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Histopathological evaluation of prostate biopsy in-patient with Prostate cancer in Benghazi Medical Center in the period between 2020-2023.

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Original Research Article

Abstract

This descriptive, cross-sectional study was conducted at Benghazi Medical Center (BMC), Benghazi, Libya. Data were collected from the medical records of 81 patients diagnosed with prostate cancer who were admitted to the oncology department between January 2020 and December 2023. The aim of this study was to describe the demographic, clinical, and histopathological characteristics of prostate cancer patients.

Results: The mean age of the patients was 71.6 years, and 83% of cases occurred among those aged 71–80 years. Overall, 19.8% of patients were smokers. Nine patients (11.1%) had diabetes mellitus, one patient (1.2%) had hypertension, and approximately 84% reported no family history of prostate cancer. Histopathological examination revealed adenocarcinoma in different stages of differentiation, with acinar adenocarcinoma accounting for 95% of cases and ductal adenocarcinoma for 2.5%. Most adenocarcinoma cases presented as Grade I (44.4%), followed by Grades II and IV (17.3% each).

Conclusion: The study demonstrated that most cases occurred in older patients and were diagnosed at an early stage. Acinar adenocarcinoma was the predominant histopathological type, and the low rate of metastasis suggests a favorable prognosis.

Keywords: prostate cancer, adenocarcinoma, PSA, Libyan males, Benghazi, histopathology.

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INTRODUCTION

Prostate cancer is one of the most common malignancies among men, particularly those older than 50 years, and remains a leading cause of cancer-related mortality in industrialized countries (1). Its incidence and outcomes are influenced by a combination of hereditary, environmental, and sociocultural factors, which contribute to the variations observed across populations (2). Genetic predisposition is among the most important determinants of risk, with family history consistently identified as a significant predictor. Evidence from epidemiologic and twin studies confirms the substantial contribution of inherited traits to prostate cancer susceptibility (3). Mutational alterations in genes involved in androgen synthesis and metabolism further support the critical biological role of androgens in carcinogenesis (4,5).

Although some prostate tumors remain latent for years, progression to advanced or metastatic disease significantly increases morbidity and mortality. Understanding the molecular mechanisms underlying this transition is therefore crucial for guiding treatment and improving survival rates. Spondin 3 (RSPO3), previously associated with colorectal and lung cancers, has been proposed as a potential yet underexplored biomarker in prostate cancer (6).

The diagnostic process typically begins with abnormal prostate-specific antigen (PSA) results or suspicious findings on digital rectal examination, followed by histopathological confirmation through biopsy. Management strategies vary according to stage and may include active surveillance, surgery, radiotherapy, or hormonal therapy. In recurrent or advanced cases, androgen deprivation therapy (ADT), chemotherapy, and targeted agents are widely used, with combination regimens often achieving better outcomes (7).

Histologically, prostate adenocarcinoma is the most common type of malignancy, with acinar adenocarcinoma being the predominant subtype. Ductal adenocarcinoma, although less common, is more aggressive. Other rare forms include urothelial carcinoma of prostatic origin and squamous cell carcinoma, both associated with poorer prognoses (8). Accurate histological classification is essential for guiding treatment decisions. Staging relies on several prognostic indicators—including the Gleason grading system, TNM classification, PSA levels, and the Grade Group system—all of which play key roles in determining disease severity and therapeutic strategies (9). This study was aimed to describe the demographic, clinical, and histopathological characteristics of prostate cancer patients.

MATERIALS AND METHODS

This descriptive, cross-sectional study was conducted at Benghazi Medical Center (BMC), Benghazi, Libya. Data were collected from the medical records of 81 patients diagnosed with prostate cancer who were admitted to the oncology department between January 2020 and December 2023. The variables extracted included socio-demographic characteristics, medical history, smoking status, histopathological type, and prostate-specific antigen (PSA) levels.

STATISTICAL ANALYSIS

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Frequencies, percentages, and mean ± standard deviation (SD) were calculated. Fisher's exact test was used to assess statistical associations. A p-value < 0.05 was considered statistically significant. Figures were generated using Microsoft Excel 2010

RESULTS

During the study period, a total number of 81 cases of prostate cancer were found, patients' age was between 52 to 92 and the mean age was 71.6 years and the majority were between 71 and 80 years as shown in figure 1.

