

# Pattern of prostate cancer presentation among the Egyptian population: A study in a single tertiary care center

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**Introduction** Prostate cancer is a common health problem that in the majority of cases starts to develop at the age of 50 years, reaching its peak at 60–70 years of age. A variation in its incidence and prevalence exists between western, Asian and Arabic populations.

The aim of our work was to report the pattern of prostate cancer presentation in Alexandria University that as a tertiary referral center provides care for uro-oncology cases.

**Material and methods** Data collection for all patients diagnosed with prostate cancer at Alexandria University in Egypt through the year 2012 was done.

**Results** The mean age of the patients was 67. Mean serum total PSA, prostate volume and PSA<sub>d</sub> were 149 ng/ml, 63 grams and 3.1 ng/ml/gm respectively. 25% of patients were asymptomatic diagnosed accidentally during screening for prostate cancer. The remaining group was presenting with LUTS, including 23 patients who presented initially with back pain.

**Conclusions** Egyptian men with prostate cancer have a markedly high PSA density and Gleason grade at diagnosis.

**Key Words:** prostate cancer ◊ Egyptian population ◊ risk stratification

## INTRODUCTION

Prostate cancer is a common health problem that in the majority of cases starts to develop at the age of 50 years, reaching its peak at 60–70 years of age. A variation in its incidence and prevalence exists between western, Asian and Arabic populations. The highest incidence is in the USA and Canada followed by European countries, then the Asian population and the lowest incidence is in Arabic population [1, 2]. The incidence of prostate cancer was reported to be about 100–127/100.000 men in the USA [3], while only 3.1, 3.3 and 6.5/100.000 men in Saudi Arabia [4], Oman [5] and Kuwait [6]. The marked difference in the incidence and prevalence of prostate cancer between western and Arabic countries is very interesting and can be attributed to different explanations. All Arabic countries are actually Islamic countries where Muslims constitute the majority of the population. They adopt male circumcision in the first few years of life as an obligatory event in relation to the

religion of Islam. Interestingly, many recent studies confirmed the association between circumcision and the lower incidence of penile viral infections. Uganda trial reported that applying male circumcision results in a reduced incidence of HSV2 infection by 25%, HPV infection by 35% and HIV infection by 50–60% [7, 8]. Morris [9] recently reported that male circumcision is a surgical vaccine that guards against genital and urinary bacterial and viral infection and protects against penile and prostate cancer. In a study of 20,243 men in Finland, infection with HPV18 was associated with a 2.6-fold increase in risk of prostate cancer ( $P < 0.005$ ) [10]. For HPV16, the increased risk was 2.4-fold. This is similar to the increased penile HPV infection in uncircumcised men [11]. Some studies reported that uncircumcised men have more than twice the incidence of prostate cancer compared with circumcised men [12, 13, 14] which explains why prostate cancer is relatively rare amongst Jews. Of men operated on for prostatic obstruction, 1.8% of obstructions were cancerous in Jews (cir-

cumcised), compared with 19% of non-Jews (uncircumcised) [15]. A study in the UK in 1996 found an odds ratio for the reduction in risk of prostate cancer in circumcised men to be 0.62 [16]. Table 1 illustrates some recent publications studying the association between male circumcision, STDs and prostate cancer. The age-standardized incidence rate of prostate cancer is lower in Asian countries than in the United States and European countries. However, the incidence rate in Asians living in the United States is substantially higher than that in those living in their homelands [17]. Migration studies [18] have shown an increase in prostate cancer incidence in Asian men after emigration to the United States. This observation suggests that environmental factors and changes in lifestyles, particularly in dietary practices, can affect the aetiology of prostate cancer [19].

A higher intake of vegetables in the Arabic population may be also a factor that contributes to the lower incidence of prostate cancer. A recent study from Egypt [20] confirmed higher vegetable intake to be of significant value in reduction of the risk of prostate cancer. A recent systematic review [21] confirmed that a diet low in fat and meat and rich

in vegetables and fruits is recommended to lower the risk for prostate cancer.

Another interesting possible explanation is the racial difference in serum testosterone during adulthood. Kehinde et al. [22] studied the difference in serum testosterone between Arab and German groups of patients with diseases other than prostate cancer and was able to demonstrate a significantly lower level of testosterone in the Arab population in the middle age group (<30 years), pointing out that the relatively lower level of serum testosterone in that age group may be protective in the long run. In another study, the same group published [23] the difference in levels of serum testosterone between Arabs and American Caucasians and reported lower levels of testosterone in Arabic men in all age groups, with a higher significance in the middle age groups (<30 years).

