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Correlation of risk factors for prostatic hyperplasia with doubtful prostate antigen values

Correlación de los factores de riesgo de hiperplasia prostática con valores de antígeno prostático dudoso

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ABSTRACT

Introduction: Prostate cancer is a condition that mainly affects the male population after the age of 45, which includes several risk factors, some modifiable, on which prevention strategies must be designed to avoid even doubtful prostate antigen levels.

Objective: Determine the correlation of risk factors for prostatic hyperplasia with doubtful prostate antigen values.

Methods: During the year 2022, a quantitative correlational study was carried out in the population of four clinics belonging to the "East Area" of the Camaguey municipality, were 80 patients of ages with specific prostate antigen determination participated. The variables were analyzed: age groups, color of skin, family history of prostate cancer, other prostate disease and behavioral risks. The corresponding statistical analysis was performed for this type of study.

Results: There was a predominance of patients with doubtful PSA/normal PSA in a ratio of 13/4 in the age group (>45 years). When determining the relationship of the doubtful PSA event with the

variables of skin color and a history of other prostate disease, no relationship was found, while the family history of prostate cancer and the behavioral variables were closely related.

Conclusions: As a conclusion, the association of the main risk factors with the doubtful prostate antigen levels was determined, in order to find data that will help in the design of health interventions.

Keywords: prostate specific antigen; risk factor's; cancer.

RESUMEN

Introducción: El cáncer de próstata es una afección que afecta a la población masculina mayoritariamente después de los 45 años, que incluye varios factores de riesgo, algunos modificables, sobre los que se deben diseñar estrategias de prevención para evitar incluso cifras de antígeno prostático dudoso.

Objetivo: Determinar la correlación de los factores de riesgo de hiperplasia prostática con valores de antígeno prostático dudoso.

Métodos: Durante el año 2022 se llevó a cabo un estudio cuantitativo correlacional en la población de cuatro consultorios pertenecientes al "Área Este" del municipio Camagüey, donde participaron 80 pacientes con edades con determinación de antígeno prostático específico. Se analizaron las variables: grupos etarios, color de la piel, antecedentes familiares de cáncer de próstata, de otras enfermedades prostáticas y de riesgos conductuales. Se realizó el análisis estadístico correspondiente para este tipo de estudios.

Resultados: Predominaron los pacientes con PSA dudoso/PSA normal en razón 13/4 en el grupo etario (>45 años), que demuestra la relación entre valores de PSA dudoso y la edad mayor de 45 años. Al determinar la relación del evento PSA dudoso con las variables color de la piel y antecedentes de otras enfermedades prostáticas no se constató relación, mientras el antecedente familiar de cáncer de próstata y los conductuales guardaron estrecha relación.

Conclusiones: A modo de conclusión, se determinó la asociación de los principales factores de riesgo con las cifras de antígeno prostático dudoso, para encontrar datos que ayudarán en el diseño de intervenciones en salud,

Palabras clave: antígeno prostático específico; factores de riesgo; cáncer.

Introduction

Prostate cancer, according to Linares and others,[1] is the third most common neoplasm in men worldwide and the first in developed countries if we except skin cancer. In 2020, the American Society of Clinical Oncology[2] reported that 1,414,259 people had been diagnosed and 375,304 had died from this cause.

Bray et al.[3] add that prostate cancer was the main incident in the male population of 40 countries in Africa. Latin America, according to the World Health Organization,[4] has an annual incidence of 54.2, and Cuba, according to data from the Health Statistical Yearbook,[5] in its 50th edition, states that malignant tumors occupy second place within of the top ten causes of death, whose rate is 277.9 per 100 thousand inhabitants. The Camagüey province shows a high percentage of deaths from malignant tumors with 1,944 deaths in 2021 for a crude rate of 255.4 per 100 thousand inhabitants.

