Cutaneous melanoma diagnosis delay: socioeconomic and demographic factors influence

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SUMMARY

OBJECTIVE: Malignant cutaneous melanoma is the most aggressive type of skin cancer, and its early detection and prompt initiation of treatment play an important role in reducing disease-associated morbidity and mortality. Many factors influence the diagnosis of melanoma, and its recognition is essential for the development of strategies for its early detection. This study was carried out to Identify the main variables related to the delay in diagnosis of Malignant Cutaneous Melanoma and correlate them with the time interval for making the definitive diagnosis.

METHODS: Retrospective analysis of 103 patient records from January 2015 to December 2020 correlating social, economic, demographic, and cultural factors with the time elapsed between the onset of symptoms and the diagnosis of malignant cutaneous melanoma.

RESULTS: The average time to seek medical services from the onset of symptoms was 29.54 months. The mean time for a referral from the primary to the referral service was 1.35 months, and the factors that contributed to a faster diagnosis were lesion Breslow (>1 mm), lesion growth, income range (≤1.5 minimum wages), lower phototypes (I and II), not having gone to the Basic Healthcare Units, profession (household), smoking, and type of housing.

CONCLUSIONS: Our findings demonstrate that there is still a great delay in the recognition of signs and symptoms related to the diagnosis of malignant cutaneous melanoma in our country, influenced by several socioeconomic and demographic factors.

KEYWORDS: Melanoma. General practice. Public health. Late diagnoses. Epidemiology.

INTRODUCTION

Skin cancer accounts for 30% of all cancer diagnoses in Brazil. Malignant cutaneous melanoma (MCM) is the most aggressive tumor, representing about 5% of malignant cutaneous tumors and being responsible for most skin cancer-related deaths[1]. However, if diagnosed in its early stages, complete resection of the lesion is associated with favorable survival rates.

Some signs and symptoms are often undervalued, which can contribute to a delay in diagnosis[2]. The main warning sign regarding melanoma is the change in clinical features of preexisting nevus lesions or the occurrence of a new pigmented lesion. Changes such as variation in color, diameter, height, or shape (asymmetry) are reported by 80% of patients at the time of diagnosis[3,4].

Due to its high potential to produce metastasis, early recognition is extremely important. This represents, however, a challenge for dermatologists, cancerologists, and surgeons, since they must perform the differential diagnosis with several other pathologies without delaying the definitive diagnosis and its therapy, which could interfere with the prognosis since excisional removal is often curative[5]. For this, the instruction received during their professional training is essential.

Patient education regarding attention to early signs of the disease is also essential for early diagnosis and successful treatment of melanoma. The level of education and socio-economic-cultural factors of patients can influence the early recognition of complaints associated with melanoma. Restricting access to specialized centers in our country with continental dimensions can also contribute to delayed diagnosis.

The aim of the present study was to identify the main variables related to the delay in diagnosis of MCM and to correlate them with the time interval for making the definitive diagnosis in a center specialized in the treatment of skin cancer.

METHODS

After approval by the institution's Research Ethics Committee, medical records of 103 patients followed in our institution by the Brazilian Unified Health System, without age restriction, diagnosed with melanoma skin cancer and treated between 2015 and 2020 were retrospectively analyzed. Cases that lost follow-up in the service were excluded. All necessary information was obtained from 89 medical records and, in 14, socioeconomic and demographic variables could not be collected.

Socioeconomic and cultural variables were evaluated, such as occupation, family income (in minimum wages and per capita income), employees living in the same household, physical housing conditions, and education. Aspects related to the diagnosis, such as initial signs and symptoms, presence of metastasis, and type of treatment given were also evaluated.

The time elapsed between the initial perception of symptoms and the first contact with the medical service, as well as between this contact and the first consultation at the referral hospital, where the diagnosis was made, were analyzed. The first contact with the health service was considered when the patient was seen for the first time with symptoms related to the final diagnosis. These time intervals were used to define diagnostic delay.

To verify the hypothesis of agreement between two dichotomous categorical variables, checking the symmetry between lines and columns, the McNemar test was used. The Wilcoxon-Mann-Whitney test was used to compare measures of central tendency between two groups. This test is an alternative non-parametric method of the two-independent sample t-test that is used to test whether the (median) positions of population measurements are equal, considering the magnitude of differences between the pairs. To verify the association or compare proportions, the chi-square test or Fisher's exact test was used, when necessary.

RESULTS

Through descriptive analysis, it was found that the mean age of patients at diagnosis was 66.34±13.5 years; 44.7% were male and 55.3% were female; 1% were phototype I, 40.8% phototype II, 55.3% phototype III, 1% phototype IV, and 2% phototype V. Metastasis at initial diagnosis was reported in 5.82% of cases and tumors with Breslow ≤1 cm in 76.7%. Other nonmelanoma skin cancers were found concomitantly in 31.06% of patients.

