

Artigo científico

Temporal assessment of risk predictors of penile cancer in the state of Maranhão

Avaliação temporal de preditores de risco para câncer de pênis no estado do Maranhão

Joane Caroline Menck Vieira¹, Victoria Gabrielly de Oliveira Sampaio², Vinícius de Almeida Moura³ & Vinicius Lino de Souza Neto⁴

¹ Graduando em medicina - Universidade Nove de Julho, Osasco, São Paulo, Brasil. E-mail: joanemenck@gmail.com

² Graduando em medicina- Universidade Nove de Julho, Osasco, São Paulo, Brasil. E-mail: victoriasampaio@outlook.com

³ Graduando em medicina- Universidade Nove de Julho, Osasco, São Paulo, Brasil. E-mail: amoura.vine@gmail.com

⁴ Graduado em Enfermagem -Universidade Federal do Estado de São Paulo, São Paulo, Brasil. E-mail: neto.lino@unifesp.com.br

Abstract: The study aims to gather information on epidemiological trends regarding the main risk factors for penile cancer in Maranhão between 2013 and 2019. This is an ecological time series study with data collection from the National Cancer Institute, SUS Department of Informatics and TABNET/DATASUS, and SIM. Maranhão was chosen for the high number of cases and mortality from penile cancer. The search was carried out between January and April July 2022, with a time frame from 2013 to 2019. In 2014, a study was developed that determined that low educational index, that is, individuals with education up to elementary school was a risk factor since it was reported that they had never heard about penile cancer before. Another study showed that, in the same year, 40% of deaths from penile cancer occurred in individuals without any education. In addition, according to a study conducted in 2013, poor intimate hygiene is responsible for 35% of cases of penile cancer and this is closely linked to socioeconomic factors. The mortality rate in Maranhão varies between 26.7% and 41%, if diagnosed in stages 1 and 2, has a 5-year survival in 85% of cases. It is noted that penile cancer is a frequent reality in Maranhão and that preventive actions can significantly affect this collective health problem.

Keywords: Epidemiology; Health promotion; Primary prevention.

Resumo: O estudo tem por objetivo reunir informações sobre as tendências epidemiológicas frente aos principais fatores de risco para o câncer de pênis no Maranhão entre 2013 a 2019. Trata-se de um estudo ecológico da série temporal, com coleta de dados a partir do Instituto Nacional do Câncer, Departamento de Informática do SUS e do TABNET/DATASUS, e o SIM. O Maranhão foi escolhido pela alta quantidade de casos e mortalidade por câncer de pênis. A busca foi feita entre janeiro a abril e julho de 2022, com recorte temporal de 2013 a 2019. Em 2014, foi desenvolvido um estudo que determinou que o baixo índice educacional, ou seja, indivíduos com escolaridade até o ensino fundamental era fator de risco já que foi relatado que nunca ouviram falar sobre câncer de pênis antes. Já outro estudo demonstrou que, no mesmo ano, 40% dos óbitos por câncer de pênis ocorreram em indivíduos sem nenhuma escolaridade. Além disso, de acordo com um estudo realizado em 2013, a má higienização íntima é responsável por 35% dos casos de câncer de pênis e isso está intimamente atrelado a fatores socioeconômicos. A taxa de mortalidade no Maranhão varia entre 26,7% e 41%, se diagnosticado nos estágios 1 e 2, apresenta uma sobrevida de 5 anos em 85% dos casos. Nota-se que o câncer de pênis é uma realidade frequente no Maranhão e que ações de prevenção podem afetar significativamente este problema de saúde coletiva.

Descritores: Epidemiologia; Promoção à saúde; Prevenção primária

1 INTRODUCTION

Penile cancer is a malignant disease that affects men from the fifth decade of life. It is rare in developed countries, since in the United States it affects 1 in 100,000 men, while in some underdeveloped countries in Africa, Asia and South America it represents approximately 10% of all malignancies affecting men (LIANG et al., 2019; FU et al.2022).

