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# CURRENT STATUS OF HISTOPATHOLOGY GRADING OF PROSTATIC CARCINOMA AT THE TIME OF PRESENTATION IN A TERTIARY CARE HOSPITAL.

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**ABSTRACT**

**Introduction**: Prostate carcinoma is a common malignant tumor occurring in men. It ranges from a small indolent tumor to large aggressive malignancy with a high rate of mortality. Histopathology is the gold standard of diagnosing tumors and also plays a important role in determining treatment and prognosis.

**Aim:** To analyze the present scenario of the grade of prostate cancer at the time of histopathological diagnosis of prostate carcinoma at the time of histopathological diagnosis of carcinoma of prostate.

**Materials and Methods**: This retrospective study was done for duration of 1yr in a Tertiary Care Centre from Jan 2023 to Dec 2023. 31 patients with confirmed diagnosis of prostate carcinoma were selected. The patients aged in the range of 53-86yrs and the specimen obtained was from excision in 25 cases

and in remaining 6 cases it was from core needle biopsy. The cases obtained were grouped according to Gleason grade group.

**Results**: In the current study 9.67% were 51-60yrs, 38.70% were 61-70yrs, 48.38% were 71-80yrs, 3.22% in 81-90yrs. Specimen obtained by excision was 80.64% and 19.34% were core needle biopsies. Gleason grading showed 0% from Grade 1, 22.58% from Grade 2, Grade 3 each, 38.70% from Grade 4 and 16.12% from grade 5. Gleason grade group score of ≤6 was not seen, 45.16% cases score 7, 38.70% score 8, 16.12% score 9 was obtained.

**Conclusion**: Histopathological evaluation still remains the gold standard used for accurate prompt detection of prostate carcinomas. Use of newer reliable technologies may be essential for prompt and early detection of prostate carcinomas.

**Keywords:** Gleason grading, Gleason scoring, Prostate Adenocarcinomas

## Introduction

Prostate cancer is the second most common malignancy worldwide in men and the 5th leading cause of death in men.[1,2] In India, following lung and oral cavity, prostate is the third most common site for cancer.[3] According to latest report, prostate carcinoma accounts for 14.2% of new cancer in men. Prostate carcinoma is seen more commonly in developed countries than in developing countries like India. However current research shows that the rate of incidence is increasing in Asian countries.[4] Incidence of prostate malignancy is increasing in India by 1% every year.[5] The higher incidence of prostate cancer may be attributed to either a genuine increase in disease occurrence or to more frequent screening tests being conducted in asymptomatic men. The associated risk factors of prostrate carcinoma are advance aged black men and a positive family history. Testosterone hormone is required for the normal functioning of prostate gland and mutation in the androgen receptors AR gene leads to prostate carcinoma. Mutations of p53, DNA repair genes like BRCA1 and BRCA2 in normal peripheral basal cells of prostate glandular leads to prostate carcinoma. Adenocarcinoma arises from the glandular part of the prostate gland.[6]

Prostate adenocarcinoma ranges from a small indolent tumour to large aggressive life threatening tumours. Thus early evaluation of prostate adenocarcinoma is essential to establish its presence of tumour, local and distant cancer extension through AJCC TNM staging system to assess its aggressiveness.[7]

Transrectal ultrasound guided prostate biopsy TRUS is the gold standard to confirm the diagnosis in all cases.[8] All biopsies obtained are assessed using Gleason grading system which has been incorporated into the WHO classification of prostate carcinoma and is one of the key factors in determining treatment.[9] Prostate adenocarcinoma are most lethal when metastasis occurs to bone. The Gleason

score is the primary initial histological assessment tool used to grade prostate malignancies and has proven to have significant prognostic value.

This present study was aimed at analysing the present scenario of the grade of prostate cancer at the time of histopathological diagnosis of prostate carcinoma at the time of histopathological diagnosis of carcinoma of prostate.

