

ORIGINAL ARTICLE

THE FREQUENCY OF TESTICULAR LESION IN A
TERTIARY CARE CENTERPrih Bashir^{1*}, Noshaba Rahat², Humera Shahzad³, Asma Jalbani¹, Farhana Zulfiqar⁴, Bhawani Shankar⁵

ABSTRACT

Objective: Testis is affected by both neoplastic and non-neoplastic lesions. Most commonly, patients present with scrotal swelling and pain. The objective of our research was to assess each testicular lesion's histopathology.

Methods: This study was conducted in Pathology Department, Basic Medical Sciences Institute of Jinnah Postgraduate Medical Centre Karachi during the period of 2016 to 2021. All testicular tissues received for histopathological evaluation were included in this study. The demographic data was taken directly from a surgical proforma. Findings from the research were analyzed statistically and presented in simple percentages.

Results: Total of 145 testicular tissues were obtained between 2016 and 2021. Of the 145 biopsies, 128 (88.2%) had non-neoplastic testicular lesions, with a mean age of 16.2 years; the remaining 17(11.7%) had neoplastic lesions, which primarily affected people with a mean age of 25 years. Among non-neoplastic lesion testicular torsion 35(24.1%) were the most common followed by testicular abscess 34(23.4%). In neoplastic lesion, seminoma 7(4.8%) were most frequent followed by mixed germ cell tumor 5(3.4%).

Conclusion: Overall, our results show that the prevalence of testicular non-neoplasms is higher than that of testicular neoplasms. In particular, seminoma was the most commonly detected neoplastic lesion and testicular torsion emerged as the most common non-neoplastic disease.

Keywords: Testicular lesion; pathology; neoplastic lesions; biopsies

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INTRODUCTION

From pediatric to adult populations, there are various types of testicular lesions. They typically present

with scrotal pain, swelling or a mass in the abdomen. A variety of conditions can affect the testis, both non-neoplastic and neoplastic in nature. Testicular atrophy, testicular torsion, cryptorchidism, tuberculosis, epidermoid cysts, infertility, malakoplakia and vasculitis are non-neoplastic causes [1]. The undescended testis, referred to as cryptorchidism, is one of the most common congenital abnormalities affecting boys, and a known risk factor for testicular cancer [2]. Testicular torsion is a severe surgical emergency that typically affects adolescents between the ages of 12 and 16 [3]. Additionally, it affects fertility and hormonal function of the testis in the future as it is the most common cause of testicular atrophy in children [4]. Among the extra pulmonary tuberculosis forms, urogenital tuberculosis is the most common. Due to the non-specific nature of the symptoms, genital organ

involvement presents a diagnostic challenge [5]. The incidence of cancer has risen over the past two decades in Western countries, where men between the ages of 14 and 44 are most likely to develop the disease. Testicular cancer is influenced by both genetic and environmental factors, with cryptorchidism being the most common risk factor [6]. An estimated 8,850 new cases of testicular cancer were diagnosed in 2017 in the United States, and 410 deaths were reported. Overall, 97% of patients survive five years with effective treatment. In addition to undescended testis (cryptorchidism), personal or family histories of testicular cancer, age, ethnicity, and infertility all contribute to the risk of testicular cancer [7]. There is only a limited amount of local literature available. Therefore, the objective of this study was to assess the histopathological aspects of neoplastic and non-neoplastic diseases of the testis.

This study aimed to determine the frequency of testicular lesions, encompassing both neoplastic and non-neoplastic types, characterizing the histopathological spectrum of these lesions and assessing the age-wise distribution of testicular lesions.

METHODOLOGY

The study was conducted between 2016 and 2021 as a retrospective analysis at the Pathology Department of Jinnah Postgraduate Medical Centre (JPMC), Karachi, under the Basic Medical Sciences Institute. It involved the review of all testicular tissue specimens submitted for histopathological evaluation during this period. The specimens were collected from patients who underwent surgical procedures, and their corresponding demographic and clinical data were documented using a standardized surgical proforma.

Following established laboratory protocols, the testicular specimens were preserved in 10% formalin to ensure tissue fixation. The biopsy samples were then processed using standard techniques and embedded in paraffin blocks. Thin sections, measuring 3-4 μm , were cut from the paraffin-embedded tissues and subsequently stained with hematoxylin and eosin (H&E), a routine method for

histopathological examination.

Two experienced pathologists independently examined the stained sections under a light microscope to assess the histopathological features of the specimens. Any discrepancies in the findings were resolved through consensus. The relevant demographic data, including patient age and clinical history, were extracted from the surgical proforma to aid in the analysis.

The findings from the histopathological evaluation, as well as the demographic information, were analyzed statistically. The results were presented in simple percentages to provide a clear summary of the data and trends observed during the study period. Ethical approval of the study was obtained from Institutional Review Board of Jinnah Postgraduate Medical Center-Karachi.

RESULTS

One hundred forty five testicular lesions were analyzed, of which 128 (88.2%) were non-neoplastic, and 17 (11.7%) were neoplastic.