The analysis of variables related to socioeconomic, cultural, and demographic conditions revealed that 68.53% had a monthly income of at least 1.5 minimum wages; 1.12% were illiterate; 20.22% had incomplete primary education; 34.83% complete primary education, 8.98% incomplete secondary education, 21.34% complete secondary education, and 12.8% complete higher education. Regarding profession, 56.31% of the patients worked outside the home and 43.68% were housewives or retired. Regarding housing conditions, 80.9% lived in brick and 19.1% in wood houses; 83.1% had basic sanitation and 16.9% used a septic tank.

Among the initial symptoms reported, lesion growth was present in 33% of cases, bleeding in 2.9%, lesion color change in 27.18%, pruritus in 8.73%, and pain in 3.88%. In total, 39.8% of patients did not observe changes in the lesions.

The average length of time between the first symptom observed by the patients and the first contact with the medical service was 29.54 months (ranging from 0 to 240 months). The total time between the first symptom and diagnosis was 30.9 months (range 0–240 months). The relationship of these times with the histological tumor subtype can be seen in Table 1.

Simple linear regression analysis was used to identify variables that could influence the time interval between the appearance of the first symptoms and the first medical contact. Significant associations (p<0.05) were found between the variables: Breslow less than or equal to 1 mm (p=0.024),

Table 1. Descriptive analysis and comparisons with histological type.

	Superficial spreading melanoma (n=46)	Lentigo maligna melanoma (n=8)	Acral lentiginous melanoma (n=2)	In situ superficial spreading pattern (n=10)	In situ Lentigo maligna pattern (n=31)
Time period 1 (mean±SD) Time period 1 (mean min–max)	22.54±27.69 12.0 (0.0–120.0)	26.25±40.3 15.0 (0.0–120.0)	5.1±2.96 5.1 (3.0–7.2)	52.83±74.79 24 (0.36–240.0)	38.57±53.6 24.0 (0.0–240.0)
Time period 2 (mean±SD) Time period 2 (mean min-max)	0.77±2.2 0.03 (0.0–12.0)	0.31±0.37 0.26 (0.0–1.0)	2.5±3.53 2.5 (0.0–5.0)	0.62±0.95 0.15 (0.0–3.0)	1.92±6.34 0.26 (0.0–36.0)
Time period T (mean±SD) Time period T (mean min-max)	23.28±28.35 12.03 (0.0–126.0)	26.52±40.17 15.5 (0.0–120.0)	7.6±6.5 7.6 (3.0–12.2)	53.45±74.71 24.1 (1.06–240.0)	39.29±52.86 24.5 (0.0–240.0)

Total time period (T): Sum of time periods 1 and 2. Time period 1: Time elapsed from the onset of symptoms and the first medical contact. Time period 2: From the first medical contact to the first consultation at the reference hospital.

Stage 0 (neoplasms in situ) (p=0.028), perception of lesion growth (p=0.032), income range lower than 1.5 minimum wages (p=0.016), phototypes I and II (p=0.024), and search for BHU (p=0.008). Among these, the variable perception of lesion growth and income range were negative in time for seeking medical care, while Breslow less than or equal to 1, Stage 0, phototypes I and II, and the search for the BHU were positive, contributing to a longer time until the first contact with the health services (Table 2).

Furthermore, statistically significant associations for some variables with the time interval between the first contact with the medical service until the definitive diagnosis in the reference service, namely, were found: smoking and household profession proved to be significantly negative for the delay in referral to the reference service (p=0.034 and p=0.005, respectively), while housing condition (living in a brick house) was found to be a positive association for the delay in referral (p=0.043) (Table 2).

Finally, significant associations were evidenced between some variables and the time interval between the onset of the first symptom and the definitive diagnosis of melanoma in the reference service. The presence of tumors whose Breslow is less than or equal to 1 (p=0.037), Stage 0 tumors (in situ, p=0.039), phototypes I and II (p=0.021),

and the search for the BHU before arrival at the service reference (p=0.009) presented as positive correlation factors for the greatest delay in time to definitive diagnosis since the presentation of the first symptom; while income range lower than 1.5 minimum wages (p=0.026) and residence in a wooden house (p=0.036) were significantly negative for the same time interval (Table 2).

DISCUSSION

The signs and symptoms associated with MCM are often common to other more prevalent dermatological pathologies, making it difficult for both patients and general practitioners/dermatologists to recognize them, leading to a delay in its diagnosis and influencing both the immediate management and the prognosis of the disease.