**Material and methods**

The current study was a single centre, retrospective study conducted on 31 patients with prostate carcinoma in a tertiary care hospital for a span of one year from Jan 2023 to Dec 2023. The study was approved by the Institutional Ethical Committee and strictly adhered to global and local ethical norms. All the participants of the study were informed about the study and written consent letter was obtained. The specimens obtained from core needle biopsy or TRUS were subjected to routine processing. The paraffin embedded tissue blocks of specimens of prostate carcinoma obtained were selected along with details of demographic data and presence or absence of clinical findings. The histopathology grading of prostate carcinoma was divided into 5 groups based on Gleason grading system of prostate carcinoma (Grade I-Grade V) and scoring system was done by using Gleason Grade group. Both grading system and scoring system was assessed by an independent General Pathologist. The values obtained were entered numerically in excel sheets and expressed as percentile.

The details of age, gender, method of obtaining specimen, Gleason grading and the scoring by Gleason Grade group was tabulated and the values were expressed as percentage.

**Results**

The current retrospective study was conducted on a total of 31 confirmed cases of prostate adenocarcinoma. All participants were in the age range of 53-86yrs of which 3 (9.67%) patient were in age range of 51-60yrs, 12 (38.70%) were 61-70yrs range, 15 (48.38%) were 71-80yrs range and only 1 (3.22%) was in 81-90yr age range. (Table 1, Chart 1).

**Table 1 showing age distribution of prostate carcinoma in the study**

| Age range | Total no of cases (31) | Percentage |
|---|---|---|
| 51-60 | 03 | 9.67% |
| 61-70 | 12 | 38.70% |
| 71-80 | 15 | 48.38% |
| 81-90 | 01 | 3.22% |

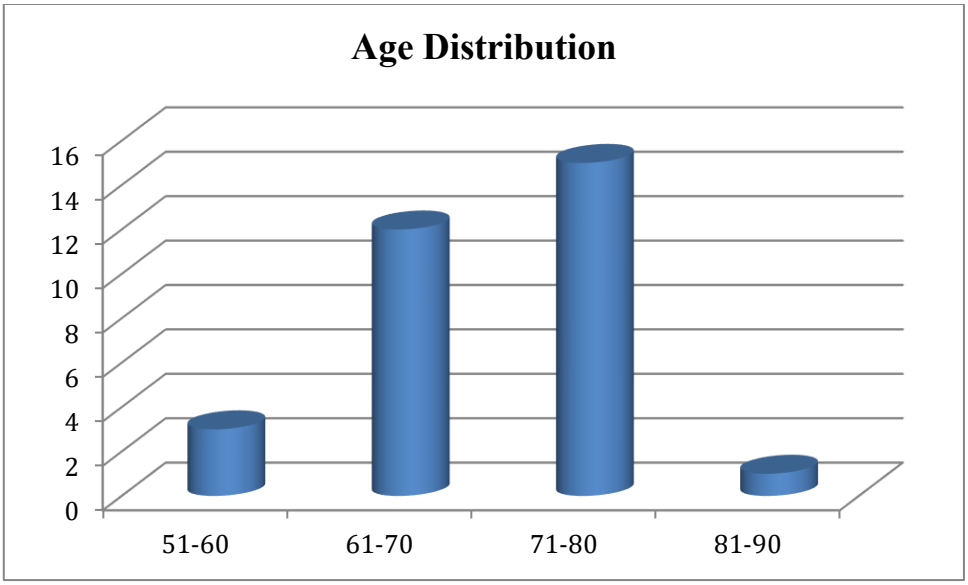


**Chart 1 Bar graph showing age distribution**

Out of 31 cases, the specimen in 25 cases was obtained by excision and the remaining 6 were obtained by core needle biopsy. (Chart 2)

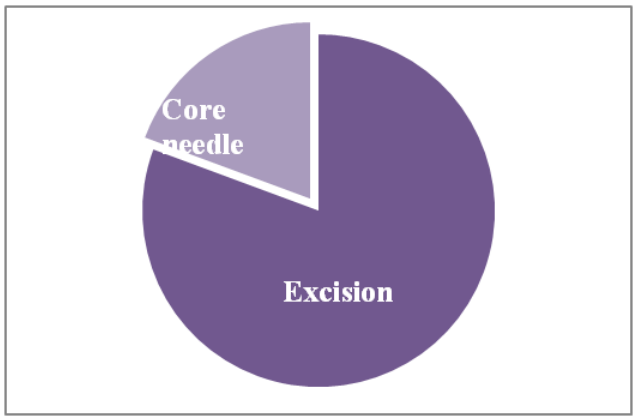


**Chart 2 Pie graph showing needle biopsies and excision biopsies in the study**

Out of the 31 cases in the current study, none of the cases were grade 1, 7cases (22.58%) were of grade 2, 7cases (22.58%) were of grade 3, 12cases (38.70%) were of Grade 4 and 5cases (16.12%) were grade 5. (Table 2; Chart 3)