In Brazil, the incidence of this type of cancer reaches 5.7 cases per 100,000 men, with up to 50% of cases occurring in the North and Northeast regions of the country (MONTES; GARCIA-PERDOMO, 2017). Data from the Cancer Mortality Atlas show that in 2020 (the last year with statistics available), 463 men died from the disease. This data is still more significant in Maranhão, the state of the country with the highest incidence of penile cancer, and 6.1 per 100,000 men have the disease, which represents 22.7% of cancer cases in

the state, with penile cancer second only to skin cancer (SBU,2023).

The disease can lead to serious economic impacts, since it affects the population linked to the production of wealth of a country that 83.1% of men are acting actively in the labor market, this population can temporarily decrease by treatment or death, a fact that will generate repercussions on the dynamics of the state, since of 2,491,489 economically active people existing in Maranhão, 1,470,322 are men, that is, more than half of the population (IPEA, 96; IBGE, 2010).

Although Primary Health Care is the main gateway to SUS for actions of promotion, prevention and early diagnosis, as soon as diagnosed men are referred to tertiary care to start treatment, whether surgical, chemotherapy or radiotherapy, except in palliative care where comfort can be performed in the BHU itself. The time between the onset of the first lesion

and the diagnosis was greater than 3 months in 80% of cases (STRATTON; CULKIN, 2016).

The average spending for the Union with hospitalizations from 1992 to 2017 was US\$3,002,705.73 (US\$115,488.68/year) and 38% of the total amount was spent in the Northeast Region. In the United States, about 220 billion dollars/year is spent on cancer treatment and each chemotherapy can cost as much as \$8,694 per patient, but the exorbitant spending does not guarantee that the death rate will decrease (KORKES et al., 2020).

According to the 10th Sustainable Development Goal (SDG), by 2030 Brazil must reduce inequalities through the empowerment of social, economic and political inclusion, which has not been developed within the country, reflecting the wide inequality, poor distribution of health resources and increased prevalence of unusual diseases in developed countries, such as penile cancer that Maranhão has the highest number of cases in Brazil and in the world (KORKES et al., 2020; MONTES; GARCIA-PERDOMO, 2017).

In this context, it is believed that research with macro-population development content can direct actions of great impact as well as contribute to the formulation of health policies. Thus, the study aimed to gather information on epidemiological trends regarding the main risk factors for penile cancer in Maranhão between 2013 and 2019.

2 METHODS

The study in question was conducted from data referring to the State of Maranhão, located in the Northeast Region of Brazil, with an area of 331,936.948 km², divided into 217 municipalities and a population of approximately 6.5 million inhabitants, with 49.6% corresponding to males (IBGE, 2015).

According to the Maranhão Institute of Socioeconomic and Cartographic Studies (IMESC), a state public entity linked to the Brazilian Institute of Geography and Statistics (IBGE) and the Government of Maranhão, in 2019, the Gross Domestic Product (GDP) of Maranhão was R\$97.340 billion (IMESC, 2021). In parallel to the state's economic advance, a total of 757,514 workers with a formal contract were registered, which represents an important improvement in the labor market with a 1.4% growth in formal jobs compared to the previous year. Despite this growth, according to the IBGE, it is observed that the per capita household income of the State is equivalent to half of the national average, that is, a total of R\$814/month, signaling an important regional inequality and

fragility in the Maranhão economy (IMESC, 2021; CHRISTODOULIDOU et al., 2015).

The search was carried out between January and April 2022, with a time frame from 2013 to 2019 through the TABNET platform, a tool developed by the Ministry of Health and made available on the electronic portal of the Department of Informatics of the Unified Health System (DATASUS) and the Mortality Information System (MIS). To search for possible predictors analyzed the macro-variables, such as the mortality rate, the number of amputation of the penis, oncological amputation of the penis and total extended penile amputation.