The most common non-neoplastic lesion was testicular torsion, accounting for 35 cases (24.1%), with a mean age of 11 years. This was followed by testicular abscess with 34 cases (23.4%), having a mean age of 15 years, and testicular atrophy, seen in 33 cases (22.7%), with a mean age of 14 years. Less frequent non-neoplastic conditions included chronic granulomatous orchitis (10 cases, 6.8%, mean age 17 years), acute necrotizing inflammation and acute degenerative orchitis (each with 7 cases, 4.8%, and mean ages of 22 and 12 years, respectively). Rare conditions like varicocele and hydrocele were each reported in only 1 case (0.6%), with mean ages of 21 and 18 years, respectively. The overall mean age for non-neoplastic lesions was 16.2 years.

Among the neoplastic lesions, seminoma was the most common, with 7 cases (4.8%), and a mean age of 21 years. Mixed germ cell tumors accounted for 5 cases (3.4%), with a mean age of 23 years, and

other germ cell tumors were seen in 4 cases (2.7%), with a mean age of 25 years. A single case of Hodgkin lymphoma was reported (0.6%), with a mean age of 31 years. The overall mean age for neoplastic lesions was 25 years.

The histopathological features of various testicular conditions are demonstrated in Figure 1. Figure 1a displays a photomicrograph of seminoma (Hematoxylin and Eosin [HE] stain, X40), revealing a diffuse, sheet-like arrangement of glycogen-rich,

uniform cells. Figure 1b shows a photomicrograph of a testicular abscess (HE stain, X10), characterized by distorted and necrotic testicular tissue with a significant infiltration of neutrophils. Figure 1c illustrates chronic granulomatous inflammation (HE stain, X40), highlighting the presence of granulomas and multinucleated giant cells. Figure 1d depicts Hodgkin lymphoma (HE stain, X40), showing a diffuse infiltration of lymphocytes within the seminiferous parenchyma.

Table-1: Distribution of non-neoplastic & neoplastic diseases and their mean age

Non neoplastic lesion	Number (%)	Mean Age
Testicular Torsion	35 (24.1)	11
Testicular Abscess	34 (23.4)	15
Testicular Atrophy	33 (22.7)	14
Chronic Granulomatous Orchitis	10 (6.8)	17
Acute Necrotizing Inflammation	7 (4.8)	22
Acute Degenerative Orchitis	7 (4.8)	12
Varicocele	1 (0.6)	21
Hydrocele	1 (0.6)	18
Total	128 (88.2)	16.2
Neoplastic lesion		
Seminoma	7 (4.8)	21
Mixed Germ cell tumor	5 (3.4)	23
Other germ Cell tumor	4 (2.7)	25
Hodgkin Lymphoma	1 (0.6)	31
Total	17 (11.7)	25

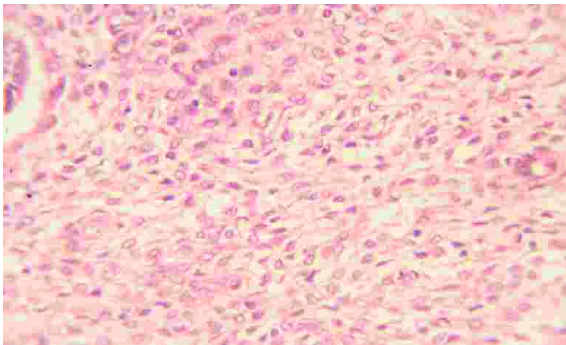


Figure 1a: Photomicrograph of seminoma (HE stain, X40) showing diffuse sheet like Pattern of glycogen-rich uniform cells.

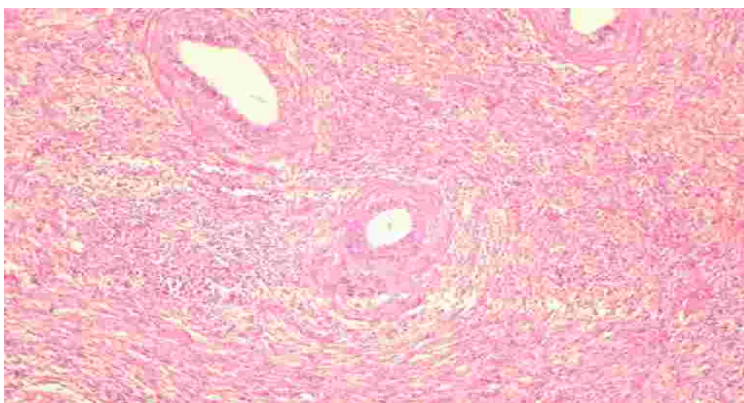


Figure 1b: Photomicrograph of testicular abscess (HE stain, X10) showing distorted and necrotic testicular tissue with abundant neutrophils.

