients had a complementary healthcare plan.

The municipal HDI average was 0.74 (0.64-0.82) and the municipal Gini index average was 0.50 (0.36-0.65). When categorizing both indexes (Table 1), it was observed that 75.2% of patients resided in municipalities with high HDI (values between 0.700 and 0.799), while 55% of patients resided in municipalities with poor wealth distribution (Gini index >0.50).

Clinicopathological characteristics

The most common primary locations of the lesions were the trunk (32.7%) and lower limbs (25.7%), for both sexes. The superficial spreading histological subtype was the most frequent, representing 33.7% of the cases. The mean depth of the tumors (Breslow thickness) was 4.46mm (0.28-27.0mm). Most of the tumors did not present perineural invasion (69.3%), vascular invasion (71.3%), regression (60.4%), or microscopic satellitosis (62.4%). In addition, 45.5% of tumors did not present ulceration. According to the clinical stage, 54.4% of the patients presented tumors in the early stages and 45.6%, in the advanced stages (Table 2).

According to the treatment of patients, 69.3% had no indication for systemic treatment. Of the 31 patients who underwent systemic treatment, 83.9% used only one therapeutic modality: 17 patients were treated with anti-PD-1 drugs, 8 with chemotherapy, and 1 with targeted therapy.

Association analysis

As the pathological staging is consistently associated with the prognosis,[28] we tested its association with the sociodemographic data. Tumor staging was dichotomized into initial and advanced.[14] For these analyses, 12 patients with unknown primary tumors were excluded due to the absence of data on the primary tumor or the natural trajectory of the disease, remaining 89 patients.

Association of sociodemographic characteristics with pathological staging

Sex, time of suspicion of the lesion and the search for specialized help, time of appointment to the first consultation at the BCH, local HDI, type of means of transportation to the hospital, distance, and time of travel between the residence and the BCH were associated with different clinical stages (Table 3).

Most (55.6%) of male patients had advanced-stage melanomas at diagnosis whereas 77.4% of female patients had early-stage melanomas (p=0.002). Regarding the time between the appointment and the first consultation in the BCH, 66.7% of the patients who took more than one month to be consulted arrived with advanced tumors, while 66.2% of the patients who were consulted within one month arrived with initial tumors (p=0.017) (Table 3 and Figure 1). Sixty-six percent of patients coming from cities with high HDI had initial tumors, while 77.8% of patients coming from cities with medium HDI had advanced tumors (p=0.037). Patients moving from their residence to BCH using public transportation presented, in their majority (77.8%), advanced tumors, while patients moving with other types of transport presented more initial tumors (p=0.025). Related to the municipality of residence, about 71.0% of the patients who lived less than 330 km from BCH and consequently spent less than 5 hours on this route arrived at the hospital with less advanced tumors (p=0.034 and p=0.027, respectively). The time between the suspicion of the lesion and the search for specialized help indicated a trend towards staging of the tumors, where 72.0% of the patients who took less than 3 months to seek medical assistance arrived at BCH with initial tumors (p=0.057) (Figure 2). The other evaluated characteristics did not demonstrate an association with the staging of the patients (Table 3).

Finally, we performed a multivariate analysis to verify the chance of patients being diagnosed with advanced-stage melanoma. The variables self-declared color, sex, residence location, Gini index, municipal HDI, transportation used, the time between suspicion and search for a physician, the time between appointment and first visit at the BCH, and

Table 1. Sociodemographic characteristics of 101 melanoma patients treated at the Barretos Cancer Hospital.