The National Program for Cancer Control and Diagnosis (PNCDC) from Primary Health Care (PHC) promotes the active investigation of risk factors for prostate cancer, in which the determination of the value of the prostate antigen constitutes a cardinal marker. control.[4]

Prostate-specific antigen (PSA) is the most used tumor marker in prostate cancer monitoring. It is a substance produced by both normal and cancerous cells in the prostate gland, a fairly sensitive test. Its incorporation as a predictive method improves the accuracy of risk stratification and helps in the decision-making process to perform prostate biopsies.[6]

In this sense, Dellavedova,[7] highlights the usefulness of PSA for more than 30 years, as it is a characteristic biomarker both in the diagnosis of this type of tumors and in monitoring its reaction to various therapies. For his part, Vachani,[8] adds about the values that are considered "normal" with respect to the blood level, which must be less than 4.0 ng/ml, but emphasizes that above a single value is the trend throughout of time what really matters.

Vargas Calvo and Vargas Mena,[9] point out the importance of knowing the pathophysiological variations in PSA levels, for this the same cut-off point and an average age have been established. Men who have a level above the median for their age have a higher risk of developing cancer. The median in the 30s is 0.5 ng/ml, 40 0.7 ng/ml, 50 0.9 ng/ml, 60 1.3 ng/ml, 70 1.7 ng/ml and 80 2.1 ng/ml. It should also be suspected when the rate of increase is more than 0.75 ng/ml/year in patients in the range of 4-10 ng/ml or more than 0.35 ng/ml/year in patients with a range of less than 4 ng/ml.

Explanations for the origin of prostate cancer use three indisputable elements in its genesis: age or aging; familial inheritance of other or prostate cancers in family members and specific dark-skinned ethnicity. It is also believed that tobacco and alcohol consumption may be involved, but it has not

been conclusive and in terms of lifestyle, physical activity is promoted to reduce circulating testosterone.[10]

The risk factors according to studies by Vertosick and others,[11] can be grouped into non-modifiable ones (they include race, family history of hyperplasia and bladder cancer) and into modifiable ones (metabolic syndrome and obesity, excessive coffee intake , sedentary lifestyle and alcoholism. In addition, Vietri and others.[12] attribute a strong hereditary component within the family history, with first-degree relatives (father or siblings) and in relation to age they point out that the risk increases in direct relationship; Likewise, African American men have a higher incidence than those of other races.

Obesity, and other environmental factors such as eating diets rich in fat and sugar, could increase the risk, since prostate cancer is a mixed bag based on epidemiology and genetics; where the interaction between genetics, the environment, influences, and social causes for specific survival rapidly increase the risk; as demonstrated by the study by Sekhoacha and others.[13]

Due to the increase in patients with prostate problems and alterations in laboratory tests, it was decided to carry out this investigation with the objective of determining the correlation of risk factors for prostate hyperplasia with doubtful prostate antigen values.

Methods

During the year 2022, a quantitative correlational study was carried out in the population of four clinics belonging to the "Área Este" Polyclinic of the municipality of Camagüey, with determination of specific prostate antigen. Of 98 patients studied, 80 who met the selection criteria were selected. Those with doubtful PSA totaled 40, as did those with normal PSA.

Inclusion criteria: Patient with PSA determination in the period January-December 2022, who agreed to participate in the research.

Exclusion criteria: Patient for whom the data collection form could not be filled out or the medical history did not appear in the office.

The variables were analyzed: age groups, defined by the groups of <45 years and >45 years, skin color: white or black, family history of prostate cancer operationalized as yes (Exposed) and no (Not Exposed), other prostate diseases in the same way (Exposed) or (Not Exposed) and behavioral risks (Yes = Exposed, No = Not Exposed). Each variable obtained two denominations according to exposed and not exposed.

