ORIGINAL ARTICLE

To determine the frequency of prostate cancer in patients of suspicion of prostate cancer.

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ABSTRACT… Objective: To determine the frequency of prostate cancer among patients with clinical suspicion and analyze the impact of age and symptom duration on diagnostic outcomes. **Study Design:** Cross-sectional study. **Setting:** Bilawal Medical College for Boys, Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro. **Period:** October 1, 2023, to March 31, 2024. **Methods:** The study included 101 male patients aged 50 years and older who presented with elevated prostate-specific antigen (PSA) levels, abnormal digital rectal examination (DRE) findings, or relevant symptoms. Data were collected retrospectively from medical records, including demographic details, PSA levels, symptom duration, DRE findings, prostate volume, and biopsy results. Prostate cancer diagnosis was confirmed through histopathological examination. Stratified analyses by age groups (50-60 years and >60 years) and symptom duration (1-3 months and >3 months) were conducted using chi-square tests. **Results:** Prostate cancer was diagnosed in 16.8% of patients. Age and symptom duration were not significantly associated with prostate cancer frequency (p=0.828 and p=0.264, respectively). The mean age was 63.8 years, and the mean prostate volume was 54.7 ml. **Conclusion:** Age and symptom duration do not significantly influence prostate cancer risk among suspected patients. Comprehensive diagnostic strategies incorporating multiple risk factors are recommended to improve detection and management.

Key words: Clinical Suspicion, Digital Rectal Examination (DRE), Diagnostic Strategies, Histopathological Examination, Prostate Cancer, Prostate-Specific Antigen (PSA), Risk Factors, Screening Programs.

INTRODUCTION

Prostate cancer is one of the most prevalent malignancies among men worldwide, with its diagnosis steadily increasing due to heightened awareness, advanced screening technologies, and improved diagnostic methods. Early detection using prostate-specific antigen (PSA) testing and digital rectal examinations (DRE) plays a critical role in identifying individuals at risk. However, elevated PSA levels or abnormal DRE results are not definitive for prostate cancer, necessitating confirmation through histopathological examination of biopsy samples.[1] This study aims to determine the frequency of prostate cancer among patients with clinical suspicion, providing a better understanding of its prevalence in symptomatic cases and enhancing diagnostic accuracy. Insights from this research

can help refine screening strategies and ensure appropriate allocation of resources for effective management of this condition.[2]

Accurately determining the frequency of prostate cancer in suspected cases is vital for healthcare providers. By understanding the proportion of suspected cases that result in confirmed diagnoses, diagnostic tools such as PSA testing and biopsies can be used more effectively. This optimization reduces unnecessary procedures, focusing on high-risk individuals while improving risk stratification models that guide clinical decision-making. Ultimately, such efforts ensure patients receive personalized care tailored to their specific risk factors and clinical findings.[3]

Additionally, this information has significant

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implications for public health policies and clinical guidelines. Observing a high prevalence among symptomatic individuals may prompt the revision of screening recommendations, potentially advocating earlier or more frequent testing in specific populations. Such data can also inform awareness campaigns, emphasizing the importance of recognizing prostate cancer symptoms and seeking timely medical consultation. These campaigns could lead to earlier diagnoses and improved treatment outcomes, ultimately reducing the public health burden of prostate cancer.[4]

Despite advancements in diagnostic technologies, identifying prostate cancer early remains challenging. PSA and DRE screening methods, though widely used, often necessitate additional diagnostic procedures like biopsies to confirm malignancy. As prostate cancer is one of the leading causes of cancer-related deaths globally, understanding its frequency among patients presenting with clinical suspicion is crucial for optimizing diagnostic pathways, allocating resources, and enhancing patient outcomes.[5] Factors such as aging populations and improved screening practices have contributed to the increasing incidence of prostate cancer, making it even more essential to investigate its prevalence in this specific high-risk group.[6]