Characteristic	N (%)
Sex	
Male	53 (52.5)
Female	48 (47.5)
Self-declared color	
White	75 (74.3)
Brown	19 (18.8)
Black	7 (6.9)
Sun exposure	
Chronicle	47 (46.5)
Intermittent	20 (19.8)
None	21 (20.8)
No information	13 (12.9)
Number of people in residence	
1	15 (14.9)
2-3	59 (58.4)
4-7	27 (26.7)
Residence location	
Urban area	82 (81.2)
Rural area	19 (18.8)
Residence situation	
Own	81 (80.2)
Rented	7 (6.9)
Ceded	13 (12.9)
Educational level	
Elementary school	49 (48.5)
High School	25 (24.8)
Higher education	23 (22.8)
No study	4 (4.0)
Monthly income	
Up to R$ 937.00	27 (26.7)
From R$ 937.00 to R$ 3,748.00	43 (42.6)
From R$ 3,748.00 to R$ 6,559.00	10 (9.9)
More than R$ 6,559.00	2 (2.0)
No income	19 (18.8)
Median distance from residence to BCH, *Km (range)*	330 (1.9 - 2.404)
Time from the residence to BCH	
Up to 1 hour	18 (17.8)
1-5 hours	36 (35.6)
5-10 hours	29 (28.7)
More than 10 hours	18 (17.8)
Means of transportation to BCH	
Offered by the city hall of origin	47 (46.5)
Private vehicles	40 (39.6)
Collective land transportation	11 (10.9)
Other	3 (3.0)
Gini index	
≤0.50	45 (45.0)
>0.50	55 (55.0)
Municipal HDI	
Middle (0.550 – 0.699)	13 (12.9)
High (0.700 – 0.799)	79 (78.2)
Very high (0.800 – 1.000)	9 (8.9)
Private healthcare plan	
Yes	20 (19.8)
No	81 (80.2)

BCH: Barretos Cancer Hospital.

Table 2. Clinicopathological characteristics of 101 melanoma patients treated at the Barretos Cancer Hospital.

| Characteristic	N (%)
Histological subtype	
Superficial spreading	34 (33.7)
Nodular	17 (16.8)
Acral lentiginous	16 (15.8)
Fusocellular	4 (4.0)
Lentigo maligna	3 (3.0)
Ocular	2 (2.0)
Verrucous	1 (1.0)
Amelanotic	1 (1.0)
Unclassifiable	23 (22.8)
Missing	29 (28.7)
Ulceration	
Yes	30 (29.7)
No	46 (45.5)
Missing	25 (24.8)
Perineural invasion	
Yes	5 (5.0)
No	70 (69.3)
Missing	26 (25.7)
Vascular invasion	
Yes	5 (5.0)
No	72 (71.3)
Missing	24 (23.8)
Regression	
Yes	12 (11.9)
No	61 (60.4)
Missing	28 (27.7)
Microscopic satelitosis	
Yes	7 (6.90)
No	63 (62.4)
Missing	31 (30.7)
Tumor staging	
0	10 (9.9)
I	27 (26.7)
II	18 (17.8)
III	21 (20.8)
IV	25 (24.8)
Sistemic treatment	
No indication	70 (69.3)
Loco-regional or in transit disease	2 (2.0)
Adjuvant treatment	2 (2.0)
Non-visceral metastatic disease	4 (4.0)
Visceral metastatic disease	23 (22.8)
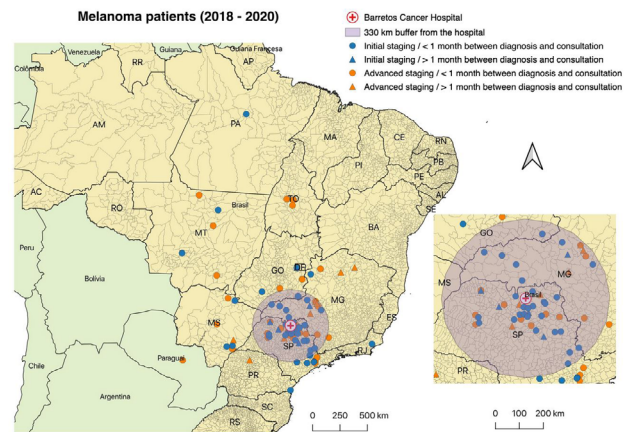
Figure 1. Association between the time from diagnosis to the first consultation at Barretos Cancer Hospital (BCH) and the clinical stage of the patients.
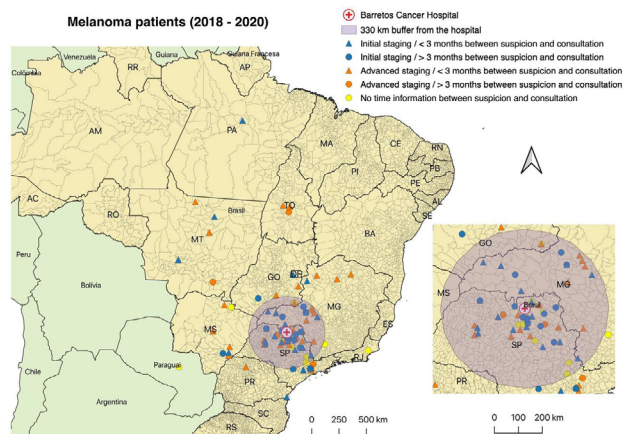