**Table 2 showing distribution of Gleason grade in the study**

| | Total no of cases (31) | Percentage (%) |
|---|---|---|
| Grade 1 | 00 | 00 |
| Grade 2 | 07 | 22.58 |
| Grade 3 | 07 | 22.58 |
| Grade 4 | 12 | 38.70 |
| Grade 5 | 05 | 16.12 |

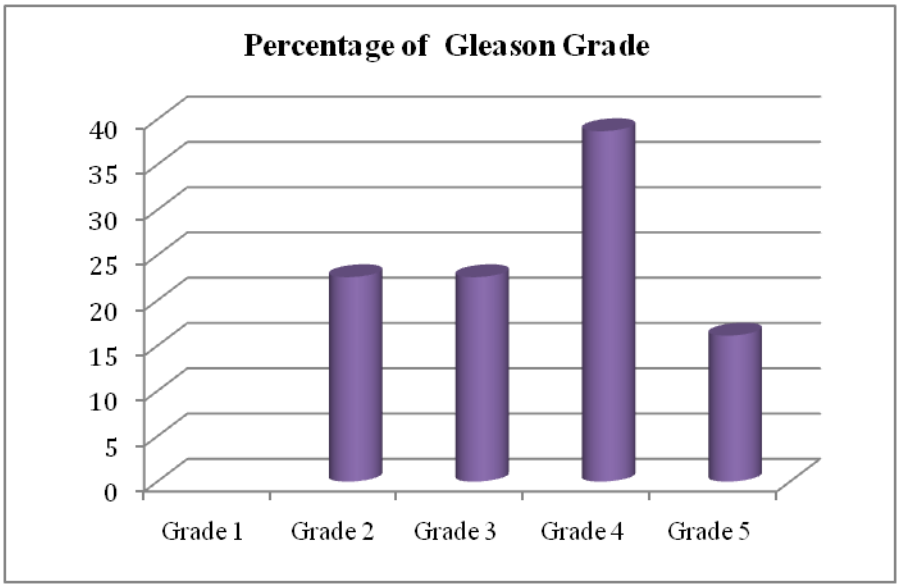


**Chart 3 Bar graph showing distribution of Gleason Grade in the study**

Gleason score of ≤6 was not obtained in any case, score of 7 was obtained in 14cases (45.16%), score of 8 was obtained in 12cases (38.70%) and score of 9 was obtained in 5cases (16.12%). (Table 3; Chart 4)

**Table 3 showing distribution of Gleason Grade group score in the study**

| | **Total no of cases (31)** | **Percentage (%)** |
|---|---|---|
| Score 7 | 14 | 45.16 |
| Score 8 | 12 | 38.70 |
| Score 9 | 05 | 16.12 |

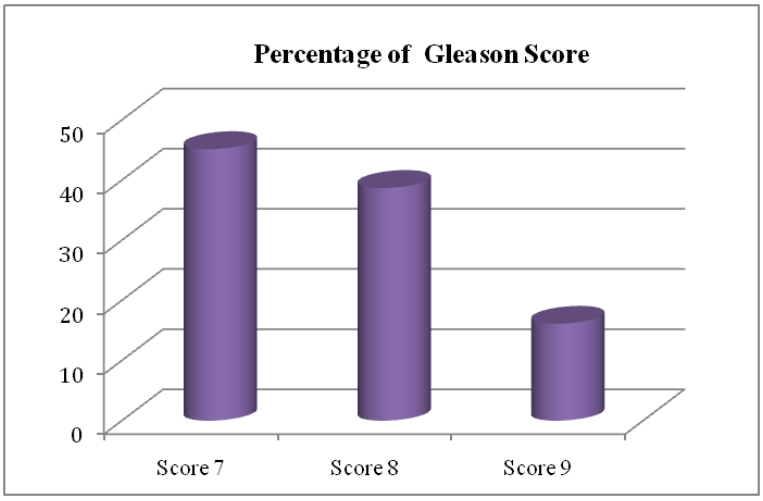


**Chart 4 Bar graph showing distribution of Gleason Grade group score in the study**

Based on our study, the current trend in histopathological presentation of the Carcinoma Prostate in a Tertiary care hospital in South India is shown in Fig 1.