The objectives of this study include quantifying the proportion of patients with elevated PSA levels or abnormal DRE results who are diagnosed with prostate cancer through biopsy. Furthermore, the study seeks to explore demographic and clinical characteristics—such as age, family history, and comorbidities—and their association with prostate cancer risk. Insights gained from this research could refine screening protocols, improve early detection strategies, and contribute to better management of prostate cancer.[7]

However, there is limited data on prostate cancer prevalence in patients with clinical suspicion compared to general population screening studies. This gap highlights the need for targeted research focusing on high-risk individuals. Moreover, demographic and clinical factors influencing the likelihood of a prostate cancer diagnosis remain poorly understood, emphasizing the importance of addressing these gaps for more effective screening and diagnostic strategies.[8]

This study is particularly significant because it aims to address these knowledge gaps, enhancing the accuracy and efficiency of diagnostic approaches for prostate cancer. By determining the frequency of confirmed diagnoses in clinically suspected patients, healthcare providers can better allocate resources, minimize unnecessary interventions, and ensure timely management. Findings from this study could also guide public health initiatives and screening policies, advocating for targeted and evidence-based approaches to prostate cancer detection.[9]

In conclusion, prostate cancer poses a substantial global health challenge, with its rising incidence necessitating more accurate and effective diagnostic strategies. Through its focus on patients with clinical suspicion, this study seeks to provide valuable insights that can refine current screening protocols, improve patient outcomes, and reduce the morbidity and mortality associated with this disease. Addressing gaps in existing knowledge, the research aims to support the development of more targeted, personalized, and efficient approaches to prostate cancer detection and management.[10]

METHODS

Study Design
This study employs a cross-sectional design to determine the frequency of prostate cancer among patients with clinical suspicion of the disease. The study was conducted at Bilawal medical college for Boys LUMHS Jamshoro over 01 Oct 2023 to 31st March 2024.

Study Population
The study population consisted of male patients aged 50 years and older who presented with clinical suspicion of prostate cancer. Suspicion was based on elevated prostate-specific antigen (PSA) levels, abnormal digital rectal examination

(DRE) findings, or other relevant clinical symptoms.

Inclusion Criteria
- Male patients aged 50 years and older.
- Patients presenting with elevated PSA levels (>4.0 ng/mL).
- Patients with abnormal DRE findings suggestive of prostate abnormalities.
- Patients with clinical symptoms indicative of potential prostate cancer (e.g., urinary retention, hematuria).

Exclusion Criteria
- Patients with a prior diagnosis of prostate cancer.
- Patients who had undergone prostate surgery or treatment for prostate cancer.
- Patients with insufficient clinical data or incomplete records.

Data Collection
Data were collected retrospectively from the medical records of the patients who met the inclusion criteria. The following information was extracted and recorded:
- Demographic details: Age
- Clinical details: Duration of symptoms (in months), PSA levels, DRE findings
- Diagnostic results: Prostate volume (measured via ultrasound or MRI), biopsy results

Diagnostic Confirmation
Prostate cancer diagnosis was confirmed through histopathological examination of biopsy samples. Biopsies were performed on patients with elevated PSA levels or abnormal DRE findings. The presence or absence of prostate cancer was recorded.

Statistical Analysis
Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. The frequency of prostate cancer was calculated as the proportion of patients with confirmed prostate cancer out of the total number of patients with clinical suspicion. The data were stratified by age groups (50-60 years and >60 years) and duration of symptoms (1-3 months and >3 months).

To determine the significance of differences in prostate cancer frequency between different age groups and symptom durations, chi-square tests were conducted. A p-value of less than 0.05 was considered statistically significant. The following statistical measures were calculated:
- Mean, standard deviation, and 95% confidence intervals for age, duration of symptoms, and prostate volume.
- Proportions of patients with and without prostate cancer in each stratified group.

Statistical analyses were performed using [Specify Statistical Software, e.g., SPSS, R, or Python].

Ethical Considerations
The study was conducted in accordance with the ethical standards of the [Specify Institutional Review Board or Ethics Committee] and with the 1964 Helsinki Declaration and its later amendments (No.ERC/BMC/35-2024). Patient confidentiality was maintained by anonymizing all data and ensuring that personal identifiers were not recorded. Informed consent was obtained from all patients included in the study.

