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RACIAL DIFFERENCES IN PROSTATE CANCER PREVALENCE

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ABSTRACT

Objective: To evaluate racial differences in prostate cancer prevalence in Brazil.

Materials and Methods: We evaluated 1,773 men submitted to digital rectal examination (DRE), serum total prostate-specific antigen (PSA) assay, and the AUA-IPSS questionnaire from 1992 to 1997. They were classified according to the race in whites (1180 men), blacks (201 men) and yellows (45 men). Racial classification was not possible in 347 men. When PSA and/or DRE were abnormal, transrectal ultrasound guided prostate biopsy was indicated. Clinical stage and Gleason score were recorded and racial prevalence were compared.

Results: 346 biopsies were performed and 51 cancers were diagnosed (positive biopsy rate of 14.7%). The distribution of PSA among these cancer cases was normal PSA in 4 (7.8%), between 4 ng/ml and 10 ng/ml in 16 (31.4%), and PSA > 10 ng/ml in 31 (60.8%). The cancer prevalence in white men was 2.4% and in black men 5.5% ($p < 0.05$). White men median age was 62.3 ± 0.4 and black men median age was 62.4 ± 0.7 ($p > 0.05$). Median PSA was 3 ng/ml for white men and 3.3 ng/ml for black men ($p > 0.05$). Black men had higher prevalence of abnormal DRE (18.9% versus 11.7%, $p < 0.05$). Median education class for white men was 3 and for black men 2 ($p < 0.05$). Prevalence of clinically localized cancer was 61.3%.

Conclusions: The prevalence of prostate cancer is higher in blacks than in whites (5.5% versus 2.4%). The median PSA was similar for both racial groups. DRE abnormalities in black men were more prevalent than in white men (18.9% versus 11.7%).

Key words: prostate; prostatic neoplasm; diagnosis; epidemiology
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INTRODUCTION

Prostate cancer (PCa) is the most common cancer diagnosed in men, and the second most common cause of cancer death in the United States (1). Prostate cancer is the third most common cancer death in Brazil (2). However, regional differences exist with regard to some PCa features. Some authors reported on differences in PCa prevalence in United States, Japan, and China, and they have suggested that this fate is due to the differences in ethnic groups (3-5). The prevalence of some kind of cancer presents regional differences in countries populated by different ethnic groups (6).

Herein, we aim to describe the racial prevalence of PCa in Brazil.

MATERIALS AND METHODS

From October 1992 to September 1997, 1,773 men were submitted voluntarily to a PCa screening program (passive screening). The following tests were

performed in all individuals: digital rectal examination (DRE), serum total prostate specific antigen testing (EIA-PSA 2 assay, CISbio International®, with normal values ranging from 0 ng/ml to 4 ng/ml), and the AUA-IPSS questionnaire. With regard to ethnicity, patients were classified by physicians as yellows, whites, or blacks. Black men were considered all individuals that presented black skin, hair or another typical feature of the black race. Men presenting oriental features were classified as yellow, and the others were considered as white.

Patients, who presented abnormal level of total PSA and/or DRE, were submitted to a transrectal ultrasound-directed prostate biopsy (Toshiba® SSA-340[a] machine, 6 and 7 MHz biplane probe and 18-gauge Biopty® instrument, Pro Mag 2.2). Lower urinary tract symptoms (LUTS) were classified as low (0-8), mild (9-16), and high (17-35). Tumor grade was also analyzed. The patients' age distribution is showed in the Table-1, and other individual characteristics in Table-2.

RESULTS

Prostate biopsy was indicated due to only an abnormal level of PSA in 488 patients (71.8%), an abnormal DRE only in 54 (7.9%), and both abnormal level of PSA and abnormal DRE in 138 (20.3%). Of all 680 patients who had formally an indication for prostate biopsy, only 346 were effectively performed, and 51 patients with prostate cancer were diagnosed (positive biopsy rate of 14.7%).

Table 1 *- Patients stratified by age.*

Age (years)	Percentage
< 40	0.4
40 – 49	4.9
50 – 59	33.4
60 – 69	39.9
70 – 79	18.7
80 – 89	2.7

Of all men diagnosed with prostate cancer, 4 patients (7.8%) presented normal PSA level, 16 (31.4%) PSA level between 4.1 ng/ml and 10 ng/ml, and 31 patients (60.8%) presented PSA value greater than 10 ng/ml (Table-3).

While prostate cancer prevalence in white men was 2.4% (28 tumors in 1,180 men), black men presented 5.5% (11 tumors in 201 men), Table-4.

Analysis of Black and White Ethnicity with regard to Age, PSA, DRE, and Education Class

Black and white men were evaluated regarding to homogeneity for age, PSA, education level, and DRE. The 2 groups were age and PSA matched (Table-5 and 6), $p > 0.05$.