Schistosomiasis is a parasitic disease that is endemic in tropical countries with more than half of the cases located in Africa and Middle East. Animal studies on the effect of schistosomal infection on the testes confirmed that schistosomal infection results in a significant decrease in the level of serum testosterone [24–27]. Another endemic problem that emerged in Egypt, secondary to Schis-

**Table 1.** Publications studying the association of circumcision with sexually transmitted diseases and prostate cancer

Authors	Journal	Conclusions
Tobian, et al.	N Engl J Med. 2009; 360: 1298–1309	Circumcision significantly reduced the risk of HSV 2, HPV and HIV
Auvert, et al.	J Infect Dis. 2009. 1; 199: 14–19	Circumcision reduces the risk of male urethral HPV infection
Morris BJ	Bioessays. 2007; 29: 1147–1158	Prostate cancer is 1.6–2 times higher in uncircumcised men
Morris, et al.	BJU Int. 2007; 10: 5–6	Prostate cancer is 1.6–2 times higher in uncircumcised and applying circumcision can markedly reduce the cost of its treatment
Oliver, et al.	Prostate Cancer Prostatic Dis. 2001; 4: 228–231	Circumcised men have a slightly lower PSA than uncircumcised. Uncircumcision is associated with higher incidence of Chlamydia infection and prostate cancer
Sobngwi–Tambekou, et al.	Sex Transm Infect. 200; 85: 116–120	Circumcision reduces the risk of Chlamydia and trichomonas infection
Al Moustafa AE	Med Hypotheses. 200; 71: 209–211.	High risk HPV play an important role in prostate cancer progression
Carozzi, et al.	Int J Biol Markers. 2004; 19: 257–261	High risk HPV play a role in etiology of prostate cancer
Dillner, et al.	Int J Cancer. 1998; 75: 564–567	Infection with HPV may be involved in etiology of prostate cancer

**Table 2.** Publications correlating serum testosterone in Arabic and western populations

Authors	Journal	Arabic countries	Conclusions
Kehinde, et al.	Int J Urol 2006; 13: 354–361	Kuwait and Oman	Mean total testosterone was significantly lower in Arabic men than German populations, esp in adult age group
Kehinde, et al.	Int Urol Nephrol. 2006; 38: 33–44	Kuwait and Oman	Mean total testosterone was significantly lower in Arabic men than Caucasian men (including USA whites)
Saad, et al.	J Egypt Soc Parasitol. 1999; 29: 307–303	Egypt	Infection with Schistosoma in Egypt was associated with lower level of serum testosterone

tosomiasis, is caused by the treatment itself. In the mid-20 century, the Egyptian Ministry of Health began to conduct mass treatment in rural areas and for every suspected infection using tartar emetic intravenous injection. At that time, the dangers of exposure to human blood weren't considered and disposable needles and syringes were not available [28, 29]. Frank et al. [28] reported a direct relationship between parenteral treatment of Schistosomiasis and the country wide prevalence of antibodies to Hepatitis C infection. Many studies [30, 31] confirmed the association between hepatitis C infection and chronic liver disease with the occurrence of hypogonadotropic hypogonadism manifested by low serum level of gonadotropic hormones and serum testosterone. Table 2 illustrates findings in publications correlating serum testosterone in Arabic and western populations.

Serum PSA is a widely used parameter for the early detection and monitoring of prostate cancer. In western countries men with total PSA <2.5 ng/ml have a low probability of having prostate cancer, while those with PSA >10 ng/ml have >50% chance of having prostate cancer [32, 33, 34]. A recent paper from Kuwait [35], demonstrated that for cases with PSA >10 ng/ml, prostate cancer was still of a low probability, with the majority of cases with elevated PSA only suffering from prostatitis or BPH. They could detected a PSA value of >50 ng/ml to carry 100% specificity for prostate cancer in the Arabic population.

A recent paper from Saudi Arabia [36] studying the incidence of prostatic adenocarcinoma in patients admitted to King Abdul-Aziz University hospital showed that prostate cancer was detected in 28.5% of patients with PSA >4 ng/ml, which is considered lower than the expected incidence for their patients median age group of 68 years. Table 3 demonstrates the difference in incidence between the findings in the Saudi Arabia study [36] with a Canadian [37] and a multi-institutional [38] studies.

Another Arabic study [39] compared age adjusted serum level of PSA of the Arabic population with that of USA Caucasians and the Japanese population. They showed that USA whites tend to have the highest total PSA, followed by Japanese population and finally the lowest PSA level, adjusted to age, was present in Arabic population.

PSA density (PSAd) is another important parameter that was introduced by Benston and colleagues as a useful tool to increase specificity of the detection of prostate cancer [40]. Different cut-off values of PSAd ranging from 0.1 to 0.15 was proposed by urologists aiming to increase the specificity of prostate cancer detection in the grey zone area of total

**Table 3.** Incidence of prostate cancer in different recent studies

	Saudi Arabia	Canada; Ontario study	Multi-institutional study
Number of patients	285	226	15753
Median age	68	66	Not mentioned
Prostate adenocarcinoma	28.5%	58.2%	33.4%

**Table 4.** Patients characteristics

Age	80>	(90%) 196
	124 80<	(10%) 20
PSA	10>	(18.5%) 40
	10–20	(24.5%) 53
PSAd	20<	(57%) 123
	0.15>	(12.5%) 27
DRE	0.15<	(87.5%) 189
	T0	(22.7%) 49
	T2	(40.8%) 88
Gleason	T3	(36.5%) 79
	7>	(14%) 30
Presentation	7≤	(86%) 186
	Asymptomatic	(25%) 54
	Irritative	(58%) 126
	Obstructive	(6%) 13
	Bone pain (deposits)	(11%) 23

PSA level, and thus avoid unnecessary prostatic biopsies [41–44]. Contrary to studies on the Western population, a recent Arabic study [45], trying to include PSAd as a mean to avoid unnecessary prostatic biopsy, concluded that in patients with total PSA <10 ng/ml, values of PSAd <0.32 strongly suggest benign disease.