The data collection form constituted the primary record of information, while individual medical records were used for the secondary record. Statistical processing was carried out using the Package

for the Social Sciences (SPSS) version 24.0 on a Pentium IV computer, and numbers and percentages were obtained as summary measures. The results were presented in the form of texts and 5 2 x 2 contingency tables that independently analyzed the association of a risk factor with doubtful PSA values. We worked with incidence, difference and rate ratio, cumulative incidence, difference and risk ratio, as well as the odds ratio and 95% confidence interval using the Wald method. The Chi Square (X2) and p values were also determined. When Chi was obtained less than 5, Z was applied to determine whether it fits the Ha (alternate hypothesis): (P1-P2)>0 or (P1-P2)<0.

The study was approved by the Scientific Council and the Ethics Committee of the Polyclinic, and the information obtained was not used for purposes other than the research. The principles of the Declaration of Helsinki were taken into account.

Results

Table 1 analyzes the association of doubtful prostate-specific antigen (PSA) with the age groups over 45 years (Exposed) and under 45 years (Unexposed). In the first of 69 patients, a doubtful/normal PSA ratio of 38/31 was obtained, while in the second of 11 patients the ratio was 2/9. The speed of onset (TI) of this event in the population is 1.00 and the risk of developing the disease (AI) during the period studied was 50.00. The odds ratio (OR), showing values greater than 1, indicates that patients over 45 years of age have a greater risk of getting sick. Similarly, when calculating p in Wald's Chi Square as it is less than 0.05, the null hypothesis is rejected, and there is a relationship between the variables.

Table 1- Association of prostate-specific antigen (PSA) with age groups > 45 (Exposed) and <45 years (Unexposed).

Questionable PSA		TP*/PSA normal
Exposed	38	31
Not Exposed	2	9

Frequency and association	**Measure○**	**IC 95 %•**
Incidence rate (IT)	1,00	0,73;1,36
Exposed IT	1,23	0,89;1,69
Unexposed IT	0,22	0,06;0,88
Rate Differences (DT)	1,01	0,51;1,51

Rate Ratio (RT)	5,59	1,35;23,17
Cumulative Incidence (AI)	50,00	12,06;207,26
AI Exposed	55,07	40,07;75,68
AI Not Exposed	18,18	4,55;72,69
Risk Differences (RD)	36,89	10,22;63,56
Risk Ratio (RR)	3,03	0,85;10,80
Odds Ratio (OR)	5,52	1,11;27,43

Chi Square (X2) = 5.16 p = <0.025

Note: *Time-Person, ○TI and DT can be multiplied by a number multiple of 10, ○IA and DR are expressed in percentages and are mathematically analogous to the prevalence, ●95% confidence intervals by the Wald method.

Source: Data collection form.

Those who did and did not present doubtful PSA in relation to black (Exposed) and white (Unexposed) skin color are associated in Table 2, where it was obtained for the first 18/21 and for the second 22/19. The frequency of suffering from this condition is 0.86 (RR) times higher in patients with black skin than in patients with white skin. Obtaining a negative value in the risk difference (RD) indicates that this factor does not favor the disease. In relation to pin Wald's Chi Square, being greater than 0.05 shows that there is no relationship between the variables.

Table 2 - Association of prostate specific antigen (PSA) with black (Exposed) and white (Unexposed) skin color.

Questionable PSA	TP*/PSA normal	
Exposed	18	21
Not Exposed	22	19

Frequency and association	Measure○	IC 95 %●
Incidence rate (IT)	1,00	0,73;1,36
Exposed IT	0,86	0,54;1,36
Unexposed IT	1,16	0,76;1,76
Rate Differences (DT)	-0,30	-0,93;0,33
Rate Ratio (RT)	0,74	0,40;1,38
Cumulative Incidence (AI)	50,00	26,82;93,22
AI Exposed	46,15	29,08;73,25
AI Not Exposed	53,66	35,33;81,49
Risk Differences (RD)	-7,51	-29,65;14,63
Risk Ratio (RR)	0,86	0,55;1,34
Odds Ratio (OR)	0,74	0,31;1,78

Chi Square (X2) = 5.16 p = <0.025

Note: *Time-Person, ○TI and DT can be multiplied by a number multiple of 10, ○IA and DR are expressed in percentages and are mathematically analogous to the prevalence, ●95% confidence intervals by the Wald method.