Metzger described in 1998 that diagnostic delay in half of the patients diagnosed with MCM (and in 25% of patients with palmoplantar melanoma) was due to initial diagnostic errors. In most cases, the incorrect clinical diagnosis was made by non-dermatologists, specialists to whom patients usually initially report for dermatological complaints, and who often lack knowledge or diagnostic tools such as the

Table 2. Results of linear regression analysis to identify variables that discriminate the different times (statistically significant).

	Average time (months)	Etimated parameter	p
Time period 1			
Breslow (mm) ≤1 x >1	33.03 x 17.85	2.301	0.024
Lesion growth n x y	34.52 x 18.65	2.184	0.032
Stage lesion 0 x III and IV	41.16 x 16.8	2.271	0.028
Income (minimum wages) <1.5 x ≥1.5	14.13 x 31.56	-2.471	0.016
Phototypes I and II x III, IV, and V	43.08 x 20.13	2.328	0.024
Search BHU n x y	16.28 x 37.35	-2.729	0.008
Time period 2			
Household profession x others	0.069 x 1.485	-2.875	0.005
Smoking n x y	1.445 x 0.32	2.155	0.034
Home conditions masonry x wooden	1.721 x 0.4035	2.054	0.043
Total time period (T)			
Breslow (mm) ≤1 x >1	34.12 x 20.12	2.112	0.037
Stage lesion 0 x III and IV	42.9 x 18.86	2.139	0.039
Income (minimum wages) <1.5 x ≥1.5	16.46 x 32.69	-2.273	0.026
Phototypes I and II x III, IV, and V	44.71 x 21.3	2.381	0.021
Search BHU n x y	17.97 x 38.5	-2.655	0.009
Home conditions masonry x wooden	30.04 x 15.87	2.138	0.036

n x y: no x yes; BHU: basic healthcare units.

dermatoscope, thus interfering with the patient's prognosis, according to Robsahm et al.[6].

Regarding the association between clinical parameters of the lesions and the time to diagnosis, our study showed that for lesions with Breslow >1 mm and more advanced stages (III and IV), the time between the onset of symptoms and the patient's search for medical assistance (time 1) as well as the time between the onset of symptoms and the final diagnosis was significantly shorter. Although it seems logical to assume that a tumor will grow more deeply over time, once its invasive growth begins, there may not be a simple linear correlation between the time to diagnosis and Breslow's thickness, as demonstrated by data in the literature and in our study[7,8]. This delay in the diagnosis of initial lesions can be explained by the perception of physicians and patients who consider the hypothesis of malignant skin tumors only in more advanced stage presentations.

In a large French prospective multicenter study, a negative correlation was found between Breslow thickness and time to seek medical care. In this study, thicker tumors were responsible for a surprisingly shorter delay[9]. Furthermore, the biological behavior of the tumor may be the most important determinant of tumor thickness. As changes in slow-growing MCM tend to gradually settle down over a period of several months, it is possible that they are not noticed by the patient[7].

Symptoms other than the growth of the lesion were not decisive in motivating the early search for medical care. In our study, we found that the average time between the appearance of the first symptom and seeking medical care was 29.54 months, which highlights the difficulty in recognizing signs and symptoms related to this neoplasm.

Regarding the phototype, our study revealed a delay in the diagnosis of patients with lower phototypes, I and II of Fitzpatrick, in relation to those with higher phototypes (III and IV). This is in contrast to literature data showing that these neoplasms in patients with higher phototypes are more difficult to be detected, as 60–75% appear in less pigmented areas of the skin, generally not exposed to the sun, which may go unnoticed or be misdiagnosed as warts, fungi, or dark nails[10]. However, despite this contrast with findings in the literature, the data found in our study can be explained by the greater attention given by the population with higher phototypes to the appearance of new lesions, as they present a certain protective factor against skin neoplasms.

Surprisingly, by correlating the socioeconomic status of patients with the time between the first symptom of MCM and seeking medical care, as well as the definitive diagnosis in the oncology reference service, we observed a negative association between them, such that less favored patients had shorter times compared with more economically advantaged ones. These data go against findings in the literature that higher levels of education, generally associated with better socioeconomic conditions, would be associated with higher rates of self-detection and a faster diagnosis of melanoma[8]. The result leads us to believe that possibly skin cancer awareness campaigns may be reaching the neediest population more effectively.

A greater diagnostic delay was found in patients who sought primary health services before being referred to the tertiary hospital. Some studies have evaluated the role of physicians in delaying the diagnosis of cutaneous melanoma[6,11], noting that the difficulty in diagnosis and the performance of inadequate treatments significantly contribute to the delay in the early diagnosis of a patient[12]. This fact becomes more serious in melanoma[8,13].