Figure 2. Association between the time from suspicion to the search for medical help and the patient's clinical stage.

distance between the residence and the hospital were included in the model. The variables sex, HDI, means of transportation, and time between appointment and first BCH consultation remained independently associated with risk in our model (Table 4). Female patients showed lower chances of presenting advanced tumors than patients of the opposite sex (OR=0.131; 95%CI: 0.031-0.547; *p*=0.005). Regarding HDI, patients from municipalities with high HDI have less chance of arriving with advanced staging when compared to patients from cities with medium HDI (OR=0.033; 95%CI: 0.003-0.375; *p*=0.006). Patients who use private vehicles (OR=0.043; 95%CI: 0.005-0.394; *p*=0.005) and transportation provided by the City Hall (OR=0.025; 95% CI: 0.003-0.228; *p*=0.001) had a lower chance of presenting stage III and IV tumors when compared to patients who moved with collective transportation. Finally, patients who spent less than one month to have the first consultation at BCH had lower chances of arriving with advanced tumors (OR=0.063; 95%CI: 0.12-0.345; *p*=0.001).

Table 3. Association between sociodemographic variables and pathological staging of the tumor of 89 melanoma patients treated at the Barretos Cancer Hospital.

Characteristic	Initial stage N (%)	Advanced stage N (%)	p
Self-declared color			
White	44 (64.7)	24 (35.3)	0.161
Non-white	10 (47.6)	11 (52.4)	
Age			
≤ 55 years	29 (65.9)	15 (34.1)	0.317
> 55 years	25 (55.6)	20 (44.4)	
Gender			
Male	20 (44.4)	25 (55.6)	0.002
Female	34 (77.3)	10 (22.7)	
Residence location			
Urban area	46 (64.8)	25 (35.2)	0.115
Rural area	8 (44.4)	10 (55.6)	
Educational level			
Elementary school	22 (52.4)	20 (47.6)	0.266
High School	17 (77.3)	5 (22.7)	
Higher education	13 (61.9)	8 (38.1)	
No study	2 (50.0)	2 (50.0)	
Monthly income			
Up to R$ 937.00	14 (56.0)	11 (44.0)	0.853
More than R$ 937.00	30 (62.5)	18 (37.5)	
No income	10 (62.5)	6 (37.5)	
Sun exposure			
Chronicle	25 (61.0)	16 (39.0)	0.750
Intermittent	9 (52.9)	8 (47.1)	
None	13 (65.0)	7 (35.0)	
Time between suspicion and finding a doctor			
Less than 3 months	18 (72.0)	7 (28.0)	0.057
More than 3 months	26 (49.1)	27 (50.9)	
Time between appointment and first BCH consultation			
Less than 1 month	49 (66.2)	25 (33.8)	0.017
More than 1 month	5 (33.3)	10 (66.7)	
Gini index			
≤ 0.50	27 (69.2)	12 (30.8)	0.144
> 0.50	27 (54.0)	23 (46.0)	
Municipal HDI			
Medium	2 (22.2)	7 (77.8)	0.037
High	47 (66.2)	24 (33.8)	
Very high	5 (55.6)	4 (44.4)	
Private healthcare plan			
Yes	10 (52.6)	9 (47.4)	0.418
No	44 (62.9)	26 (37.1)	
Means of transportation			
Private vehicle	22 (61.1)	14 (38.9)	0.025
Provided by the City Hall	29 (70.7)	12 (29.3)	
Collective transportation	2 (22.2)	7 (77.8)	
Distance from the residence to the BCH			
Up to 330 Km	34 (70.8)	14 (29.2)	0.034
More than 330 Km	20 (48.8)	21 (51.2)	
Travel time from residence to BCH			
Up to 5 hours	36 (70.6)	15 (29.4)	0.027
More than 5 hours	18 (47.4)	20 (52.6)	