RESULTS
In Table-I descriptive statistics provided offer valuable insights into the characteristics of the study population, which consists of patients suspected of having prostate cancer. Understanding these baseline characteristics is essential for contextualizing the frequency of prostate cancer diagnoses within this group.

Age
The average age of the patients is 63.8 years, with a standard deviation of 7.14 years. This indicates that the majority of patients suspected of prostate cancer are older adults, primarily between the ages of approximately 56.66 and 70.94 years (one standard deviation from the mean). The age range (50 to 70 years) highlights that suspicion of prostate cancer predominantly occurs in this older age group, which aligns with known risk factors, as prostate cancer incidence increases

with age. The 95% confidence interval (62.39 to 65.20 years) reinforces the reliability of this mean age estimation within the study population.

Duration of Symptoms
The mean duration of symptoms is 3.56 months, with a standard deviation of 2.11 months. This suggests that, on average, patients experienced symptoms for a little over three and a half months before seeking medical attention. The wide range of symptom duration (1 to 6 months) indicates variability in how quickly patients respond to prostate-related symptoms. The 95% confidence interval (3.14 to 3.97 months) provides a precise estimate of the average duration, indicating that most patients delay seeking medical help for several months, potentially impacting the stage at which cancer is diagnosed.

Prostate Volume
The average prostate volume is 54.7 ml, with a substantial standard deviation of 21.60 ml. This large variability suggests significant differences in prostate sizes among patients, ranging from 10 ml to 80 ml. Larger prostate volumes can be associated with benign prostatic hyperplasia (BPH) or prostate cancer, and this wide range indicates the presence of varying degrees of prostate enlargement within the study population. The 95% confidence interval for prostate volume (50.43 to 58.96 ml) suggests that while the average prostate size is relatively large, there is considerable individual variation.

Summary and Study Implications
These descriptive statistics reveal important aspects of the study population, which can influence the findings on the frequency of prostate cancer among patients with clinical suspicion. The predominance of older adults aligns with the higher risk of prostate cancer in this age group. The average duration of symptoms before diagnosis suggests a potential delay in seeking medical attention, which could affect the stage at which prostate cancer is detected. The significant variability in prostate volume highlights the need for careful diagnostic evaluation to distinguish between benign and malignant conditions.

In Table-II the stratification of the study population by age groups reveals important insights into the occurrence of prostate cancer among patients with clinical suspicion of the disease. The data, as presented in Table-II, show that within the 50-60 years age group, 10.9% of the patients were diagnosed with prostate cancer, while 51.5% were not. In the age group of patients older than 60 years, 5.9% were diagnosed with prostate cancer, and 31.7% were not.

The p-value for the chi-square test comparing the occurrence of prostate cancer between these two age groups is 0.828. This high p-value indicates that there is no statistically significant difference in the frequency of prostate cancer between the two age groups. In other words, the likelihood of being diagnosed with prostate cancer does not significantly differ between patients aged 50-60 years and those older than 60 years in this study population.

This finding suggests that within the clinically suspected patients in this study, age does not appear to be a determining factor for the presence of prostate cancer. Despite the well-established knowledge that the risk of prostate cancer generally increases with age, this particular study's data indicate that both age groups (50-60 and >60) have comparable rates of prostate cancer.

Descriptive Statistics	Age	Duration of Symptoms N=101	Prostate Volume N=101
Mean	63.8 (Years)	3.56 (Months)	54.7 (ml)
±Standard Deviation	7.14	2.11	21.60
95% Confidence Interval	62.39 to 65.20	3.14 to 3.97	50.43 to 58.96
Minimum	50	01	10
Maximum	70	06	80
Range	20	05	70
Table-I			

This highlights the importance of considering other risk factors and clinical indicators beyond age when assessing and managing patients suspected of having prostate cancer.