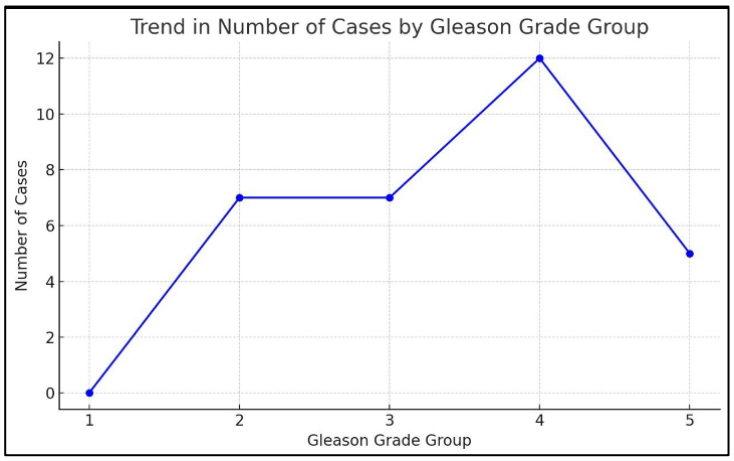


**Fig 1 showing histopathological presentation of prostate carcinoma in the study**

## DISCUSSION

The word "prostate" originated from *prostates*, a Greek word that means "to stand before" (urinary bladder). The prostate gland was first described by the Greek anatomist and Father of Anatomy, *Herophilus* of Alexandria as a glandular structure termed glandular assistants.[10] The prostate gland is located in the male pelvis at the base of the penis and produces 25-30% of the semen which nourishes the sperm and provides alkalinity maintaining high pH.[11] The prostate gland requires androgen (testosterone) to function optimally. Hormonal therapies, such as testosterone deprivation, are effective in treating prostate cancer, though castration-resistant tumours may produce their own intracellular androgens.[12] North America, Europe and Australia exhibit higher incidence rates of prostate cancer, compared to Asia and Africa.[13] The role of diet, nutrition, height, weight, hypertension, sedentary lifestyle, exposure to chemicals, pesticides, smoking, and alcohol in causation of prostate carcinoma is lacking.[14] Prostate cancer is most commonly found in the peripheral zone of the prostate, which is the area that can be palpated during a digital rectal examination.[15] Prostate cancer commonly metastasizes to the bones and lymph nodes. Metastases to the bone are believed to be partially due to the prostatic venous plexus draining into the vertebral veins.[16]

Traditionally prostate carcinomas are diagnosed by direct rectal examination, laboratory investigations, radiological examination and histopathological examination.[8] Of these various methods histopathological diagnosis and grading plays a crucial role in treatment and management of prostate carcinoma. The Gleason grading system is named after Dr Donald Gleason (1960) who graded prostate adenocarcinoma based on its histological growth patterns and degree of cell differentiation. WHO endorsed Gleason grading system in 2004 as a key factor in treatment decision. Gleason grading system consists of 5 grades (Grade 1 to 5) based on its architectural pattern rather than cellular features and is associated with increasing tumour aggressiveness and decreasing tumour differentiation. The Gleason

score is a sum of first predominant and second dominant tumour architecture and is scored from 1-10, however score 2-5 is rarely used thus score 6 is the lowest possible grade and ranges from score 6-10. In cases where only one grade exists then the score is calculated by doubling it. A Gleason score of <6 indicates an indolent prostate carcinoma and a score of ≥8 is associated with poorly differentiated tumours with worse prognosis.[17,18]

In 2014 International Society of Urologic Pathology ISUP recommended changes to the Gleason Grading system as Grade I- Gleason score of ≤ 6; Grade II- score of 7 (3+4); Grade III- Score of 7 (4+3); Grade IV- score of 8 (4+4) and Grade 5- all Gleason score of 9 and 10. Even after all these modifications, there is a lack in early diagnosis and management of carcinoma of the prostate which necessitates further research in this regard.

This current study was conducted to analyze the present scenario of the grade of prostate cancer at the time of histopathological diagnosis of prostate adenocarcinoma.