BCH: Barretos Cancer Hospital; HDI: Human Development Index.

Table 4. Multivariate analysis by logistic regression method to evaluate the chance of being diagnosed with advanced melanoma at the Barretos Cancer Hospital.

Characteristic	Odds Ratio	CI (95%)	p
Gender			
Male	Reference		
Female	0.131	0.031 - 0.547	0.005
HDI			
Middle	Reference		
High	0.033	0.003 - 0.375	0.006
Very high	0.093	0.005 - 1.653	0.106
Means of transportation			
Collective transportation	Reference		
Private vehicle	0.043	0.005 - 0.394	0.005
Provided by the City Hall	0.025	0.003 - 0.228	0.001
Time between appointment and first BCH consultation			
More than 1 month	Reference		
Less than 1 month	0.063	0.012 - 0.345	0.001

CI: Confidence Interval; HDI: Human Development Index; BCH: Barretos Cancer Hospital

DISCUSSION

The results of this study demonstrated that the socioeconomic and demographic status of melanoma patients impact their diagnosis and, consequently, their treatment conditions. The male sex, the lower HDI of the municipality in which they reside, the public transportation used for displacement to the hospital, and the prolonged time elapsed between scheduling and first consultation was related to a higher stage at diagnosis of the patients.

Regarding sex, male patients showed a greater chance of presenting advanced tumors in diagnosis. This characteristic is in accordance with a previous retrospective study that included 1,073 patients, where the discrepancy between genders regarding TNM staging was evidenced.[29] In this study, 28.9% of women were in advanced stages, against 44.1% of men. In this same way, the study performed by Scoggins et al. (2006)[30] demonstrated that in patients with Breslow above 2mm, 64% were male, against 36% of females; of patients with ulcerated tumors, 63.8% were male, while 36.2% were female; and of patients with positive sentinel lymph nodes, 61.5% were male and 38.5%, female. With these results, we cannot fail to highlight that several studies report that women seek health services more than men, and those men are less likely to regularly seek health services for preventive measures. This leads to a delay in the diagnosis of diseases that could be controlled or treated.[31,32]

Most of the patients included in this study came from locations with high HDI, agreeing with a global population-based study that assessed the pattern of cancer change and HDI levels and found a high incidence of melanoma in regions with higher HDI.[33] Compared to those residents of cities with medium HDI, patients from high HDI locations presented lower chances of being diagnosed in the advanced stages of the disease. Taking into consideration that the HDI uses three parameters to evaluate the development of a given location (per capita income, education, and longevity), and so far, no Brazilian studies addressed this point with melanoma patients, the individual impact of these characteristics directly strengthens our findings. A previous Brazilian study investigated the characteristics of health services and the quality of cervical cancer screening and found better access and early screening conditions for women from higher HDI regions.[34] Respecting education and income factors, a Danish study indicated that patients in groups with low education and low income had 1.53 and 1.79 more chances, respectively, of being diagnosed with advanced melanoma.[35]