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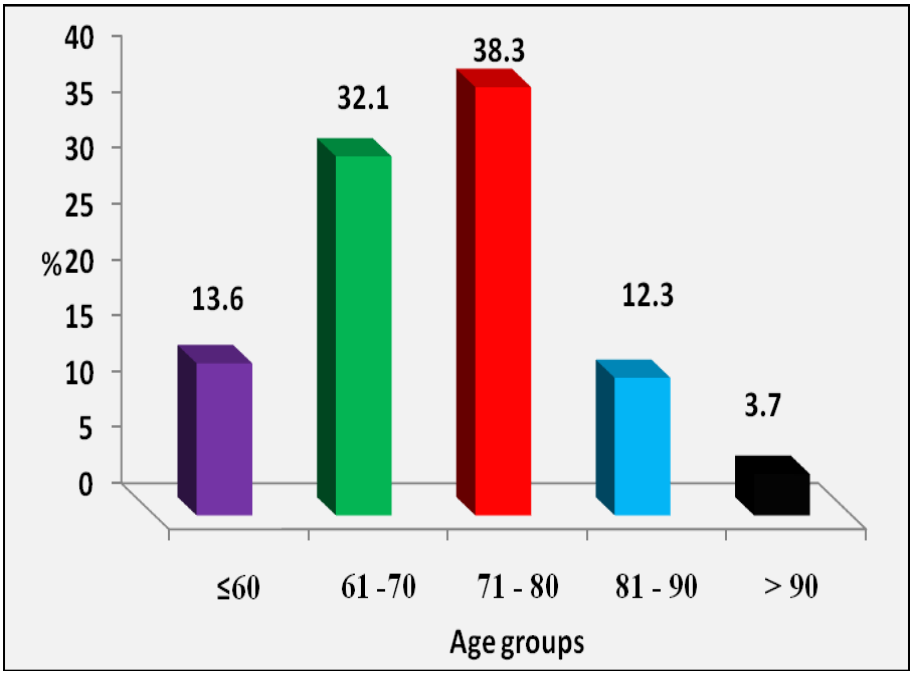

Figure 1. Distribution of patients according to age

As shown in Table 1, the majority of cases (n = 52, 64.2%) were from Benghazi, while 29 patients (35.8%) were from outside the city.

Table 1: Distribution of patients according to place of residence

Address	No.	%
Benghazi	52	64.2
Outside Benghazi	29	35.8
Total	81	100

Figure 2 shows that most prostate cancer patients were nonsmokers (n = 62, 80.2%). Among the patients, 11.1% had diabetes mellitus, 1.2% had hypertension, and 66.7% had both conditions. Additionally, 84% of the cases had no family history of prostate cancer.

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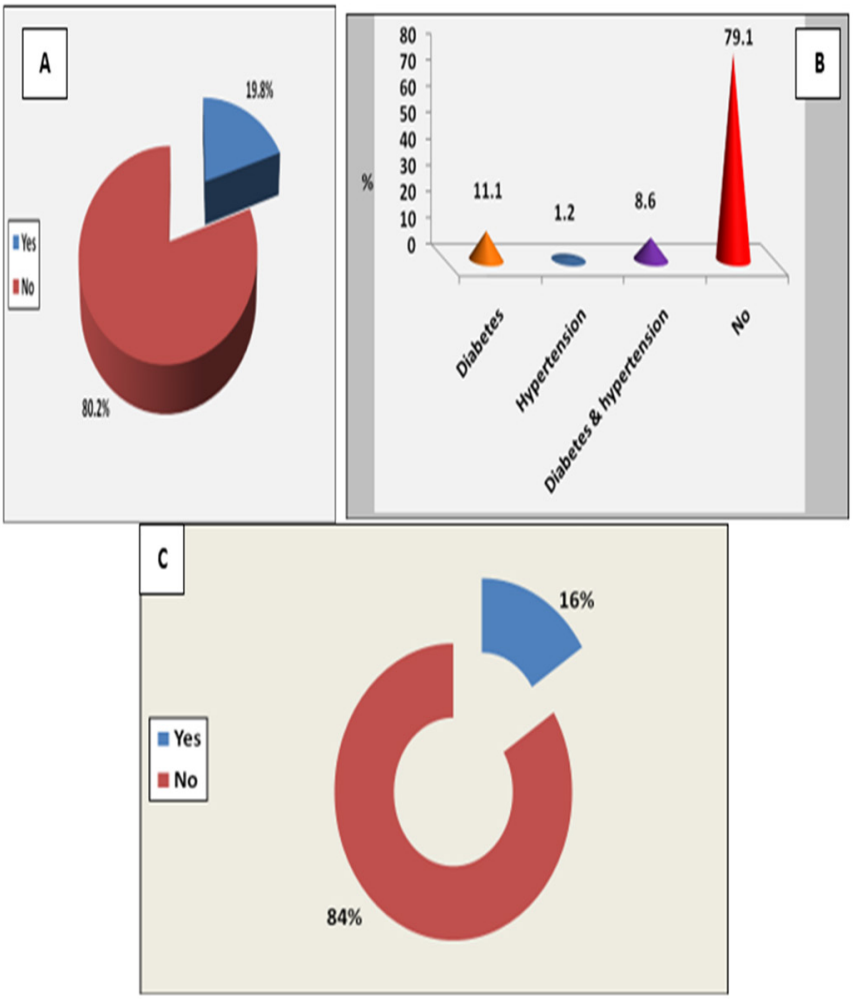