Source: Data collection form.

Table 3 represents the risk of presenting doubtful PSA in relation to a family history of prostate disease. Of the 40 exposed, 30 had a doubtful PSA and 2 had a normal PSA, while of the 40 not exposed, 5 had a doubtful PSA and 16 had a normal PSA. The incidence rate of the disease was 1.00 (95% CI = 0.58;1.51), in that sense the cumulative incidence of exposed people reached 68.18, as there was a close relationship between the history family of prostate disease and presenting doubtful prostate specific antigen. The odds ratio (OR) showed values greater than 1 denoting that those in whom the history was collected had a higher risk. By calculating p in Wald's Chi Square as less than 0.05, the null hypothesis is rejected, and the relationship between the variables examined is accepted.

Table 3 - Association of prostate-specific antigen (PSA) with (Exposed) and without family history (Unexposed) of prostate cancer.

30	14

Questionable	PSA	10	26	TP*/PSA normal
Exposed				
Not Exposed				

Frequency and association	**Measure○**	**IC 95 %●**
Incidence rate (IT)	1,00	0,73;1,36
Exposed IT	2,14	1,50;3,06
Unexposed IT	0,38	0,20;0,71
Rate Differences (DT)	1,76	0,96;2,56
Rate Ratio (RT)	5,63	2,75;11,52
Cumulative Incidence (AI)	50,00	24,44;102,28
AI Exposed	68,18	47,67;97,51
AI Not Exposed	27,78	14,95;51,63
Risk Differences (RD)	40,40	20,05;60,75
Risk Ratio (RR)	2,45	1,40;4,31
Odds Ratio (OR)	5,57	2,12;14,65

Chi Square (X2) = 5.16 p = <0.025

Note: *Time-Person, ○TI and DT can be multiplied by a number multiple of 10, ○IA and DR are expressed in percentages and are mathematically analogous to the prevalence, ●95% confidence intervals by the Wald method.

Source: Data collection form.

The ratio of exposed people with doubtful and normal PSA (26/20), as well as that of unexposed people with doubtful and normal PSA (4/20) is seen in Table 4. It also shows an incidence rate of 1 .00, as well as, the instantaneous probability (RT) of presenting doubtful PSA upon contact with behavioral risk factors was 9.00. The cumulative incidence rate (AI) reached values of 50.00 for presenting doubtful PSA during the analyzed period. The frequency of suffering from these figures was 3.86 (RR) times higher in those who had a history of behavioral factors than those who did not. The result of the odds ratio (9.00) showed a digit greater than 1, which means that those who had behavioral risks were at greater risk of presenting doubtful PSA. With respect to pin Wald's Chi Square, being less than 0.05, the null hypothesis is discarded and there is a relationship between the variables.

Table 4 - Association of prostate-specific antigen (PSA) with (Exposed) and without a history of behavioral risks (Not Exposed).

Questionable PSA	TP*/PSA normal
Exposed	36	20
Not Exposed	4	20

Frequency and association	**Measure○**	**IC 95 %●**
Incidence rate (IT)	1,00	0,73;1,36
Exposed IT	1,80	1,30;2,50
Unexposed IT	0,20	0,08;0,53
Rate Differences (DT)	1,60	0,98;2,22
Rate Ratio (RT)	9,00	3,20;25,29
Cumulative Incidence (AI)	50,00	17,80;140,48
AI Exposed	64,29	46,37;89,13
AI Not Exposed	16,67	6,26;44,42
Risk Differences (RD)	47,62	27,81;67,43
Risk Ratio (RR)	3,86	1,54;6,64
Odds Ratio (OR)	9,00	2,70;30,02

Chi Square (X2) = 5.16 p = <0.025

Note: *Time-Person, ○TI and DT can be multiplied by a number multiple of 10, ○IA and DR are expressed in percentages and are mathematically analogous to the prevalence, ●95% confidence intervals by the Wald method.

Source: Data collection form.