In addition, another study found these same factors associated with a higher risk of death, where patients residing in regions whose educational level of the population was lower had a 20.9% increased chance of death, and for regions where the average annual income was less than $38,000, patients with melanoma had a 23.7% higher chance of death.[36] Finally, a Surveillance, Epidemiology, and End Results

(SEER) Program study analyzed the association between UV radiation exposure, diagnostic scrutiny, and geographical patterns of melanoma incidence in the United States. Findings showed that UV radiation exposure had little correlation with melanoma incidence, while median household income was positively correlated. Counties with no dermatologists had the lowest incidence, while those with ample supply had the highest. The study suggests that diagnostic scrutiny is more associated with melanoma incidence than UV radiation exposure.[37]

As for the means of transportation used, patients who do not depend on public transportation to access treatment had a lower chance of reaching the hospital with advanced tumors. The means of transportation were previously described as a barrier to access to cancer diagnosis and treatment.[38] In this study, patients reported that their greatest difficulties in gaining access to medical care were linked to distance, access to an automobile, or the availability of someone to take them to the treatment center, which can result in a delay or evasion of these patients. Added to the type of transportation available, the distance and time of travel are factors that can lead to a late diagnosis and consequently impact the prognosis and quality of life.[39,40] Although these two factors were not sustained in the multivariate analysis of this study, both demonstrated an association in univariate analysis. The lack of significance in the multivariate analysis may be influenced by other confounding factors.

The elapsed time for the first consultation at BCH also influenced the stages of the disease, so those who had consultation less than one month of scheduling showed lower chances of presenting advanced disease. Majeed et al. (2018)[41] described the barriers associated with delay in initial care and reported delays in referral and shortage of specialized hospitals and health facilities as common barriers. This is reflected in the scope of BCH's reception, which receives patients from all regions of the country.[42] Another Brazilian study concluded there is still a significant delay in recognizing melanoma symptoms in the country, influenced by various socioeconomic and demographic factors.[43] The authors showed that Breslow, lesion growth, income range, phototype and housing conditions were associated with a deferral in melanoma diagnosis, corroborating with some of our findings.

It is important to note that some factors such as monthly income, educational level, and possession of private health insurance did not influence the outcomes of this study's patients. A possible reason for the non-significant impact of those parameters remains in the specific context of Barretos Cancer Hospital, which provides accessible and comprehensive public healthcare services, providing equitable access to medical care for melanoma patients regardless of their income, education, or insurance status. The present study has certain limitations that merit consideration. Firstly, the number of patients included in the study was constrained due to the ongoing global SARS-CoV-2 pandemic, which limited direct contact with patients attending the institution. This circumstance may introduce a potential bias as it could impact the representation of certain patient groups or demographics. Secondly, the data collection process relied on a socioeconomic questionnaire, which did not directly address the specific reasons hindering access to healthcare for the patients. This limitation may have obscured important factors contributing to the barriers faced by the patients in seeking medical care. Furthermore, the categorical approach employed for collecting some of the data limited the depth of analysis for certain findings. This restriction in data representation might have resulted in an oversimplification of complex relationships and nuances within the study population. Consequently, the conclusions drawn from this study may not fully capture the intricate interplay of various factors affecting healthcare access.

Future studies with a larger and more diverse patient cohort and comprehensive data collection methods are essential to establish more robust causal relationships and gain a comprehensive understanding of the barriers to accessing healthcare.

CONCLUSION

In conclusion, we found that socioeconomic and demographic factors of patients with melanoma are associated with the conditions of access to diagnosis and treatment. Through the characterization of these conditions and the survey of living conditions related to the city where the patients live, it was possible to identify the limiting barriers to access. The distance and time of travel to the BCH, sex, time until the first consultation, municipal HDI, and the type of means of transportation used presented relevance in the issues surrounding access difficulties, culminating in a late diagnosis. Public health interventions with improvements in education and access to health services are the way to change the panorama presented here.