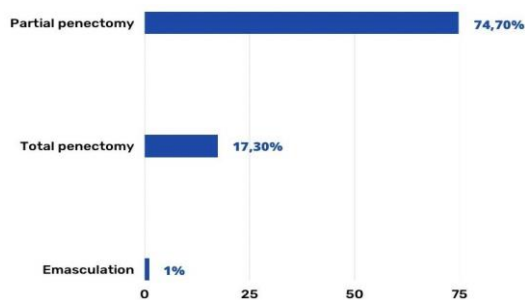
Thus, it was possible to establish relationships between the disease and socioeconomic conditions, characteristics and clinical findings. In addition, the proportion of deaths in different municipalities of Maranhão was a widely analyzed variable. The division of the State into Health Regions, namely, Itapecuru Mirim, São Luis, Imperatriz, Pedreiras, Timon, Codó, Chapadinha, Caxias, Bacabal, Balsas, Barra do Corda, Pinheiro, Presidente Dutra, Santa Inês and Viana, enabled the distribution of deaths due to malignant neoplasia of the penile throughout the Maranhão territory and, from this, the understanding of local vulnerabilities, focusing on the development of public policies aimed at elucidating and minimizing the state's health weaknesses (COELHO et al., 2018).

Descriptive and frequency statistical analyses were performed using the SPSS® 13.0 software for Windows. Because it is a type of study that refers to the analysis of public data, it was not submitted to the ethics committee in research for human beings, as directed by law 466/2012, but followed all the guidelines established by resolution 510/2016.

3 RESULTS AND DISCUSSION

According to data from the International Agency for Research on Cancer (IARC), Maranhão has the highest number of cases of penile cancer in the world, with an average of around 36 cases per year and an incidence of 1.18 per 100,000 men per year. In a study with 279 patients undergoing surgical procedures to treat penile cancer in Maranhão, 93% underwent penectomy, 74.7% of these patients underwent partial penectomy, 17.3% total penectomy and 1% underwent emasculation, as shown in figure 1 (LINDOSO et al., 2019).

Figure 1 - Frequency of treatment in the patient undergoing penectomy, Maranhão, MA, 2023.



Source: study data, 2023.

Lindoso, et.al. (2019), points to the high occurrence of penile cancer in the North and Northeast regions, with poor socioeconomic conditions, with Maranhão being the most

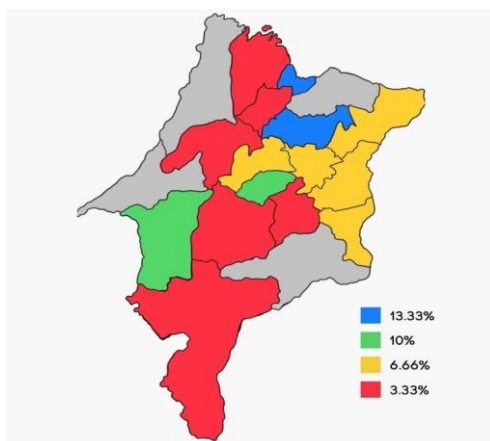
prominent state. In turn, Coelho, et. al. (2018), associates the high prevalence of the disease with the important rate of

peopleinfected by Human Papillomavirus (HPV), a virus directly involved in the pathogenesis of penile cancer.

A descriptive study presents the mortality rate from penile cancer in the years 2010 to 2014 in the state of Maranhão. Given the results, it was possible to observe an important increase in the number of deaths, from the coefficient of 5.51 in 2010 to 8.84 in 2014, for every 1 million men. This same study shows the distribution of deaths due to

malignant neoplasia of the penis in health regions of the state in 2014. Among the locations studied, Itapecuru Mirim and São Luis stand out with the highest number of deaths, presenting 13.33% of cases, followed by Imperatriz and Pedreiras with 10%, Timon, Codó, Chapadinha, Caxias and Bacabal with 6.66% and Balsas, Barra do Corda, Pinheiro, Presidente Dutra, Santa Inês and Viana with 3.33%, as shown in figure 2 (BONFIM, 2017).

Figure 2 - Penile cancer mortality coefficient from 2010 to 2014 in regions of the state of Maranhão

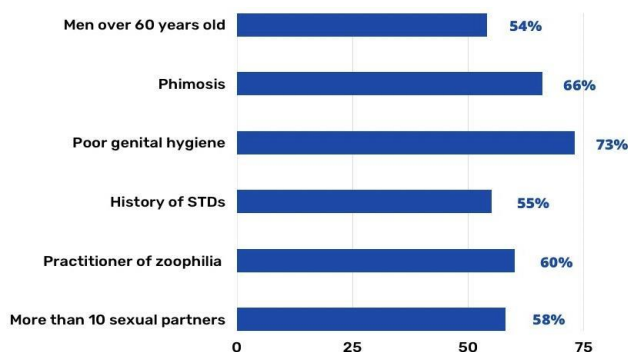


Source: study data, 2023

Vieira, et. al., 2020 trace a profile of patients with penile cancer in Maranhão, bringing signs and symptoms with a certain temporality, the most common initial symptom being pruritus (26.56% of the patients studied), differentiating from other studies that associate penile skin changes as the first clinical change and the association of pruritus with lichen sclerosus, which had only 6% association in the study. In addition, it was possible to observe that most patients lived in rural areas (57%), were married or in a stable relationship