The aim of our work was to report the pattern of prostate cancer presentation in Alexandria University that as a tertiary referral center, provides care for uro-oncology cases.

## MATERIAL AND METHODS

Data collection for all patients diagnosed with prostate cancer at Alexandria University in Egypt through the year 2012 was done. All possible information including patients' age, clinical presentation, DRE findings and serum total PSA and prostate volume were evaluated.

Statistical analysis was done using the SPSS program. Analytical analysis was done using two tailed Fisher Exact test and two tailed unpaired t test.

## RESULTS

We found 950 patients diagnosed with prostate cancer in our database through the year 2012. Complete information was found for 216 patients.

The mean age of the patients was 67 years. Mean serum total PSA, prostate volume and PSA<sub>d</sub> were 149 ng/ml, 63 grams and 3.1 ng/ml/gm respectively. 25% of patients were asymptomatic and diagnosed accidentally during screening for prostate cancer. The remaining group was presenting with LUTS, including 23 patients who presented initially with back pain. Table 4 illustrates the patients' characteristics.

Only 7 patients were found to fulfill the criteria of low risk prostate cancer namely, PSA <10, T1c and Gleason grade <7. Symptomatic patients were significantly associated with finding suspicious nodules during DRE (p 0.002) and higher PSA density (p 0.01). PSA density of 0.15 did not yield any significant difference between both symptomatic and asymptomatic groups. The median PSA density for the whole group was 0.425. When we used that value as the cutoff value, symptomatic patients had significantly higher PSA density values. Table 5 shows the analytical analysis for the studied groups.

## DISCUSSION

Prostate cancer is a major health problem that was not sufficiently studied in Egypt. Our work included

216 patients diagnosed with prostate cancer in our institution in 2012. Only 54 patients (25%) were diagnosed through surveillance programs for prostate cancer (annual total PSA and DRE) without having any symptoms. Thirty three patients had suspicious findings on DRE and 42 patients had serum total PSA >10 ng/ml. The striking features in those groups were the high PSA density and that most of the cases (46 patients) had a Gleason grade >6. Irritative urinary symptoms were the main presenting complaints in our patients and the same findings of markedly higher PSA density and higher Gleason grade were noted. Using the suggested western PSA density value of 0.15 did not give any significant difference between surveillance and symptomatic groups, as the majority of cases had a PSA density >0.15. We decided to use PSA density value of 0.425 as the cut-off value, being as it was the median value from the all 216 cases. The surveillance group had 65% of cases with a value <0.425, while the symptomatic group had 46% of patients with values <0.425 (p 0.01). This may confirm the finding of Sheikh et al. [45] that in the Arabic population, a high PSA density value up to 0.32 may present benign disease.

Our study also confirms the pivotal role of DRE in the diagnosis of patients with prostate cancer as 77% of our cases had a suspicious finding during examination. It was clear that patients diagnosed with prostate cancer in Egypt, regardless of their mode of presentation and whether screened or not,

**Table 5.** Analytical analysis for asymptomatic and symptomatic cases

		Asymptomatic	Symptomatic	P value
Age (mean)		65.5 +8.3	67.6 +9	0.1
Age	<80	50	146	0.7
	>80	4	16	
DRE	No suspicion	21	28	0.002
	Suspicious	33	134	
Total PSA (mean)		31.6 +36	189 +620	0.06
Total PSA	<10	12	28	0.4
	≥10	42	134	
Prostate volume (mean)		65 +37	62 +32	0.5
PSA <sub>d</sub> (mean)		0.6 +0.8	4 +13	0.05
PSA <sub>d</sub>	<0.425	35 (65%)	75 (46%)	0.01
	>0.425	19 (35%)	87 (54%)	
PSA <sub>d</sub>	<0.15	8	19	0.6
	>0.15	46	143	
Gleason grade	<7	8	22	0.8
	>7	46	140	

tend to have a high serum total PSA, PSA density, abnormal findings on DRE and higher Gleason grade, reflecting the aggressive nature of prostate cancer in the Egyptian population (using the western definitions). A recent paper from Nigeria [46] showed that abnormal DRE can predict higher Gleason grades.

Our study shows that prostate cancer may not be a single disease throughout the world and racial, religious and life style conditions may be contributing factors that affect the nature and presentation of the disease. Applying western definitions would mean that nearly all of our cases already had a metastatic and advanced disease, while really

only 11% of them had metastatic deposits. Our reports confirm that Egyptian men with prostate cancer had higher PSA, PSA density and higher Gleason grade at initial diagnosis and tailored risk stratification may be needed to allow proper management for our cases.

## CONCLUSIONS

Egyptian men with prostate cancer have a markedly high PSA density and Gleason grade at diagnosis. Symptomatic patients have significantly higher PSA density values and higher incidence of abnormal DRE.

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