Table 2 *- Characteristics of the studied population.*

	No. (%)	Distribution (%)		
Ethnicity♦	1,426 (80.4)	Yellow = 45 (3.2)*	White = 1,180 (82.7)	Black = 201(14.1)
AUA-IPSS♣	1,676 (94.5)	Low = 803 (47.9)	Mild = 429 (25.6)	High = 444 (26.5)
DRE	1,626 (91.7)	Normal = 1,429 (87.8)	Suspicious = 123 (7.6)	Typical = 74 (4.6)
PSA	1,628 (91.8)	≤ 4 = 965 (59.3)	4 -10 = 473 (29)	> 10 = 190 (11.7)

*♦It was not possible to define the ethnicity group in 347 of cases (19.6%);*Yellow men were excluded due to small number for statistical analysis;♣ 144 men (8.6%) presented IPSS = 0; DRE= digital rectal examination.*

Table 3 - *Distribution of prostate cancer patients stratified by PSA level.*

PSA values (ng/ml)	Percentage
0 – 4	7.8
4.1 – 10	31.4
> 10	60.8

While prevalence of abnormal DRE in blacks was 18.8% (36/90), whites presented 11.7% (127 of 1,083) (Table-7).

Education class was stratified as following: (1 = illiterate, 2 = elementary, 3 = high school and 4 = university). Thus, it was evidenced that the education class of whites was higher than blacks (Table-8).

Clinical staging was done in 31 patients (Table-9), and Gleason score was associated with racial groups (Table-10).

DISCUSSION

The PCa screening in the present series was passive, that is, patients voluntarily looked for the hospital with the intention to be submitted to a prostatic evaluation. Thus, probably our sample is biased as evidenced by the high incidence of abnormal PSA values (40.7%). Although medical literature often describes lower rates of incidence, values up to 52.3% can be found (7).

In the present series, 29% of all patients presented PSA levels between 4.1 and 10 ng/ml. So, these values are higher than those described in the literature. In general, PSA values that are found in populations submitted to a PCa screening program corresponds from asymptomatic individuals. A significant number of men presenting LUTS may explain the high rate of abnormal PSA level that was found in our series. In fact, several authors have described high PSA values in men suffering from LUTS (8), although a reasonable explanation is unknown. Just as hypothesis, high volume of prostate due to the cancer growth may cause the worsening of LUTS, and consequently, increase of serum PSA level. Other hypothesis explains tumor invasion of bladder trigone as responsible for LUTS in PCa patients. Nevertheless, only 31 of 51 PCa patients were clinically staged, and 19 (61.3%) had localized PCa and therefore without local infiltration. Some authors have found up to 98% of localized PCa in their series and 63% to 75% of the total sample are in agreement with the definitive pathologic staging (9). We did not perform an analysis of racial differences in pathological staging due to the small number of advanced PCa specimens available.

Our results showed that black men had 130% more cancer than white men. This higher prevalence of PCa in blacks has been described in the United States; African-American had 50% to 80% higher PCa

Table 4 - *Prevalence of prostate cancer (PCa) in blacks and whites.*

Ethnicity	Whites (%)	Blacks (%)
PCa Positivo	28 (2)	11 (1)
PCa Negativo	1149 (83)	189 (14)

Fisher's exact test, p = 0.02; "odds ratio" = 0.42 with CI 95% (0.21 and 0.86) P.S.: Ethnicity was not defined in 12 of 51 prostate cancer patients.

Table 5 - *Patients' age (years)*

Ethnicity	Whites	Blacks
No.	1,177	200
Age (mean)	62.3 ± 0.4	62.4 ± 0.7

No-paired t test with Welch correction, p = 0.754

Table 6 - *PSA values (ng/ml).*

Ethnicity	Whites	Blacks
No.	378	114
PSA (median)	3	3.3
25º percentile	1.6	2
75º percentile	5.6	6.1

Mann-Whitney U test, p = 0.2122

Table 7 - *Patient's digital rectal examination (DRE).*

Ethnicity	Whites (%)	Blacks (%)
DRE Positive	127 (10)	36 (3)
DRE Negative	956 (75)	154 (12)

Chi-square test (6.92) with Yates correction, p = 0.008, "odds ratio" = 0.5683 with CI of 95% (0.38; 0.85), DRE = digital rectal examination.

than white men (3, 10), and 200% to 300% higher than Chinese or Japanese (3). A reasonable explanation to this racial difference in PCa prevalence is unknown. However, it is interesting to be noted that studies in autopsies have shown no difference in the PCa prevalence in blacks and whites (11). Thus, biological behavior of PCa may differ among different races because blacks present higher mortality rate (117%) than whites and advanced disease is found 117% more frequent in blacks than whites (12, 13).