Figure 2. Distribution patients according to smoking status(A), medical history(B), and family history of prostate cancer(C)

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Table 2 shows that the majority of prostate cancer cases were acinar adenocarcinoma (n = 77, 95%), followed by ductal adenocarcinoma (n = 2, 2.5%). Another 2 cases (2.5%) had no recorded histopathological type.

Table 2. Distribution of patients according to the histopathological pattern of prostate cancer

Type of the tumor	No.	%
Acinar Adenocarcinoma	77	95
Ductal Adenocarcinoma	2	2.5
Not recorded	2	2.5
Total	81	100

Figure 3 illustrates the PSA levels at the time of initial presentation. Elevated PSA levels were observed in 29.6% of patients, while 23.5% had normal levels. In approximately 46.9% of the cases, PSA levels were not recorded.

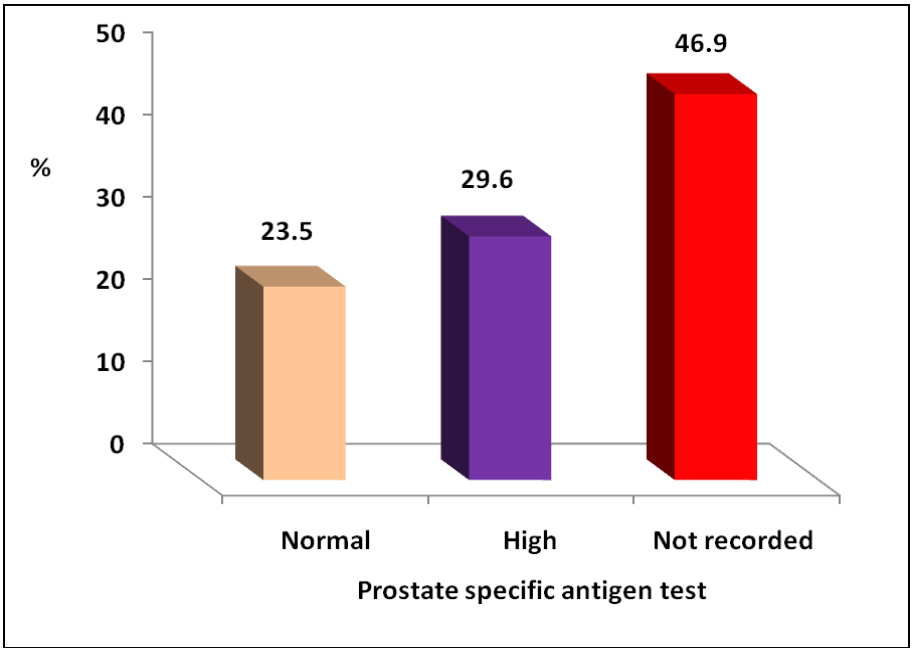

Figure 3. Distribution of patients according to PSA level

According to Gleason Score Grades, figure 4 shows that 36 patients (44.4%) had Grade I disease. Equal proportions of patients (17.3% each) were classified as Grade II and Grade IV, while 14.8% had Grade V.

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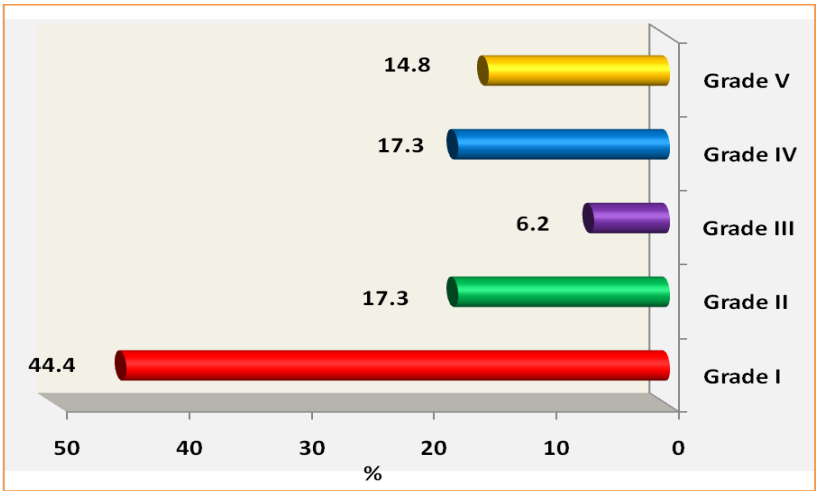

Figure 4. Distribution of patients according to the grade of the prostatic cancer

Figure 5 indicates that only 7 patients had metastatic disease.