In this retrospective study we noted that the participants were in the age range of 53-86yrs and majority of cases were seen in the age range of 71-80yrs. It is generally noted that the incidence rate of prostate carcinoma increased with increasing age and in men over the age of 65yrs nearly 60% of times.[19] Prostate carcinoma is seen 40 times more in black men of African America origin and is thought to be due to their genetic constitution suggesting the role of environmental factors in etiology.[20] We have to consider the reluctance of this age group to undergo the physical examination of the prostate or to use the diagnostic modalities available, due to social and financial stigma. So we need to consider about the community awareness programs.

Majority of the specimens obtained in prostate carcinoma were from excision and remaining were obtained from core needle biopsies and was similar to the findings of Kaur J et al 2012 who received a higher number of excision chips of total prostate specimens than needle biopsies.[21] However, findings of our study contrasted with findings of Ekta Rani 2023 who found more number of needle biopsies than excision biopsy.[18] Excision specimens have multifocal tumors and every dominant nodule must be assigned a separate score. Whereas on needle biopsy the highest Gleason pattern added may not represent the tumor behaviour accurately. Hence grading system is more accurate on excision specimens than needle biopsies.[22]

Majority of the cases seen in the current study were of Grade 4 followed by Grade 2 and 3 respectively according to Gleason grading system and none belonged to Grade 1. This indicates the inadequacy of effective early diagnosis of prostate carcinoma. It is very important to differentiate between grade 3 and grade 4 as grade 3 falls under low risk category whereas grade 4 is high risk. It plays a crucial role in determining the treatment and prognosis as recurrences and adverse pathology is associated with Grade 4.[23] Muhammed U et al in their study also found Grade 4 as the predominant grade of prostate carcinoma.[24] Gleason grading system has limitations like inter observer variability among pathologist,

potential misinterpretation of low grade grades and under grading of prostate carcinoma by patients and clinicians.[25] Thus the ISUP conference in 2005 recommended each dominant tumor nodule should be given a Gleason Score which predicts tumor progression accurately. The new grading system is simple, reflects prostate cancer biology, improves reproducibility and also reduces the possibility of overtreatment of indolent cancer. The WHO recommends the using of new grading system in conjunction with Gleason score. This becomes more important when separate nodules have significantly different Gleason grades.

The Gleason grade group score is obtained by adding up the first dominant and the second dominant tumor architecture to obtain a final score (score 2–10). Scoring of 2-5 is rarely used and score 6 correlates with Grade 1 and is the lowest possible score.

The Gleason score seen in majority of the cases the current study was 7 and was similar to the finding of our study by Ekta Rani 2023. This finding contrasted to the findings of Lima NG et al 2013 and Abubakar et al 2018 where the most frequent Gleason score was 6 (3 + 3) with Gleason Grade 1.[18,26,27]

The study by Vijay Kumar et al 2025 demonstrated the growing burden of Prostate Cancer in India, highlighting the need for advanced diagnostic practices, screening guidelines, and targeted public health interventions.[28]

Recent study on "Dilemma of Misclassification Rates in Senior Patients With Prostate Cancer" demonstrated the need of future prospective studies to further optimize Carcinoma Prostate workflow and diagnostics, such as modern imaging, molecular profiling and to implement these into biopsy strategies to identify true burden of Carcinoma Prostate.[29]

Based on our study, we recommend further studies regarding the awareness and early diagnosis of adenocarcinoma of the prostate. The limitations of the current study are the smaller sample size and lack of comparison of Gleason grading and scoring with clinical parameters, evaluation by single pathologist, PSA levels metastasis, prognosis, survival etc.

**Conclusion**

Malignant diseases like prostate adenocarcinoma can be regarded as the first and foremost public health-care issue, which impose a dramatic clinical burden, disrupt social standards, and erode a huge amount of economic resources. A global strategy shall then be designed, based on major investments for screening and treating patients, better funding for promoting the scientific research against cancer, and collaborative efforts to make cancer care more efficient and sustainable. The collaborative use of clinical features, combined with the size of the prostate, prostate-specific antigen levels, and histopathological features helps in making an accurate and early diagnosis of the patients. Newer technologies hold great promise for revolutionizing cancer care and there is a great need for newer biomarkers for screening prostate carcinomas.

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