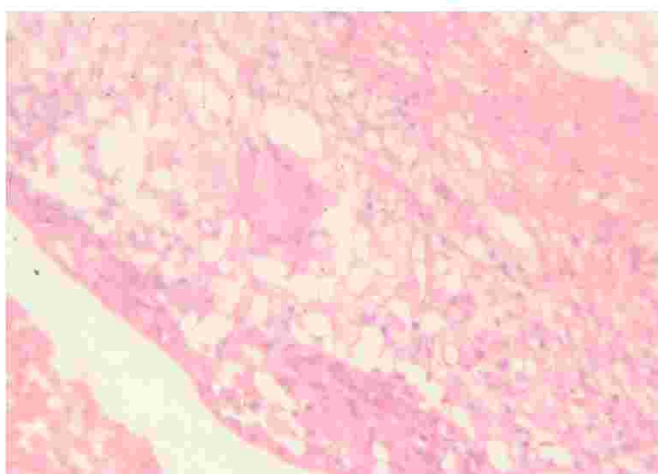


Figure 1c: Photomicrograph of chronic granulomatous inflammation (HE stain, X40) showing granuloma and multinucleated giant cells

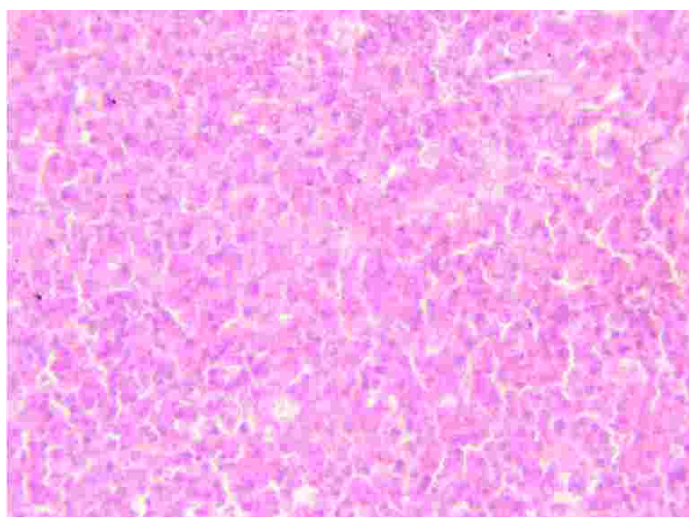


Figure 1d: Photomicrograph of Hodgkin lymphoma (HE stain, X40) showing diffuse pattern of lymphocytes infiltrating the seminiferous parenchyma.

DISCUSSION

There were total 145 testicular biopsies received during the period of 2016 to 2021. This is higher than other studies [1, 8,9]. Among the testicular biopsies performed in our study, 128 (88.3) were non-neoplastic, while 17 (11.7) were neoplastic, this is consistent with the findings of sharma et al. and qazi et al. [8, 9].

In our study, the majority of non-neoplastic testicular lesions were identified at a mean age of 29.4 years, indicating that most cases occurred in relatively young adult males. This result is slightly higher than what was reported by Qazi et al., who found the mean age for non-neoplastic testicular lesions to be 24.7 years. The difference between these findings could be attributed to variations in study populations, geographical factors, or sample sizes. Non-neoplastic lesions typically include conditions such as orchitis, hydrocele, and varicocele, which tend to occur in younger individuals but can present at different ages depending on lifestyle, infections, or underlying conditions.

In terms of neoplastic lesions, the mean age in our study was 26 years, which is consistent with the findings of Chalya et al. (2014), who reported a mean age of 28 years [10]. This suggests that testicular tumors often manifest in young adults, a demographic that are considered high-risk for conditions such as testicular germ cell tumors, the most common type of testicular cancer. Early identification in this age group is critical, as prompt diagnosis and treatment can significantly improve outcomes.

The close similarity in mean ages between our study and the findings of Chalya et al. supports the notion that testicular neoplasms, while rare, tend to affect younger individuals, typically in their late twenties. This emphasizes the importance of public health awareness and early screening for testicular abnormalities in this population, which can often be overlooked due to the general perception that testicular cancers are uncommon.

Testicular torsion 35 (27.5%) was the most frequent

lesion among non-neoplastic testicular biopsies, and this finding is consistent with a research by Reddy et al. 2016 [1]. Among children and adolescent, testicular torsion is a common cause of "acute scrotum." When ischemia persists, it may cause acute testicular damage, which requires emergency surgical intervention [11]. In present study testicular abscess was found 34 (26.8%) while Testicular atrophy in 33 (25.7%), reddy et al found 19.76% testicular abscess and 19.8% testicular atrophy [1]. Possibly, this variation is due to the shorter duration of the latter study.

In our study, chronic granulomatous orchitis was observed in 7 individuals, accounting for 5.4% of the cases. This incidence is slightly higher than what has been reported in previous studies, where the prevalence was recorded as 3.5%, 3.77%, and 3.77% respectively [1, 8, 9]. Chronic granulomatous orchitis is a relatively uncommon form of testicular inflammation, typically characterized by the presence of granulomas, which are clusters of immune cells, often in response to infection or inflammation.

In addition to this, our study identified acute necrotizing inflammation and acute degenerative orchitis in another 7 individuals (also 5.4%). These forms of orchitis are marked by severe inflammation and tissue destruction, often requiring immediate medical attention to prevent further complications. Interestingly, we also found single cases (representing 0.7% each) of varicocele and hydrocele. Varicocele, an enlargement of the veins within the scrotum, and hydrocele, the accumulation of fluid around the testicle, are less frequent findings in our cohort but are important to document as they can contribute to scrotal swelling and discomfort.

Out of the 17 neoplastic testicular disorders, seminoma (7 (41.4%)) was the most frequently observed, followed by mixed germ cell tumor (5 (29.5%)), other germ cell tumor (4 (23.4%)), and one instance of Hodgkin lymphoma. Qazi et al found 4 (20%) of seminoma and 6 (30%) of mixed germ cell tumor in his study [9]. Other study [12] shows 48.2% of seminomas.