The average time between the first medical appointment and the final diagnosis in this study was 1.35 months. Differences in times evidenced in the literature (1.3 months in South Africa; 1.5 months in Italy; 2 months in Germany; 3 months in the United States; and 3.9 months in Canada)[8] can be explained by the presence of a private and bureaucratic health system in other countries, compared with the Brazilian Unified Health System, which offers universal care to the entire population. The delay in referring the patient to the tertiary referral hospital interferes with the early definitive diagnosis may be attributed to the inexperience, insecurity, or insufficient training of physicians to make the diagnosis of melanoma.

Therefore, all physicians involved in primary or secondary health care need to be aware of the possibility of Melanoma, especially in those with a positive family history, report of long exposure to the sun, skin with photodamage, or other changes evidenced by the patient, as a change in the clinical characteristics of a pre-existing nevus lesion (changes such as variation in color, diameter, height, or change in shape – asymmetry), and the occurrence of a new pigmented lesion.

CONCLUSIONS

We observed that there is a significant lack of knowledge about melanoma and the recognition of its first signs, both by patients and by health professionals, especially in primary care, significantly affecting the early diagnosis of this pathology, with consequent delay in the treatment of the disease. It is of great importance that strategies to raise awareness of patients and health professionals are implemented to reduce the time for diagnosing these tumors.

AUTHORS' CONTRIBUTIONS

REFERENCES

1. Ward WH, Farma JM. Cutaneous melanoma: etiology and therapy [Internet]. Brisbane: Codon Publications; 2017. PMID: 29461771.

2. Najmi M, Brown AE, Harrington SR, Farris D, Sepulveda S, Nelson KC. A systematic review and synthesis of qualitative and quantitative studies evaluating provider, patient, and health care system-related barriers to diagnostic skin cancer examinations. Arch Dermatol Res. 2022;314(4):329-40. https://doi.org/10.1007/s00403-021-02224-z

3. Flint PW, Haughey BH, Lund V, Robbins KT, Thomas JR, Lesperance MM, et al. Management of cutaneous head and neck melanoma. In: Flint PW, Haughey BH, Lund V, Robbins KT, Thomas JR, Lesperance MM, et al. Cummings otolaryngology: head and neck surgery. 7th ed. Elsevier; 2020. p. 1124-37.

4. Coroiu A, Moran C, Davine JA, Brophy K, Bergeron C, Tsao H, et al. Patient-identified early clinical warning signs of nodular melanoma: a qualitative study. BMC Cancer. 2021;21(1):371. https://doi.org/10.1186/s12885-021-08072-4

5. Purim KSM, Sandri CO, Pinto NT, Sousa RHS, Maluf EPC. Perfil de Casos de Melanoma em um Hospital Universitário, 2003 a 2007. Rev Bras Cancerol. [Internet]. 2013 [cited on May 24, 2022];59(2):193-9. Available from: https://rbc.inca.gov.br/index.php/revista/article/view/523

6. Robsahm TE, Helsing P, Svendsen HL, Veierød MB. Clinical Suspicion Sensitivity of Nodular and Superficial Spreading Melanoma. Acta Derm Venereol. 2021;101(4):adv00427. https://doi.org/10.2340/00015555-3782

7. Brochez L, Verhaeghe E, Bleyen L, Naeyaert JM. Time delays and related factors in the diagnosis of cutaneous melanoma. Eur J Cancer. 2001;37(7):843-8. https://doi.org/10.1016/S0959-8049(00)00418-4

8. Xavier MHSB, Drummond-Lage AP, Baeta C, Rocha L, Almeida AM, Wainstein AJA. Delay in cutaneous melanoma diagnosis. Medicine (Baltimore). 2016;95(31):e4396. https://doi.org/10.1097/MD.0000000000004396

9. Richard MA, Grob JJ, Avril MF, Delaunay M, Thirion X, Wolkenstein P, et al. Melanoma and tumor thickness. Arch Dermatol. 1999;135(3):269-74. https://doi.org/10.1001/archderm.135.3.269

10. Tucker MA, Goldstein AM. Melanoma etiology: where are we? Oncogene. 2003;22(20):3042-52. https://doi.org/10.1038/sj.onc.1206444

11. Martinka MJ, Crawford RI, Humphrey S. Clinical recognition of melanoma in dermatologists and nondermatologists. J Cutan Med Surg. 2016;20(6):532-5. https://doi.org/10.1177/1203475415623513

12. Richard MA, Grob JJ, Avril MF, Delaunay M, Gouvernet J, Wolkenstein P, et al. Delays in diagnosis and melanoma prognosis (II): the role of doctors. Int J Cancer. 2000;89(3):280-5. https://doi.org/10.1002/1097-0215(20000520)89:3<280::AID-IJC11>3.0.CO;2-2

13. Baumert J, Plewig G, Volkenandt M, Schmid-Wendtner MH. Factors associated with a high tumour thickness in patients with melanoma. Br J Dermatol. 2007;156(5):938-44. https://doi.org/10.1111/j.1365-2133.2007.07805.x