AUTHORS' CONTRIBUTIONS

RJT: Collection and assembly of data, Conception and design, Data analysis and interpretation, Manuscript writing.

BPS: Data analysis and interpretation, Manuscript writing.

RDVL: Data analysis and interpretation.

AGR: Data analysis and interpretation.

FLV: Conception and design.

VLV: Conception and design, Final approval of manuscript.

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	Supplementary Form 1		
	Avaliação da acessibilidade ao sistema de saúde para o diagnóstico e tratamento do paciente com melanoma no Hospital de Câncer de Barretos		
Identificação			
	Data de coleta de dados DD/MM/AAAA		
1	ID paciente	1	
2	RH _ _ - _ _ _ _ _	2	
3	Iniciais	3	
4	Endereço	4	
5	Cidade	5	
6	Telefone (_ _) _ _ _ _ _ - _ _ _ _	6	
7	Data de nascimento DD/MM/AAAA	7	
8	Gênero 1- Masculino; 2- feminino	8	
9	Estado civil 1- Solteiro; 2- Casado; 3- Divorciado; 4- Viúvo; 5- União estável	9	
10	Naturalidade	10	
11	Nacionalidade 1- Brasileira; 2- Estrangeira	11	
12	Raça (autodeclarada) 1- Branco; 2- Negro; 3-Parda; 4- Amarelo; 5- Indefinida	12	
13	Ocupação atual	13	
14	Ocupação anterior	14	
15	Diagnóstico médico	15	
16	Médico responsável	16	
	Questionário		
17	Quantas pessoas residem com você? 1- Uma; 2- Duas a três; 3- Quatro a sete; 4- Oito a dez; 5- Mais de dez	17	
18	Sua casa é: 1- Própria; 2- Alugada; 3- Cedida; 4- Sem residência fixa	18	
19	Sua casa está localizada em: 1- Zona urbana; 2- Zona rural; 3- Outros	19	