CONCLUSION:

Our research suggests that testicular non-neoplasms are more common than testicular neoplasms. Testicular torsion in particular turned out to be the most prevalent non-neoplastic disease, but seminoma was the most commonly seen neoplastic lesion. The average age at which these disorders manifest also differs noticeably: non-neoplastic lesions usually present at a mean age of 16.2 years, whereas neoplastic lesions normally present at a mean age of 25 years. The significance of taking age-related variations into account while managing testicular problems are highlighted by this information, which may be useful for directing diagnostic and therapeutic approaches.

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Authors' Contribution

PB: devised the idea and wrote the manuscript.

NR: write up and proof reading

HS: tabulation and proof reading

AJ: editing, statistics and data collection.

FZ: literature search and data collection

SB: literature search and statistical analysis.

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ORIGINAL ARTICLE

EXPLORING DENTISTS' KNOWLEDGE AND PERSPECTIVES ON ORAL BIOPSIES AT BAQAI DENTAL COLLEGE, KARACHI

Samara Rais^{1*}, Nauman Sheikh², Zarah Subhan³, Qasim Saleem⁴, Ayesha Azmat⁵, Ramsha Tariq⁶**Abstract**

Background: Oral biopsy is an essential diagnostic tool for identifying a range of oral lesions, from benign conditions to malignancies. Despite its significance, gaps in knowledge and practice among dentists may hinder its effective utilization, impacting patient outcomes.

Objectives: To evaluate dentists' knowledge, clinical practices, and perceptions regarding oral biopsy procedures and their role in diagnosing oral lesions.

Methods: A cross-sectional study was conducted among dental surgeons at Baqai Dental College in Karachi, where a validated questionnaire was distributed to 196 dental professionals of various designations. The questionnaire include 22 questions (8 open and 14 close-ended) which included 2 sections. The collected data was analysed using descriptive statistics with Statistical Packages for Social Sciences (SPSS) version 20 software.

Results: The study assessed the knowledge of participants regarding biopsies for diagnosing suspicious oral lesions. Out of 196 participants, 71 were house officers, 59 were lecturers, 20 senior lecturers and 46 assistant/associate professors. Thus, it found that 96% of general dental practitioners (GDPs) believed biopsies were necessary for such diagnoses; with some considering them essential for premalignant, malignant, and cystic lesions, while others felt they were needed only for premalignant and malignant lesions. About 43% of participants were familiar with all biopsy methods. Reasons for not performing biopsies included difficulty in handling, lack of experience, decreased self-confidence, and insufficient patient compliance. Nearly all dentists acknowledged the need to improve their knowledge of oral lesions and biopsy techniques.

Conclusion: The study participants were aware of oral screening and biopsy procedures but hesitant to perform them. This suggests that General Dental Practitioners (GDPs) would benefit from dental education programs focused on oral precancerous and cancer detection, as well as screening and diagnostic techniques.

Keywords: Oral biopsy, dental surgeon/practitioner, lesion, diagnosis

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INTRODUCTION

The term biopsy is originated from the Greek word which means vision of life. It was first introduced by Ernest Besnier in 1879 and the first biopsy was performed by M.M Rudnev in 1875 in Russia. It is the most reliable procedure as well as considered to be the gold standard for various oral diseases [1,2].

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Oral biopsy surgery is a common procedure in dental practice that involves the incision, excision or punch of oral mucosal tissue for histopathological evaluation [3]. It must be highlighted that it is not only limited to diagnosis but is also greatly useful to determine the nature of the lesions present anywhere on lip/oral mucosa and for designing effective management strategies [4,5].

According to American cancer society there are three main types of oral biopsies which include: Excisional biopsy that is undertaken to remove small benign lesions, Incisional biopsy; performed for larger or suspicious lesions and fine needle aspiration biopsy (FNAC) that is indicated to diagnose cysts (such as: Dentigerous cyst, Eruption cyst, Lateral periodontal cyst, Gingival cyst), lymph nodes and disorders of the salivary glands [6-8].

The two-week rule recommended by World Health Organization for assessing and potentially biopsying suspicious oral lesions is a common guideline followed by healthcare professionals. It emphasizes the importance of promptly evaluating any persistent oral lesion that has not resolved within two weeks after the identification and elimination of local causal factors, such as trauma or infection [9-11].

The purpose of a biopsy is to characterize a lesion based on its histopathological features, determine the prognosis for malignant or premalignant conditions, guide the prescription of targeted treatments, assist in evaluating treatment efficacy, and serve as a document with legal medical significance [3,12]. An innovative approach that examines biological fluids, mainly blood, to detect cancer-related biomarkers is referred to as liquid biopsy [13]. The application of LB for cancer screening, patient stratification, and monitoring has been well-documented, its significance in oral squamous cell carcinoma (OSCC) is particularly emphasized [14]. Besides blood, other bodily fluids such as urine, saliva, seminal fluid, pleural effusion, cerebrospinal fluid, sputum, and stool samples can also be utilized for LB [15].