(74%), were engaged in agriculture (58%) and did not have education or had only primary education (90%). Among the predominant clinical characteristics observed were men over 60 years of age (54%), with phimosis (66%), poor/moderate genital hygiene (73%), history of STDs (55%), practitioner of zoophilia (60%) and with more than 10 sexual partners throughout life (58%), shown in figure 3(VIEIRA et al., 2020; KOIFMAN et al., 2011).

Figure 3 - Clinical characteristics of patients with penile cancer at the University Hospital of the Federal University of Maranhão and at Aldenora Bello Cancer Hospital, in the city of São Luís, Maranhão, 2023

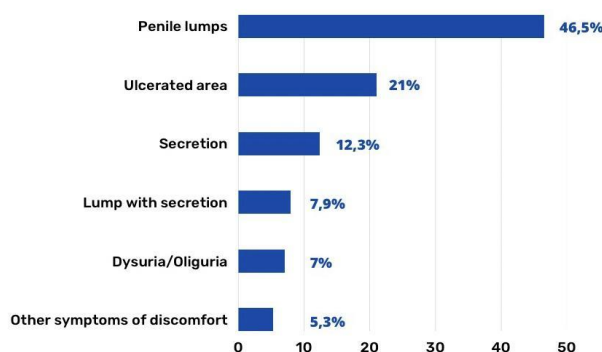


Source: study data, 2023

Another study, aiming to analyze the cases of penile cancer in Maranhão, showed that the most common clinical findings reported are the appearance of a lump in the penis (46.5%), ulcerated area (21%), secretion (12.3%), nodule with secretion (7.9%), dysuria and/or oliguria (7%) and other symptoms of discomfort (5.3%), as shown in figure 4¹⁸. The range of patients seeking treatment was high, being greater than 1 year

in up to 50% of cases, mostly caused by shame, fear and social stigma; this finding together with the structural reality of the health network of Maranhão result in a high number of cases of patients with advanced degree of disease and surgical treatments(THOMAZ JUNIOR et al., 2022; FAVORITO et al., 2018).

Figure 4 - Most reported clinical findings in patients with penile cancer in Maranhão, MA, 2023



Source: study data, 2023

The high presence of HPV in the state contributes to the large number of cases of penile cancer, and this finding is described as the largest finding among the patients evaluated in the studies, with 80.5% of cases reported in one study positive for HPV. The findings of Vieira et al 2020 specify that the common subtype of carcinoma was the most found in the reported cases (40%), but once considered together, the HPV-related subtypes represent 62% of the cases. In addition, the frequency of HPV in men who had 6 or more partners reached 75% of the sample, and in men who had sex before the age of 17 was 59% (CHRISTODOULIDOU et al., 2015; JUNIOR et al., 2018)

4 CONCLUSION

The study reveals that Maranhão represents the state with the highest number of cases of penile cancer in Brazil. Precarious socioeconomic conditions, high prevalence of HPV, poor genital hygiene and low schooling are some of the factors that directly contribute to the high incidence and prevalence of the disease, making necessary assistance coverage based on strengthening the social determinants of health.

REFERENCES

ANTONIO THOMAZ JUNIOR et al. A comprehensive analysis of penile cancer in the region with the highest worldwide incidence reveals new insights into the disease. v. 22, n. 1, 2022. <https://doi.org/10.1186/s12885-022-10127-z>

BONFIM, S.B.A. Situação da mortalidade por câncer de pênis no Estado do Maranhão. Centro de Ciências Biológicas e da Saúde. Universidade Federal do Maranhão. 45p. 2017. <https://monografias.ufma.br/jspui/handle/123456789/1301>

BARBOSA JÚNIOR, A. et al. Câncer do pênis: estudo da sua patologia geográfica no Estado da Bahia, Brasil.