Although hormonal, dietetic, and environmental factors may influence the PCa prevalence, an explanation to the racial difference in the incidence of PCa is unknown. Analysis of the ethnic groups in our series showed that they are age and PSA matched. Our analysis diverges of some authors that have found higher PSA levels in black men. Moul et al. (14) found that blacks had higher (14.0 ng/ml) PSA mean values than whites (8.3 ng/ml) at the time of diagnosis. Differences in our results may be occurred due to the population characteristics, or a biased total sample. Other explanation is based on the fact that the Brazilian population is characterized by a very mixed

Table 8 - *Patients' education level.*

Ethnicity	Whites	Blacks
No.	378	114
Median	3	2
25º percentile	2	2
75º percentile	3	2

Mann-Whitney U test, p < 0.0001 Education level: 1 = illiterate, 2 = elementary, 3 = high school, 4 = university.

Table 9 - *Prostate cancer stratified by clinical staging.*

Stage	T1	T2	T3	T4
No. (%)	5 (16.1)	14 (45.2)	1 (3.2)	11 (35.5)

19 cases (61.3%) of localized cancer.

people, or different method to classify individuals into racial group. For example, when we compared ethnic distribution in our series with those from the Brazilian Institute of Geography and Statistic (IBGE), important differences can be highlighted. Accordingly to IBGE, 54% of people declared their selves as whites, and 45.3% as blacks, and just 0.7% as other ethnic group (15). Discrepancies in results may be occurred due to methods used. IBGE uses the self perception. On the contrary, in our series a physician determined the individual race, and a definition of the race was not possible in 19.6% of all cases. This is due to the difficulty in determining race in a very mixed population, as the Brazilians.

Ethnic distribution is not the only factor that explains differences in racial prevalence of PCa in our series. Social and economic differences exist in the analyzed racial groups. These differences may influence the voluntary seek for PCa screening program, because individuals who have high education class have a more easy access to information used in public health programs. Possibly, these considerations could indicate a necessity of more participation of black men in cancer screening program.

An interesting work that addressed perception of whites and blacks about PCa showed important differences between groups: blacks had had propensity to be submitted to DRE or PSA testing. Furthermore, these patients known lower number of patients with PCa, and they had more difficulties to understand that men with PCa can have a normal life style, or that they could be asymptomatic (16). This study also showed that most men did not know that heredity and race are risk factors. Finally, this study evidenced that different racial groups have different facilities to access PCa screening programs. The same was observed with regard to the disease perception and its treatment as well as precocious diagnosis and

Table 10 *- Gleason score (G) stratified by ethnicity.*

Ethnicity	G 2	G 3	G 4	G 5	G 6	G 7	G 8	Total
Whites	3	1	4	2	8	4	1	23
Blacks			1		1	3		5
Total	3	1	5	2	9	7	1	

Number of black men is very small to perform a statistical analysis.

risk factors. This represents barriers to a precocious diagnosis of PCa in black men. This fate may explain the lower rate of black men participation in our series, because significant differences occurred with regard to education class between blacks and whites. Thus, possibly due to a lower cultural class and lower population presence with respect to the general population (14.1% of blacks versus 82.7% of whites in our series, as compared to 45.3% of blacks versus 54% of whites in IBGE data) PCa prevalence in black men may have been underestimated.

A similar percentage of blacks (45.4%) and whites (43.3%) was advised to perform prostate biopsy. However, acceptance rate was higher in blacks than in whites. The higher acceptance rate of blacks to be submitted to procedures may be due to the fate that blacks have lower cultural class, or due to the difficulty in obtain a second medical opinion. Besides the higher acceptance rate of biopsy, number of diagnosis of PCa in black men was disproportionately higher than in whites, suggesting a more cancer prevalence in blacks.

CONCLUSION

PCa prevalence in black men is higher than in white men. Median PSA level was similar in blacks and whites. However, abnormal DRE in black men was more prevalent than in white men.