20	Qual é o seu nível de escolaridade? 1- 1ª à 4ª série do Ensino Fundamental (antigo primário); 2- 5ª à 8ª série do Ensino Fundamental (antigo ginásio); 3- Ensino Médio (antigo 2º grau); 4- Ensino Superior; 5- Não estudou	20	
21	Qual é o nível de escolaridade do seu pai? 1-1ª à 4ª série do Ensino Fundamental (antigo primário); 2- 5ª à 8ª série do Ensino Fundamental (antigo ginásio); 3- Ensino Médio (antigo 2º grau); 4- Ensino Superior; 5- Não sei dizer; 6- Não estudou	21	
22	Qual é o nível de escolaridade da sua mãe? 1-1ª à 4ª série do Ensino Fundamental (antigo primário); 2- 5ª à 8ª série do Ensino Fundamental (antigo ginásio); 3- Ensino Médio (antigo 2º grau); 4- Ensino Superior; 5- Não sei dizer; 6- Não estudou	22	
23	Quanto é, aproximadamente, a renda mensal da sua família? 1- Até R$ 937,00 (um salário mínimo); 2- De R$ 937,00 a R$ 3.748,00; 3- De R$ 3.748,00 a R$ 6.559,00; 4- Mais de R$ 6.559,00; 5- Outros	23	
24	Qual é, aproximadamente, a sua renda mensal? 1- Até R$ 937,00 (um salário mínimo);2- De R$ 937,00 a R$ 3.748,00; 3- De R$ 3.748,00 a R$ 6.559,00; 4- Mais de R$ 6.559,00; 5- Outros	24	
25	Quantas horas por semana você trabalha? 1- De 11 a 20 horas semanais; 2- de 21 a 30 horas semanais; 3- De 31 a 40 horas semanais; 4- Mais de 40 horas semanais; 5- Aposentado; 6- Não se aplica	25	
26	Com qual idade você começou a trabalhar? 1- Antes dos 14 anos; 2- Entre 14 e 16 anos; 3- Entre 17 e 18 anos; 4- Após os 18 anos; 5- Não se aplica	26	
27	Quanto tempo levou entre a suspeita em relação à lesão (pinta, ferida, etc.) e a procura de um médico? 1- 1 dia a 1 semana; 2- 1 semana a 2 semanas; 3- 2 semanas a um mês; 4- 1 mês a 3 meses; 5- Acima de 3 meses	27	
28	Quanto tempo você precisou esperar entre quando a consulta foi inicialmente agendada e quando você visitou o especialista? 1- Menos de 2 semanas; 2- De 2 semanas a 1 mês; 3- De 1 mês a 3 meses; 4- Acima de 3 meses	28	
29	Na sua opinião, o tempo de espera foi: 1- Demorado; 2- Aceitável; 3- Rápido; 4- Sem opinião	29	
30	Na sua opinião o processo até chegar aqui foi: 1- Difícil; 2- Normal; 3- Fácil; 4- Sem opinião	30	
31	Qual a distância, em Km, da sua casa até o hospital de câncer? 1- De 1 a 10 km; 2- De 10 a 50 km; 3- De 50 a 100 km; 4- De 100 a 500 km; 5- Acima de 500 km	31	
32	Quanto a distância impactou no tempo em que você demorou para ter a primeira consulta? 1- Me causou muito atraso; 2- Me causou um pouco de atraso; 3- Não me causou atraso 4- Não sei dizer	32	
33	Quanto tempo, em horas, você demora para chegar da sua casa ao hospital de câncer? 1- Até 1 hora; 2- De 1 a 5 horas; 3- De 5 a 10 horas; 4- Acima de 10 horas	33	
34	Como você avaliaria os cuidados prestados até agora? 1- Ruim; 2- Normal; 3- Bom; 4- Excelente; 5- Nenhuma das alternativas	34	
35	Qual meio de transporte você utiliza para chegar ao hospital de câncer? 1- A pé; 2- Veículo próprio; 3- Transporte coletivo terrestre (ônibus/van) pago com recursos próprios; 4- Transporte coletivo aéreo (avião) pago com recursos próprios; 5- Transporte oferecido pela prefeitura de sua cidade; 6- Ambulância; 7- Outros	35	

36	Você possui algum plano de saúde particular? 1- Sim; 2-Não	36	
37	Se sim, qual o principal motivo para adquirir um plano de saúde? 1- Segurança com a saúde; 2- Qualificação profissional dos médicos; 3- Melhor atendimento; 4- Posse de plano vinculado à empresa; 5- Emergencial; 6- Atendimento rápido; 7- Outros	37	
38	Se sim, há quanto tempo tem este plano? 1- De 1 a 6 meses; 2- De 6 meses a 1 ano;3- De 1 ano a 3 anos; 4- mais de 3 anos	38	
39	Se sim, precisou utilizar este plano para: 1- Consultas; 2- Exames; 3- Internações; 4- Remédios; 5- Não sei	39	
40	Se sim, qual o seu tipo de plano? 1- Individual; 2- Familiar; 3- Coletivo por adesão; 4- Coletivo empresarial	40	
41	Se não, qual o principal motivo para não adquirir um plano de saúde? 1- Valor muito alto; 2- Falta de necessidade; 3- Falta de qualidade dos planos; 4- Falta de interesse; 5- Empresa não oferece; 6- Cobertura ruim; 7- Uso de atendimento particular; 8- Não necessita; 9- Outros	41	
42	Você pagou por consultas ou tratamentos antes do atendimento no Hospital de Câncer? 1- Sim; 2- Não	42	