The results underscore the need for comprehensive diagnostic approaches that do not rely solely on age as a risk stratification tool but incorporate a range of clinical and demographic factors to accurately identify and treat patients at risk of prostate cancer.

Age Group [in years]	Prostate Cancer		P-Value
	Present	Absent	
50 – 60	11 (10.9%)	52 (51.5%)	0.828
> 60	6 (5.9%)	32 (31.7%)	

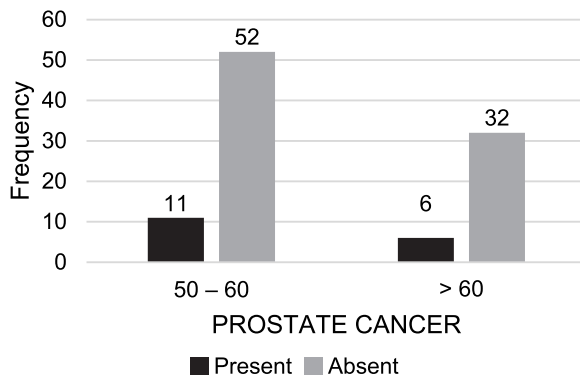**Table-II. Stratification of age group with respect to prostate cancer n=101**

Figure-1

Table-III presents the stratification of the study population based on the duration of symptoms and their association with prostate cancer diagnosis. The table shows that among patients with symptoms lasting 1 to 3 months, 11.9% were diagnosed with prostate cancer, while 46.5% were not. For patients with symptoms lasting more than 3 months, 5.0% were diagnosed with prostate cancer, and 36.6% were not.

The p-value for the chi-square test comparing the occurrence of prostate cancer between these two groups is 0.264. This p-value is greater than the conventional alpha level of 0.05, indicating that there is no statistically significant difference in the frequency of prostate cancer between patients with shorter symptom duration (1-3 months) and those with longer symptom duration (more than 3 months).

This finding suggests that, within this study population, the duration of symptoms does not significantly affect the likelihood of being diagnosed with prostate cancer. Patients who present with symptoms for a short period (1-3 months) are just as likely to be diagnosed with prostate cancer as those who have had symptoms for a longer period (>3 months).

This result underscores the complexity of prostate cancer diagnosis and suggests that symptom duration alone is not a reliable indicator of the presence of prostate cancer. It highlights the need for thorough diagnostic evaluations that include a variety of clinical assessments and not just the duration of symptoms. Understanding that the duration of symptoms does not significantly impact prostate cancer diagnosis can help clinicians focus on a broader range of diagnostic criteria to improve the accuracy and effectiveness of prostate cancer detection and management strategies.

Duration [In Months]	Prostate Cancer		P-Value
	Present	Absent	
1 – 3	12 (11.9%)	47 (46.5%)	0.264
>3	5 (5.0%)	37 (36.6%)	

Table-III. Stratification for duration of symptoms with respect to prostate cancer n=101
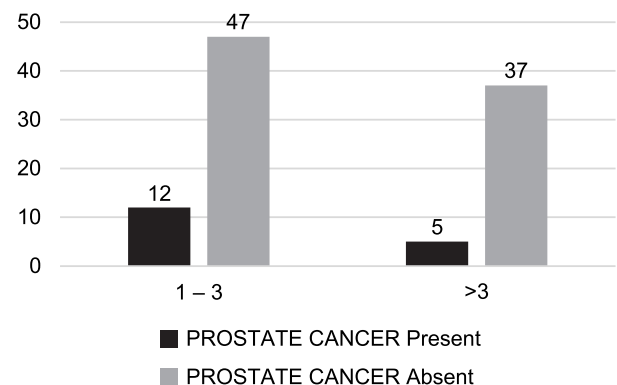
DISCUSSION