Table 5 associates the risk that exists between a history of previous prostate diseases (Exposed) or not (Unexposed). Of the total of the former, doubtful PSA was found in 22 and while 15 remained within normal values. In the seconds, 18 had doubtful PSA and 25 had normal PSA. The odds ratio (OR) showed values greater than 1, indicating that this factor does not accelerate the risk of presenting doubtful PSA. When calculating p in Wald's Chi Square, a figure of 0.95 (greater than 0.05) was obtained, therefore, the variable history of previous prostate diseases did not influence the risk of becoming ill with leptospirosis.

Table 5 - Association of prostate-specific antigen (PSA) with (Exposed) and without a history of other prostate diseases (Not Exposed).

Questionable PSA	TP*/PSA normal
Exposed	22	15
Not Exposed	18	25

Frequency and association	**Measure○**	**IC 95 %●**
Incidence rate (IT)	1,00	0,73;1,36
Exposed IT	1,47	0,97;2,23
Unexposed IT	0,72	0,45;1,14
Rate Differences (DT)	0,75	0,05;1,45
Rate Ratio (RT)	2,04	1,09;3,80
Cumulative Incidence (AI)	50,00	26,82;93,22
AI Exposed	59,46	39,15;90,30
AI Not Exposed	41,86	26,37;66,44
Risk Differences (RD)	17,60	-4,31;39,51
Risk Ratio (RR)	1,41	0,91;2,21
Odds Ratio (OR)	2,04	0,83;4,98

Chi Square (X2) = 5.16 p = <0.025

Note: *Time-Person, ○TI and DT can be multiplied by a number multiple of 10, ○IA and DR are expressed in percentages and are mathematically analogous to the prevalence, ●95% confidence intervals by the Wald method.

Source: Data collection form.

Discussion

The study of prostate conditions is increasingly necessary due to how frequent and late the diagnosis sometimes is, but without a doubt knowledge of the risk factors and prevention measures are necessary for this disease whose incidence and mortality are increasing rapidly. exponentially in the international cancer report.

When analyzing the prevalence of doubtful PSA, higher figures were obtained in patients aged 45 years and older, which corresponds to some studies consulted such as that of Núñez and others,[14] in

Venezuela, who refer to the directly proportional relationship that has age at risk of developing prostate cancer. Also Peña and others,[10] found that the average age of the volunteers was 50.4 years.

In Cuba, Rodríguez and Pérez[15] find among the main results, a predominance of the age group of 61-70 years, the national average defined as prostate risk in the country.

Although the bibliography consulted[10,11,12] demonstrates a higher incidence in black patients, in the present study it was found that the frequency of suffering from this condition is 0.86 times higher in white patients. than those with black skin color, but with a negative value in the risk difference, which indicates this factor as not favoring the disease and shows that there is no relationship between the variables.

There is no correspondence with a review,[16] that mentioned African Americans with a greater probability of presenting abnormalities in the examination. Furthermore, another study[17] added related information on the effect of race, with a greater predisposition in black patients over others.

In Cuba, the influences of the races inherited by our ancestors make miscegenation a genetic mixture, which, regardless of the predominant skin color, prevents determining the prevailing ethnic origin, which in the opinion of the authors does not constitute an important element to keep in mind as a factor. risky.

In the opinion of Núñez and others,[14] when talking about risk factors for prostate cancer, the genetic factor has a 2 to 3 times higher risk of developing the disease than expected for their age, ethnicity and geographic location.

There are no coincidences with Peña and others,[10] who obtained 26 patients without family history of the 30 studied.

In relation to behavioral risk factors, the results coincide with the study carried out by García Viltres,[18] which shows the presence of 84.3% of sedentary lifestyle; average socioeconomic level in 52.6% and 57.8% of smoking as risk factors. Nuñez and others [14] identify that smoking, active and passive exposure to tobacco smoke are considered risk factors that are 2-3 times higher in smokers of more than one pack a day, compared to non-smokers.