The study aims to assess the knowledge and perceptions of dentists regarding oral biopsy. It seeks to integrate existing research in oral pathology and contribute to understanding the attitudes of general dental practitioners and specialists toward the practice of oral biopsy.

METHODS

A descriptive cross-sectional study was conducted from August 2021 to September 2022 to comprehend the “knowledge, attitude, and practices of dentists towards oral biopsies in Baqai Dental College Karachi, Pakistan”. Ethical clearance was granted by the ethical committee, at Baqai Medical University. Informed Verbal consent was obtained from all the participants. A convenience sampling technique was used and 196 dental practitioners from Baqai Dental College were recruited which included house officers, lecturers, senior lecturers, assistant/ associate professors, and professors.

Individual house officers, lecturers, senior lecturer, assistant professors and professors are included in the study. Students and GD staffs are excluded from the study. The questionnaire included 22 questions (8 open and 14 close-ended) which included 2 sections. The first section of the questionnaire asked about the dental practitioner's demographic information, while the second half inquired about his or her knowledge, attitude, and practices regarding oral tissue biopsies. The sample size was calculated by Open Epi (version 3.01) keeping the % frequency of study outcome at 50% for most liberal estimate with 95% confidence level and 7% precision required. Data was stored in Microsoft Excel 2016, entered and analysed by IBM SPSS version 20.0. Data confidentially was ensured through password protection. The result was displayed in descriptive, tabular and graphical form, highlighting level of frequency. Chi square test was done to compare the frequencies between various groups.

RESULTS

Our study highlighted the investigation preferences of dentists when encountering a lesion in a patient's mouth. Out of 196 participants included, 136

responded and 60 were missing/excluded. The majority of participants indicated that they would refer such cases to a surgeon or pathologist. Specifically, this response was given by 42 house officers, 50 lecturers/registrar, 12 senior lecturers/registrar, and 32 assistant professors/associate professors/professors, as detailed in Table 1.

Table 1: Visible Suspicious Lesions

Investigation Method	House Officer (n, %)	Lecturer/Registrar (n, %)	Senior Lecturer (n, %)	Assistant Professor/Associate Professor/Professor (n, %)	Total (n, %)
Refer to a specialist (oral surgeon/pathologist)	42 (30.8%)	50 (36.7%)	12 (33.3%)	32 (23.5%)	136 (69%)
Refer to a closest hospital diagnostic facility	6 (66.6%)	1 (11.1%)	0 (0%)	2 (22.2%)	9 (5%)
Perform biopsy on our own	16 (40%)	8 (20%)	8 (20%)	8 (20%)	40 (20%)
Never had a patient who require biopsy	7 (100%)	0 (0%)	0 (0%)	0 (0%)	7 (4%)
Any other (please specify)	0 (0%)	0 (0%)	0 (0%)	4 (100%)	4 (2%)

The majority of respondents (69%, n=136) preferred referring patients to specialists such as oral surgeons or pathologists, demonstrating a strong reliance on expert consultation for diagnostic certainty. This approach was particularly prevalent among lecturers/registrar (25.3%, n=50) and house officers (21.3%, n=42), while senior lecturers (6.1%, n=12) and professors (16.2%, n=32) contributed fewer responses. Only 5% (n=9) of the participants opted to refer patients to a nearby hospital diagnostic facility. Among these, house officers accounted for 3.0% (n=6), lecturers/registrar 0.5% (n=1), and professors 1.0% (n=2), suggesting this approach is less favored, possibly due to perceived inadequacies in hospital facilities or a preference for specialist care.

Performing biopsies independently was reported by 20% (n=40) of respondents, distributed fairly evenly across groups: house officers (8.1%, n=16), lecturers/registrar (4.0%, n=8), senior lecturers (4.0%, n=8), and professors (4.0%, n=8). This reflects a moderate level of confidence and capability in conducting biopsies among dental practitioners. A smaller proportion, 4% (n=7), indicated they had not encountered patients requiring a biopsy, with all responses from house officers (3.5%, n=7),

highlighting their limited clinical exposure compared to more experienced practitioners. Finally, 2% (n=4) of participants, exclusively professors, reported using alternative methods, possibly indicating unique, experience-based approaches not typically practiced by others. Overall, the findings underscore a predominant preference for referring biopsy cases to specialists, pointing to potential gaps in training or confidence among dentists in independently performing such procedures.

Table 2: Dentists' Opinions on Lesions Requiring Biopsy

Lesion Type	House Officer (n, %)	Lecturer/Registrar (n, %)	Senior Lecturer (n, %)	Assistant Professor/Associate Professor/Professor (n, %)	Total (n, %)
Premalignant lesions only	6 (17.1%)	29 (82.8%)	0 (0%)	0 (0%)	35 (32%)
Benign lesions only	8 (100%)	0 (0%)	0 (0%)	0 (0%)	8 (4%)
Malignant lesions only	1 (50%)	1 (50%)	0 (0%)	0 (0%)	2 (1%)
Cysts only	3 (50%)	3 (50%)	0 (0%)	0 (0%)	6 (3%)
Premalignant and benign lesions	5 (50%)	0 (0%)	0 (0%)	5 (50%)	10 (5%)
Premalignant and malignant lesions	2 (20%)	2 (20%)	0 (0%)	6 (60%)	10 (5%)
Benign and malignant lesions	0 (0%)	0 (0%)	4 (66.6%)	2 (33.3%)	6 (3%)
Benign and cystic lesions	0 (0%)	4 (50%)	0 (0%)	4 (50%)	8 (4%)
Malignant and cystic lesions	4 (100%)	0 (0%)	0 (0%)	0 (0%)	4 (2%)
Benign, premalignant, and cystic lesions	17 (35.4%)	8 (16.6%)	0 (0%)	23 (47.9%)	48 (24%)
Premalignant, malignant, and cystic lesions	8 (44.4%)	4 (22.2%)	0 (0%)	6 (33.3%)	18 (9%)
Benign, malignant, and cystic lesions	2 (12.5%)	10 (62.5%)	2 (12.5%)	2 (12.5%)	16 (8%)