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REFERENCES

1. Kleer E, Oesterling JE: PSA and staging of localized prostate cancer. Urol Clin North Am, 20: 695-704, 1993.
2. INCA Instituto Nacional do Câncer. http://www.inca.org.br, 2000.
3. Ndubuisi SC, Kofie VY, Andoh JY, Schwartz EM: Black-white differences in the stage at presentation of prostate cancer in the district of Columbia. Urology, 46: 71-77, 1995.
4. Oesterling JE, Kumamoto Y, Tsukamoto T, Girman CJ, Guess HA, Masumori N, et al.: Serum prostate-specific antigen in a community-based population of healthy Japanese men: lower values than for similarly aged white men. Br J Urol, 75: 347-353, 1995.
5. Gu FL, Xia TL, Kong XT: Preliminary study of the frequency of benign prostatic hyperplasia and prostatic cancer in China. Urology, 44: 688-691, 1994.
6. Davis FG, Persky VW, Ferre CD, Howe HL, Barret RE, Haenszel WM: Cancer incidence of Hispanics and non-Hispanic whites in Cook County, Illinois. Cancer, 75: 2939-2945, 1995.
7. El-Galley RES, Petros JA, Sanders WH, Keane TE, Galloway NTM, Cooner WH et al.: Normal range prostate-specific antigen versus age-specific prostate-specific antigen in screening prostate adenocarcinoma. Urology, 46: 200-204, 1995.
8. Aus G, Bergdahl S, Frösing R, Lodding P, Pileblad E, Hugosson J: Reference range of prostate-specific antigen after transurethral resection of the prostate. Urology, 47: 529-531, 1996.

9. Rosen MA: Impact of prostate-specific antigen screening on the natural history of prostate cancer. Urology, 46: 757-768, 1995.
10. Smith DS, Bullock AD, Catalona WJ, Herschman JD: Racial differences in a prostate cancer screening study. J Urol, 156: 1366-1369,1996.
11. Breslow N, Chan CW, Dhom G, Drury RA, Franks LM, Gellei B et al.: Latent carcinoma of prostate at autopsy in seven areas. Int J Cancer, 20: 680, 1977.
12. Polednak AP, Flannery JT: Black versus white racial differences in clinical stage at diagnosis and treatment of prostatic cancer in Connecticut. Cancer, 70: 2152, 1992.
13. Steele GD Jr, Osteen RT, Winchester DP, Murphy GP, Menck HR: Clinical highlights from the National Cancer Data Base, 44: 71, 1994.
14. Moul JW, Sesterhenn IA, Connelly RR, Douglas T, Srivastava S, Mostofi FK et al.: Prostate-specific antigen values at the time of prostate cancer diagnosis in African- American men. JAMA, 25: 1277-1281, 1995.
15. Instituto Brasileiro de Geografia e Estatística: http://www.ibge.gov.br, 2001).
16. Demark-Wahnefried W, Strigo T, Catoe K, Conaway M, Brunetti M, Rimer BK, Robertson CN: Knowledge, beliefs, and prior screening behavior among blacks and whites reporting for prostate cancer screening. Urology, 46: 346-351, 1995.

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EDITORIAL COMMENT

The authors can be congratulated to address their efforts on a challenger issue. Unfortunately, ethnicity is a poorly understood, complex idea that is mainly used as a (respectable) synonym for race (1). Actually, the issue of race in public health research has raised several controversial points. Race is an arbitrary system of visual classification that does not demarcate distinct subspecies of the human population, and it is almost without biological merit (2). This subjective quality can be evidenced in the authors' results: it was not possible to define the race of the individual in 19.6% of the total sample studied. The Brazilian population is characterized by a very mixed population, and intents to classify the Brazilian people as white, black or yellow seems far inadequate. Racial distinctions are arbitrarily defined, and some authors advocated abandoning race as a variable in public heath research (3). Racial and ethnic categories are social. The question is whether classifications apply across regional and national boundaries. The scientific challenge, surely, is to seek classifications that have commonalities across

time and place, so that the work can have more than local relevance.

These authors concluded that black men have a higher prostate cancer detection rate compared with white men in a prostate cancer-screening program, and therefore suggest that higher participation of blacks in these programs should be stimulated. Although the intention is honorable, this statement cannot be completely supported by the results, as the authors pointed out in their discussion (biased total sample). The fact that large percentages of black had more incidence of prostate cancer is of concern and speaks to our need to develop more effective early detection methods for this population, and implies in the necessity of governmental decision to make appropriate health plans. In view of the present results, it is of questionable value to pursue such a course.

The historically dominant and still prevalent scientific idea of race is that of biologically distinctive human populations. It is long past time to abandon the false view that "race" is a valid biological category. Race has served biomedical science badly and unless researches recognize the difficulty with research into ethnicity and health and correct its weaknesses, 21st century research in this subject may suffer the same ignominious fate as that of race science in the 20th century (3).

References

1. Senior P, Bhopal RS: Ethnicity as a variable in epidemiological research. BMJ, 309: 327-330, 1994.
2. Fulliolove, MT: Comment: abandoning "race" as a variable in public health research-an idea whose time has come. Amer J Pub Health, 88: 1297, 1998.
3. Bhopal RS: Is research into ethnicity and health racist, unsound, or important science? BMJ, 314: 1751-1756, 1997.

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