In this aspect, we agree with Sawada,[19] when stating that obesity doubles the risk due to the overconsumption of calories contained in foods rich in carbohydrates; and excessive consumption of meat and saturated fats increase the risk up to 3.5 times.

In Cuba, an increase in incidence is observed, even in men under 40 years of age and although the factors that determine the risk for its development have not been clarified, it has been related to biological factors (age, race), genetic factors (first-degree family history of this cancer), environmental factors, behavioral factors and dietary factors.[20] In Villa Clara,[15] also among harmful habits are the prevalence of daily cigarette consumption, the obesity and sedentary lifestyle.

In relation to the history of previous prostate diseases and PSA alteration, there is similarity with Vertosick and others,[11] and García Viltres;[18] meanwhile, Nuñez and others,[14] obtain the history of disease as the main risk factor. sexually transmitted infection (STD) by 3.6% and Rodríguez and Pérez[15] state that patients with a high number of sexual partners constitute a subpopulation with a higher risk of suffering from prostate adenocarcinoma, as it predisposes them to prostatitis and prostatic hyperplasia.

In conclusion, the association of the main risk factors with the doubtful prostate antigen levels was determined, to find data that will help in the design of health interventions.

Bibliographic references

1. Linares Mesa NA, Rodríguez Garcés MY, Jiménez Ruiz FJ. Cáncer de próstata metastásico hormonosensible. Rev N Punto. 2021 [access: 05/02/2023];4(34):73-106. Available from: https://www.npunto.es/revista/34/cancer-de-prostata-metatstasico-hormonosensible#:~:text=El%20c%C3%A1ncer%20de%20pr%C3%B3stata%20metast%C3%A1sico,la%20poblai%C3%B3%20M1%20es%20heterog%C3%A9nea

2. American Society of clinical Oncology. Cáncer de próstata: Estadísticas. Cancer.Net. 2021 [access: 05/02/2023];[aprox. 12 p.]. Available from: https://www.cancer.net/es/tipos-de-cancer/c%C3%A1ncer-de-pr%C3%B3stata/estad%C3%ADsticas

3. Bray F. Cancer in sub-Saharan Africa in 2020: a review of current estimates of the national burden, data gaps, and future needs. Lancet Oncol. 2022 [access: 05/02/2023];23(6):719-28. Available from: https://pubmed.ncbi.nlm.nih.gov/35550275/

4. World Health Organization. Global Health Estimates 2020: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2019. WHO. 2020 [access: 05/02/2023]; [aprox. 15 p.] Available from: https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/ghe-leading-causes-of-death

5. Ministerio de Salud Pública. Dirección de Registros Médicos y Estadísticas de Salud. Anuario Estadístico de Salud 2021. La Habana, Cuba. MINSAP. 2022 [access: 05/02/2023];[aprox. 124 p.]. Available from: https://temas.sld.cu/estadisticassalud/

6. Jiménez X, Filella M, Gavagnach J, Allue D, Ferrer F. Cribado del cáncer de próstata mediante antígeno prostático específico: perspectiva del médico en atención primaria y en el laboratorio clínico. Sociedad española de médicos de atención primaria. Medicina de Familia. SEMERGEN. 2018 [access: 05/02/2023]; 44(6):409-19. Available from: https://pesquisa.bvsalud.org/portal/resource/pt/ibc-181234

7. Dellavedova, T. Antígeno prostático específico. Desde sus inicios hasta su reconocimiento como biomarcador de cáncer de próstata. Archivos Españoles de Urología. 2016 [access: 05/02/2023];69(1):19-23. Available from: https://aeurologia.com/article_detail.php?aid=aeebb6b545a4cb8236ec182a22fb353dde1e9117

8. Vachani C. Antígeno Prostático Específico (PSA). Rev Med Clin. 2020 [access: 05/02/2023];2(1):[aprox. 5 p.]. Available from: https://es.oncolink.org/tipos-de-cancer/cancer-de-la-prostata/screening-diagnosis/antigeno-prostatico-especifico-psa