The table reveals varying perspectives among dentists regarding the types of lesions requiring biopsies. The most commonly identified category was "benign, premalignant, and cystic lesions," reported by 24% (n=48) of the respondents. This was followed by "premalignant lesions only" at 32% (n=35), primarily supported by lecturers/registrar. House officers displayed diverse responses, with notable contributions to most categories, reflecting a lack of consistency in their knowledge base. Senior faculty consistently emphasized cystic, premalignant, and malignant lesions requiring biopsies, indicating their refined diagnostic understanding.

Table 3: Concerns Regarding Biopsy in General Practice

Concerns	House Officer (n, %)	Lecturer/Registrar (n, %)	Senior Lecturer (n, %)	Assistant Professor/Associate Professor/Professor (n, %)	Total (n, %)
Practical skills	15 (45.4%)	10 (30.3%)	4 (12.1%)	4 (12.1%)	33 (17%)
Patient's cooperation	19 (32.2%)	16 (27.1%)	8 (13.5%)	16 (27.1%)	59 (30%)
Future patient care	7 (30.4%)	8 (17.3%)	2 (8.69%)	6 (26.0%)	23 (12%)
Fixation/transportation	9 (20.4%)	16 (36.3%)	3 (6.8%)	16 (36.3%)	44 (22%)
Not well paid	21 (56.7%)	9 (24.3%)	3 (8.1%)	4 (10.8%)	37 (19%)

“Patient’s cooperation” emerged as the most significant concern, reported by 30% (n=59) of respondents, with assistant professors/professors and house officers expressing similar levels of concern. Issues related to “fixation and transportation” were also prominent (22%, n=44), particularly among senior faculty. Practical skills

were a concern for 17% (n=33), mostly among house officers (7%, n=15). A notable 19% (n=37) expressed dissatisfaction with remuneration for biopsy procedures. These findings suggest a blend of technical, logistical, and motivational challenges faced by dental practitioners.

Table 4: Frequency and Percentage of Dental Practitioners Regarding Practical Skills, Patient’s Cooperation, and Biopsy Updates

Aspects	Frequency (n)	Percentage (%)
Practical skills		
Yes	107	55%
No	89	45%
Patient’s cooperation		
Yes	68	35%
No	128	65%
Do you update yourself regarding biopsy?		
Yes	146	74%
No	50	26%

Table 4 highlights that 55% (n=107) of dental practitioners feel confident in their biopsy skills, while 45% (n=89) do not, indicating a gap in proficiency. A significant 65% (n=128) face challenges with patient cooperation during biopsies, while only 35% (n=68) report receiving cooperation. In terms of continuing education, 74% (n=146) actively update their knowledge on biopsy techniques, but 26% (n=50) do not, suggesting opportunities for improving ongoing training. These results point to strengths in education and skill

development but also reveal barriers in patient cooperation and areas for further professional growth. In figure 1, the bar chart illustrating the interpretation of biopsy reports across different groups of dental practitioners. The chart shows the frequencies of "Yes" and "No" responses for each group: House Officers, Lecturers/Registrars, Senior Lecturers, and Assistant Professors/Associate Professors/Professors. This visual representation helps compare the distribution of responses within each group. ?