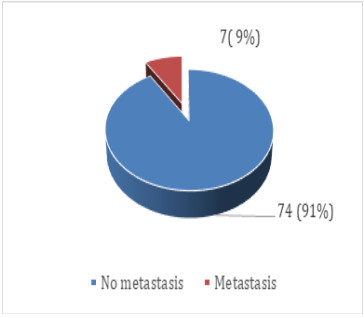

Figure 5: Distribution of the patients according to the disease metastasis.

DISCUSSION

Prostatic diseases—including inflammation, benign prostatic hyperplasia, and carcinoma—are major contributors to male morbidity and mortality. Both benign prostatic hyperplasia and prostate cancer become increasingly common with advancing age (10).

In the present study, 81 patients were included, with ages ranging from 52 to 92 years and a mean age of 71.6 years. Most patients were between 71 and 80 years old. This finding is consistent with a previous study in Benghazi (10), which reported a mean age of 73.1 ± 9.4 years (range 48–90 years), in another study in Benghazi most of the cases were aged 61–70 years (11). This reinforces age as non-modifiable risk factor within our population.

Geographical, environmental, and lifestyle factors play important roles in cancer development (12,13). In this study, most cases originated from Benghazi (64.2%). Although tobacco smoking is widely recognized as a significant risk factor—heavy smokers having a 24–30% higher risk of prostate cancer mortality than nonsmokers (14) 80.2% of the patients in this study were nonsmokers, contrasting with much of the existing literatures. The limited number of patients reporting smoking in our dataset may indicate inaccurate documentation or underreporting rather than the absence of an association.

Family history is another well-established risk factor (15). In this study, only 16% of patients reported a positive family history. The prevalence of diabetes and hypertension among the patients was consistent with previous study (16), which reported similar frequency.

Histopathological evaluation showed that acinar adenocarcinoma was the predominant subtype, in agreement with international classification systems that identify it as the most common prostate cancer subtype (8), followed by ductal adenocarcinoma. Gleason grading revealed that Grade I was the most

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common, followed by Grades II and IV. This is in agreement with a study from Pakistan (17), which also reported Grade I as the most frequent grade, but contrasts with previous findings from Benghazi (10), where Grade IV predominated. These differences may reflect variations in screening practices, patient presentation, or biopsy sampling. Notably, recent recommendations advocate adopting the Grade Group system proposed by Epstein et al. (2016) for improved prognostic accuracy, suggesting a need for standardized grading in future local research (9).

Elevated PSA levels typically reflect the disruption of normal prostate architecture (10). and levels above 20 ng/mL have been strongly correlated with adenocarcinoma (17,18). In this study, 29.6% of patients had elevated PSA values, although incomplete data limited a comprehensive interpretation. PSA is well established as an important diagnostic marker (18). Although PSA screening aims to reduce mortality through early detection, its long-term effect on death rates remains uncertain (19).

Metastasis at presentation occurred in only 8% of cases—significantly lower than the rate reported in other study (20). This comparatively low percentage may indicate improved screening strategies and more timely clinical management in this population.

CONCLUSION

This study found that prostate cancer is predominantly diagnosed among older men in Benghazi, with most cases identified at an early stage of the disease. Acinar adenocarcinoma was the most common histological subtype. The relatively low proportion of metastatic cases at presentation suggests favorable prognostic characteristics within this population.

RECOMMENDATIONS

To improve clinical outcomes, we recommend implementing structured prostate cancer screening programs in Libya, with particular emphasis on high-risk groups. Early detection and timely intervention could substantially reduce disease-related morbidity and mortality.

Multi-center research with standardized methodologies is recommended to establish a more accurate national representation of prostate cancer epidemiology and outcomes.

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Ethical Statement: This retrospective study was conducted using anonymized patient records from Benghazi Medical Center. No interventions were performed, and confidentiality was strictly maintained in accordance with institutional and international ethical guidelines.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest related to this study.

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