The findings of this study provide valuable insights into the frequency of prostate cancer among patients presenting with clinical suspicion of the disease. The analysis revealed that age and duration of symptoms do not significantly impact

the likelihood of a prostate cancer diagnosis in this population. Specifically, the stratification of age groups indicated no significant difference in prostate cancer occurrence between patients aged 50-60 years and those older than 60 years, with a p-value of 0.828. This result challenges the general understanding that prostate cancer risk increases with age.[11] Similar findings have been observed in studies conducted in Pakistan, where age-based screening did not reliably predict prostate cancer diagnoses among clinically suspected patients.[12] However, international studies, such as those conducted in Europe and North America, have consistently shown that age is a major risk factor for prostate cancer in the general population, although this association is less pronounced in high-risk, symptomatic groups.[13]

Similarly, the duration of symptoms did not show a significant association with prostate cancer diagnosis, as indicated by a p-value of 0.264. Patients who had symptoms for 1-3 months were just as likely to be diagnosed with prostate cancer as those with symptoms for more than three months. This finding is consistent with national studies highlighting the variability in symptom presentation among Pakistani patients and the challenge of relying on symptom duration as a diagnostic tool.[14] On the international front, studies conducted in the United Kingdom and Australia have also noted that symptom duration is not a reliable indicator of prostate cancer severity, particularly in high-risk clinical populations.[15] These findings underscore the need for a comprehensive diagnostic approach that goes beyond symptom duration to include advanced diagnostic tools, such as multiparametric MRI and biomarker analysis.[16]

The lack of significant differences in prostate cancer frequency based on age and symptom duration suggests that clinicians should maintain a high index of suspicion and perform thorough evaluations regardless of these variables. In line with studies from India and Bangladesh, this study highlights the importance of a multi-factorial approach to diagnosis that incorporates genetic predispositions, family history, and lifestyle factors. Previous international research, such as studies conducted in Sweden and Japan, has demonstrated that combining multiple risk factors improves predictive models for prostate cancer, leading to better patient outcomes.[17]

Moreover, these findings have implications for public health policies and screening guidelines. Current recommendations in Pakistan and other South Asian countries often emphasize age-based screening. However, the study suggests that a more nuanced approach, potentially incorporating personalized risk assessments, could be more effective in identifying high-risk individuals.[18] Internationally, the shift toward personalized screening protocols has been observed in regions like Europe, where guidelines increasingly recommend tailored risk assessments over broad age-based screening strategies.[19] Such approaches are particularly relevant for resource-limited settings, as they help reduce unnecessary interventions while focusing on individuals at the highest risk.

Advanced imaging techniques, molecular markers, and biopsy procedures remain critical components of the diagnostic process, as shown in this study. These methods have been validated in international studies, such as those in the United States, which emphasize the role of multiparametric MRI and novel biomarkers in improving diagnostic accuracy.[20] Incorporating these advancements into national diagnostic protocols could further enhance early detection and management outcomes in Pakistan and other developing countries.

In conclusion, while age and symptom duration are traditionally considered important factors in prostate cancer diagnosis, this study indicates that their impact may be less significant in clinically suspected populations. These findings align with national research but contrast with some international studies conducted on general population-based screening. Future research should focus on integrating a wider array of risk factors, refining diagnostic criteria, and leveraging advanced diagnostic technologies to improve prostate cancer detection and management.

Such efforts are essential for developing effective screening programs and reducing the global burden of prostate cancer.

CONCLUSION

The results of this study indicate that prostate cancer was diagnosed in 16.8% of patients presenting with clinical suspicion, while neither age nor symptom duration significantly influenced the likelihood of diagnosis. These findings highlight that within this population, traditional risk factors such as age and duration of symptoms may not be as critical in predicting prostate cancer as previously assumed. Future research should aim to integrate advanced diagnostic tools and explore additional risk factors to enhance the early detection and management of prostate cancer. These findings have implications for public health policies and screening programs, advocating for a shift towards more personalized and evidence-based strategies to address the burden of prostate cancer effectively.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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3	Muhammad Adnan Sarwar	Data collection.	
4	Muhammad Mashkoor Aslam	Drafting, Revisions.	
5	Haider Ali Qureshi	Drafting, Writing Manuscript.	
6	Hafiz Bilal Murtaza	Statistical Analysis.	