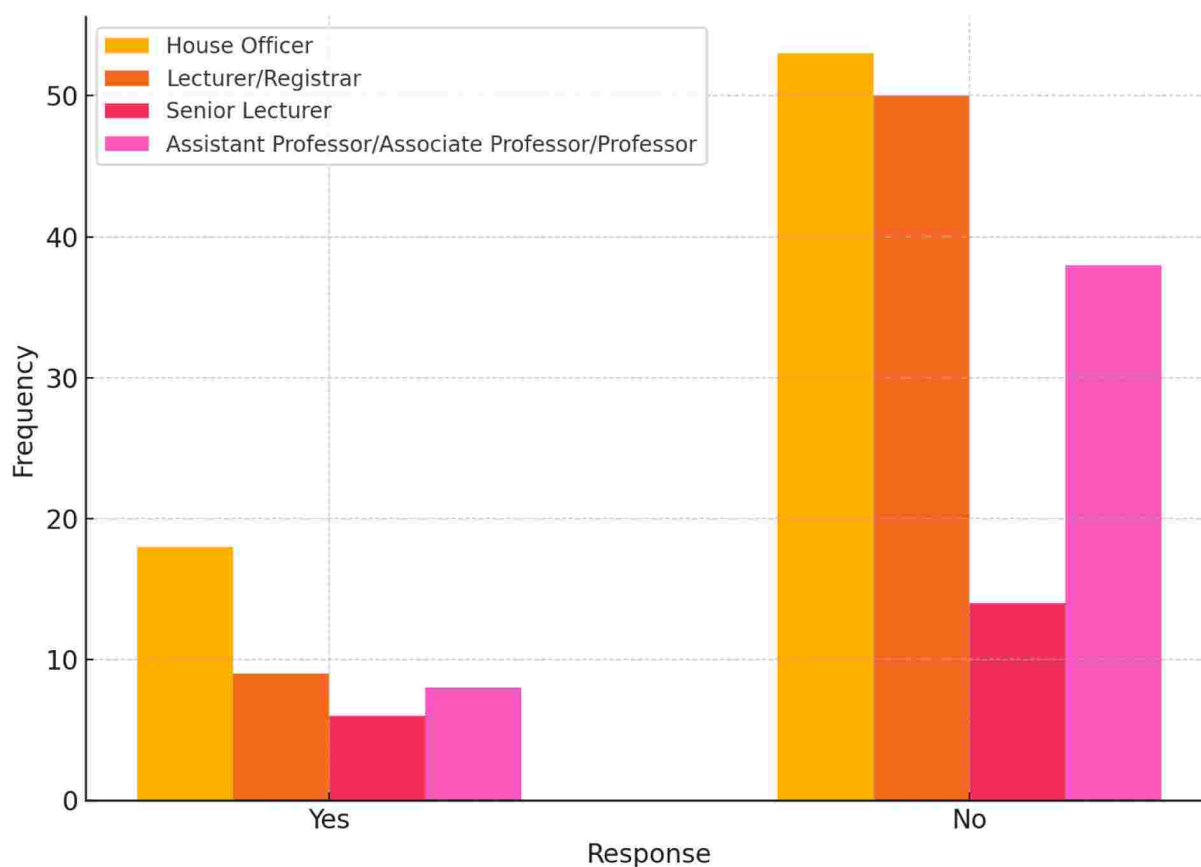


Figure 1: Interpretation of Biopsy Report

The bar chart illustrates the responses regarding the interpretation of biopsy reports among different groups of dental practitioners. The majority of practitioners across all categories, including House Officers, Lecturers/Registrars, Senior Lecturers, and Assistant Professors/Associate Professors/Professors, answered "No," indicating a lack of confidence or experience in interpreting biopsy reports. Specifically, 79% of House Officers, 84.7% of

Lecturers/Registrars, 70% of Senior Lecturers, and 83% of Professors/Associate Professors/Assistant Professors reported not interpreting biopsy reports. While a small proportion of House Officers (21%), Senior Lecturers (30%), and Professors (17%) answered "Yes," the general trend suggests that most dental practitioners do not feel confident in this aspect of their practice.

Table 3: Comparison of mean attitude scores about COVID-19 booster dose with demographic and COVID-19 related factors among medical students

Questions	Male (n, %)	Female (n, %)	p-value
Average number of patients examined in a month?			
Less than 20 patients	9 (16.2%)	16 (22.6%)	0.04
20-50 patients	8 (14.5%)	20 (28.2%)	
51-100 patients	16 (29%)	8 (11.3%)	
More than 100	4 (7.3%)	3 (4.2%)	
For any visible suspicious lesion, what comes first to your mind regarding investigations?			
Refer to a specialist (oral surgeon/pathologist)	23 (41.8%)	38 (53.5%)	0.38
Refer to a closest hospital diagnostic facility	2 (3.6%)	2 (2.8%)	
Perform biopsy on our own	10 (18.2%)	10 (14.1%)	
Never had a patient who required biopsy	1 (1.8%)	2 (2.8%)	
After removal of a lesion, what do you suggest?			
Always send it for analysis	28 (50.9%)	40 (56.3%)	0.54
Send it for analysis only when required	8 (14.5%)	11 (15.5%)	
No need to send it for analysis after removal	2 (3.6%)	1 (1.4%)	
How often do you expect an oral lesion to arrive which may require biopsy?			
At least once a week/month	18 (32.7%)	24 (33.8%)	0.848
At least once a year	14 (25.5%)	20 (28.2%)	
At least once in 5 years	3 (5.5%)	4 (5.6%)	
Never had a patient who required biopsy	4 (7.3%)	3 (4.2%)	
Which types of biopsy methods are you aware of?			
Incisional biopsy only	7 (12.7%)	9 (12.7%)	0.526
Excisional biopsy only	5 (9.1%)	12 (16.9%)	
Fine needle aspiration (FNA) only	1 (1.8%)	3 (4.2%)	
Incisional and excisional biopsy	2 (3.6%)	4 (5.6%)	
Incisional and fine needle aspiration (FNA)	1 (1.8%)	1 (1.4%)	
Excisional and fine needle aspiration (FNA)	0 (0%)	2 (2.8%)	
Incisional, Excisional, and fine needle aspiration (FNA)	23 (41.8%)	21 (29.6%)	