9. Vargas Calvo M, Vargas Mena R. Cáncer de próstata y sus nuevos métodos de tamizaje. Revista Médica Sinergia. 2021;6(9):e715. DOI: https://doi.org/10.31434/rms.v6i9.715

10. Peña Rosas GD, Maldonado Lira BM, Suarez P, España Francis NA. Factores de riesgo en la prevención de cáncer de próstata del personal de la Pontificia Universidad Católica del Ecuador Sede Esmeraldas. Univ Cien Tecn. 2019 [access: 05/02/2023];23(93):90-96. Available from: https://uctunexpo.autanabooks.com/index.php/uct/article/view/150

11. Vertosick EA, Poon BY, Vickers AJ. Relative value of race, family history and prostate specific antigen as indications for early initiation of prostate cancer screening. J Urol. 2020 [access: 05/02/2023];192(3):724-8. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4143426/

12. Vietri MT, D'Elia G, Caliendo G, Resse M, Casamassimi A, Passariello L, et al. Hereditary Prostate Cancer: Genes Related, Target Therapy and Prevention. Int. J. Mol. Sci. 2021;22(7):e3753. DOI: https://doi.org/10.3390/ijms22073753

13. Sekhoacha M, Riet K, Motloung P, Gumenku L, Adegoke A, Mashele S. Prostate Cancer Review: Genetics, Diagnosis, Treatment Options, and Alternative Approaches. Rev Molecules. 2022;27:e5730. DOI: https://doi.org/10.3390/molecules27175730

14. Núñez Liza JC, Díaz Vélez C, Velásquez JE. Frecuencia de factores de riesgo para cáncer de próstata en un distrito de alta incidencia. Revista Venezolana de Oncología. 2017 [access: 05/02/2023];29(4):244-51. Available from: https://www.redalyc.org/articulo.oa?id=375652706005

15. Rodríguez Rodríguez LL y Pérez Moreno LE. Caracterización de factores de riesgo en pacientes con cáncer de próstata en el municipio Placetas. Rev Cub Urol. 2018 [access: 05/02/2023];7(1):e51. Available from: https://revurologia.sld.cu/index.php/rcu/article/view/446

16. Fleshner K, Carlsson SV, Roobol MJ. The effect of the USPSTF PSA screening recommendation on prostate cancer incidence patterns in the USA. Nat Rev Urol. 2017 [access: 05/02/2023];14(1):26-37. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5341610/

17. Sammon JD, Dalela D, Abdollah F, Choueiri TK, Han PK, Hansen M, et al. Determinants of Prostate Specific Antigen Screening among Black Men in the United States in the Contemporary

Era. J Urol. 2016 [access: 05/02/2023];195(4):913-8. Available from: https://pubmed.ncbi.nlm.nih.gov/26598427/

18. García Viltres M. Comportamiento del adenocarcinoma de próstata con antígeno prostático específico en rangos normales. Rev Mex Urol. 2020 [access: 05/02/2023];60(6):56-9. Available from: https://www.imbiomed.com.mx/articulo.php?id=3203

19. Sawada N. Risk and preventive factors for prostate cancer in Japan: The Japan Public Health Center-based prospective (JPHC) study. J Epidemiol. 2016;27(1):2–7. Available from: https://dx.doi.org/10.1016%2Fj.je.2016.09.001

20. Klemann N, Roder MA, Helgstrand JT. Risk of prostate cancer diagnosis and mortality in men with a benign initial transrectal ultrasound-guided biopsy set: a population-based study. Rev Lancet Oncol. 2017 [access: 05/02/2023];18(1):221-9. Available from: https://pubmed.ncbi.nlm.nih.gov/28094199/

Conflict of interests

The authors declare no conflict of interest.

Authors' contribution

Conceptualization: Rolando Rodríguez Puga and Yasnier Dueñas Rodríguez.

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Formal analysis: Rolando Rodríguez Puga and Yasnier Dueñas Rodríguez.

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