Revista de Saúde Pública. v.18, n. 6 p.429-435. 1984. Doi <<https://doi.org/10.1590/S0034-89101984000600002>>.

CHRISTODOULIDOU, M.; et al. Epidemiology of penile cancer. Current problems in cancer, v.39, n.3, p.126–136. 2015. <https://doi.org/10.1016/j.currproblcancer.2015.03.010>

CARDONA C. E. M., Garcia-Perdomo H.A. Incidence of penile cancer worldwide: systematic review and meta-analysis. Revista Pan-Americana de Salud Pública. 41, e117. 2017. <https://doi.org/10.26633/RPSP.2017.117>

COELHO, R. W. P. et al. Penile cancer in Maranhão, Northeast Brazil: the highest incidence globally? BMC urology, v. 18, n. 1, p. 50, 2018. <https://doi.org/10.1186/s12894-018-0365-0>

FU L, et al. Padrão Global e Tendências na Incidência de Câncer de Pênis: Estudo de Base Populacional. JMIR Saúde Pública e Vigilância. v.8, n.7. 2022. doi: 10.2196/34874

FAVORITO, L. A. et al. Epidemiologic study on penile cancer in Brazil. International braz j urol, v. 34, p. 587–593, 2008. <https://doi.org/10.1590/S1677-55382008000500007>

INSTITUTO DE PESQUISA ECONÔMICA APLICADA. Mercado de Trabalho: Conjuntura e Análise: n. 1, jun. 1996. <https://repositorio.ipea.gov.br/handle/11058/4884>

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. Censo demográfico de 2010. Instituto Brasileiro de Geografia e Estatística. 2010. <https://censo2010.ibge.gov.br/>.

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. Relatório Maranhão 2015. Instituto Brasileiro de Geografia e Estatística. 2015. <https://cidades.ibge.gov.br/brasil/ma/panorama>

INSTITUTO MARANHENSE DE ESTUDOS SOCIOECONÔMICOS E CARTOGRÁFICOS. Produto Interno Bruto do Estado do Maranhão: período 2010 a 2019. Instituto Maranhense de Estudos Socioeconômicos e Cartográficos. v.14, n.1. 2021. <https://imesc.ma.gov.br/portal/Post/view/pib-estadual/489>

LINDOSO, G. S. et al. Epidemiologia e estratégias de prevenção do câncer de pênis no estado do Maranhão. Revista de Investigação Biomédica, v. 10, n. 3, p. 237, 2019. <https://doi.org/10.24863/rib.v10i3.331>

LAIRSON, D.R. et al. Mean treatment cost of incident cases of penile cancer for privately insured patients in the United States. Urol Oncol, v.37, n.4, p.e17-294.e25, 2019

RICHTER, S. et al. Management of carcinoma of the penis: consensus statement from the Canadian Association of Genitourinary Medical Oncologists (CAGMO). Can Urol Assoc J, v. 7, n.11, p.E797-811, 2013.

VIEIRA, C. B. et al. Profile of patients with penile cancer in the region with the highest worldwide incidence. Scientific Reports, v. 10, n. 1, 2020. <https://doi.org/10.1038/s41598-020-59831-5>

KOIFMAN, L. et al. Epidemiological aspects of penile cancer in Rio de Janeiro: evaluation of 230 cases. International braz j urol, v. 37, p. 231–243, 2011. <https://doi.org/10.1590/S1677-55382011000200010>

KORKES, F. et al. Tendências e carga econômica do câncer de pênis no sistema público de saúde brasileiro. Einstein. 18:eAO5577. 2020. Doi https://doi.org/10.31744/einstein_journal/2020AO5577

YU, Y. B., et al. The relationship between human papillomavirus and penile cancer over the past decade: a systematic review and meta-analysis. Asian journal of andrology, v.21, n.4, p.375–380. 2019. https://doi.org/10.4103/aja.aja_39_19

KORKES, F. et al. Tendências e carga econômica do câncer de pênis no sistema público de saúde brasileiro. Einstein. 18:eAO5577. 2020. Doi https://doi.org/10.31744/einstein_journal/2020AO5577