The table compares the responses of male and female dental practitioners regarding various biopsy-related practices. For the question about the average number of patients examined in a month, a higher percentage of females (22.6%) reported examining fewer than 20 patients, compared to 16.2% of males. On the question about investigations for suspicious lesions, a larger proportion of females (53.5%) prefer referring patients to specialists, compared to 41.8% of males. When asked about sending removed lesions for analysis, 50.9% of males and 56.3% of females always send lesions for analysis, while others do so only when required or not at all. Regarding the frequency of oral lesions requiring biopsy, there was little variation between males (32.7%) and females (33.8%) expecting such lesions at least once a week or month. For the question about biopsy methods awareness, 41.8% of males and 29.6% of females were aware of incisional, excisional, and fine needle aspiration biopsies. The p-values and Fisher's Exact Test Values indicate the statistical significance of gender differences in the responses. For example, the question about the average number of patients examined showed a statistically significant difference with a p-value of 0.04, suggesting gender-based variation in patient exposure. However, other questions, like biopsy methods awareness, showed no significant gender differences.

DISCUSSION

Performing a biopsy in the oral cavity is well within the capabilities and expertise of General Dental Practitioners (GDPs). GDPs that choose to carry out biopsies in their clinics should have a thorough understanding of the various biopsy techniques, the nature of the lesions, and the appropriate criteria for selecting patients. Misconceptions about biopsies may discourage some GDPs from recommending the procedure to certain patients, potentially reducing the likelihood of patient acceptance [16].

Identifying and treating oral lesions can greatly help dental practitioners improve patients' oral health, prevent disease progression, and enhance their quality of life, leading to a better prognosis. However, even though most dentists prefer sending biopsy patients

to a specialist or higher center, SOME consider that routine biopsies are within the purview of a GDP because they allow immediate access to prompt therapy. When it comes to diagnosing oral lesions [17,18]. GDPS with a degree in dentistry were surveyed in this study, the result of our research indicates similar findings as analysed by Murgod et al that majority of the dentists were well aware regarding biopsy as a diagnostic tool and holds a great importance for distinguishing and differentiating various oral lesions [19,20].

Out of 196 dental surgeons surveyed, 74% (145) always send suspected lesions for analysis, 20% (40) perform biopsies themselves, and 4% [7] (7) have never had a patient who required a biopsy. This data manifest their sufficient knowledge and awareness that questionable lesions demand biopsy. Else via, it will end up as great trouble due to delayed diagnosis emerging as severe morbidity and mortality [21]. A study conducted in Nepal in 2020 regarding dental surgeons and their experiences with lesions requiring biopsy. The study found that a majority of dental surgeons (96.2%) encountered such lesions, but only a small percentage (7.5%) had performed biopsies, mainly due to a lack of experience. In our study, approximately 20% (n=40) had performed biopsies, suggesting slightly raised pattern of limited experience in conducting biopsies among dental surgeons.

This was more as compare to other studies done by Diamanti et al, Murgod et al and Anandani et al, who reported 15%, 14.9%, and 11.3% respectively whereas less than Jornet et al, Wan and Savage which was 21% and 22.7% correspondingly of the general dental practitioners. Those who preferred to either refer to specialist or refer to higher center were 74% (n=145) and in other studies by Diamanti et al, Murgod et al., Anandhani et al, Wan and Savage reported 55%, 64.67%, 50.8% , 76.2% respectively [19,21].

Further, most of the participant were well informed of all the methods for biopsy mentioned in Murgod et al, although our investigation revealed that 74%

(n = 146) were up to date. It is essential to consider that various types of biopsy possess different pros and cons highlighting specific cases. When dentists were inquired about interpretation of reports of biopsies, 79% of dentists including house officer, lecturers, senior lecturers, while Professors were found to be unable to interpret a Biopsy report [19].

Whether the tissue that is removed has to be sent for histopathological examination or not is debatable. Though, Response of our study disclosed that every clinical dental practitioners have come across at least one lesion in their practicing career that require biopsy procedure [21] but most still do not perform it on their own, mainly due to in-adequate experience and education regarding the approach, which emphasizes the need for higher levels of importance to be placed on this aspect in undergraduate and postgraduate dental curriculum. Organization of specific training or continuing dental education programs to provide dental practitioners with the experience and practical skills necessary to carry out these procedures safely and confidently [20].

CONCLUSION

Oral health practitioners often encounter both hard and soft lesions in the oral cavity, but diagnosing these lesions accurately remains challenging. A study revealed a significant gap between dental professionals' theoretical knowledge of oral biopsy and its actual clinical application. This highlights the need for ongoing education and training in oral biopsy techniques. As the understanding of oral lesions and their management evolves, dental professionals must stay updated on the latest diagnostic methods and patient selection criteria. Regular training can boost practitioners' confidence in performing biopsies, improving patient outcomes and enabling earlier detection of oral diseases. Continuous education will also help address misconceptions and barriers to biopsy; ensuring practitioners can make informed decisions and provide optimal care.

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Authors' Contribution

SR: Concept & design, statistical analysis, editing of manuscript, responsible for integrity of research

NS: Data collection and manuscript writing

ZS: Edited, manuscript editing, review and final approval of manuscript

QS: Statistical analysis, editing of manuscript, review and final approval of manuscript

AA: Edited, manuscript editing, review and final approval of manuscript

RT: Edited, manuscript editing, review and final approval of manuscript

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