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HEALTH AND REHABILITATION

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ANTIBIOTIC PRESCRIPTION TRENDS AMONG DENTISTS WITH RESPECT TO DESIGNATION FOR LIVER DISEASE PATIENTS UNDERGOING DENTAL TREATMENT

Original Research

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Acknowledgement: The authors acknowledge the support of Sharif Medical and Dental College for facilitating this research.

Conflict of Interest: None
Grant Support & Financial Support: None

ABSTRACT

Background: Patients with liver disease are often immunocompromised and prone to opportunistic infections, making antibiotic prophylaxis an important aspect of dental care. The altered drug metabolism and increased risk of bleeding in such patients necessitate careful prescription practices. However, the antibiotic prescribing trends among dentists may vary based on their clinical experience and professional designation. Understanding these trends is essential for aligning practices with international guidelines and ensuring safe patient outcomes.

Objective: To assess the association between the designation of dentists and their antibiotic prescription trends for liver disease patients undergoing dental treatment.

Methods: A cross-sectional comparative study was conducted at the College of Dentistry, Sharif Medical and Dental College, Lahore, from January 2024 to January 2025. A total of 100 dentists (50 general dental practitioners and 50 house officers) were recruited using convenience sampling. Dentists with less than six months of clinical experience were excluded. Only those who had worked in the Oral Surgery and Endodontics departments were included, regardless of age or gender. Data were collected using a validated questionnaire (Cronbach's alpha = 0.914), and analyzed using SPSS version 23. The chi-square test was applied to evaluate associations, with a significance level set at $p < 0.05$.

Results: A non-significant association was found between dentist designation and antibiotic prescription for liver disease patients undergoing dental extraction ($p = 0.513$). Among house officers, 34% prescribed antibiotics compared to 26% of general dentists. For root canal treatment, 24% of house officers and 20% of general dentists prescribed antibiotics, again with a non-significant association ($p = 0.810$).

Conclusion: Although the associations were not statistically significant, notable variations in prescription practices existed between house officers and general dentists. These findings highlight the importance of standardized antibiotic prescribing education across all levels of dental training.

Keywords: Antibiotic Prophylaxis, Dental Extraction, Dentists, Endodontics, Hepatic Insufficiency, Immunocompromised Host, Prescription Practices.

INTRODUCTION

Patients suffering from liver diseases, such as cirrhosis, liver failure, or chronic hepatitis, are often immunocompromised and exhibit a higher susceptibility to opportunistic infections (1,2). Invasive dental procedures in this population necessitate a careful and well-monitored approach to antibiotic prophylaxis to reduce the risk of systemic complications (3). The immunosuppressive nature of liver dysfunction is further complicated by the liver's central role in drug metabolism, which makes pharmacological management particularly challenging. These patients not only face increased bleeding tendencies and delayed tissue healing due to hepatic involvement but also exhibit impaired drug biotransformation, particularly for medications like antibiotics that undergo extensive hepatic metabolism (4-6). Therefore, selecting and dosing antibiotics in such cases demands clinical prudence and individualized assessment. Dentists, especially those treating medically compromised patients, must weigh several factors when prescribing antibiotics in clinical settings. Among these are practitioner-related variables such as seniority, level of clinical training, and specialty background (7,8). Evidence suggests that dentists with advanced clinical experience or those specializing in areas like dental surgery and periodontology often adopt a more structured and evidence-based approach when managing patients with comorbidities and compromised immune systems (9,10). Nevertheless, despite the presence of established guidelines for antibiotic use in dental practice issued by various regulatory bodies, the level of adherence among dental practitioners remains inconsistent (11,12).

This inconsistency raises concerns, especially in the context of hepatically compromised patients, where the margin for error is significantly narrower due to the heightened risk of drug-induced toxicity (10). To safeguard these vulnerable patients, a multidisciplinary approach is warranted, where dentists collaborate closely with hepatologists to devise appropriate and safe antibiotic regimens (11,12). Alarmingly, the variations in compliance with existing guidelines among dentists with different training backgrounds and experience levels reflect substantial gaps in education and clinical preparedness (13). Such discrepancies can compromise patient outcomes and indicate a need for enhanced training protocols at both undergraduate and postgraduate levels. Reinforcing awareness and competence regarding antibiotic stewardship—particularly in relation to patients with liver dysfunction—should be an integral part of dental education and continuing professional development (13,14). Given this context, the present study aims to assess the association between dentists' designations and their antibiotic prescription trends for patients with liver disease undergoing dental treatment. The findings intend to highlight areas of educational need and inform future strategies for standardizing care through improved adherence to evidence-based antibiotic guidelines.

METHODS

This cross-sectional comparative study was conducted at the College of Dentistry, Sharif Medical and Dental College, Lahore, Pakistan, over a duration of one year from January 2024 to January 2025. Prior to initiation, ethical approval was obtained from the Sharif Medical Research Committee (Ref. No. SMDC/SMRC/168-21), and informed consent was acquired from all participating subjects in accordance with the ethical standards for research involving human participants. A total of 100 dentists were enrolled using a convenience sampling technique. The sample size was calculated based on an anticipated antibiotic prescription trend prevalence of 11.3%, with a 5% precision and a 95% confidence level (15). Participants included general dentists and house officers who had clinical rotations in the Oral Surgery and Endodontics departments, regardless of age or gender. However, dental practitioners and house officers with less than six months of clinical experience were excluded to ensure a minimum level of practical exposure and reliability in responses. Data collection was carried out using a pre-validated structured questionnaire, which included sections on demographic data as well as antibiotic prescription practices specific to liver disease patients undergoing root canal treatment (RCT) or tooth extraction. The internal consistency of the questionnaire was confirmed through a Cronbach's alpha coefficient of 0.914, indicating a high level of reliability (16). All responses were entered and analyzed using SPSS version 23.0. Descriptive statistics were employed to summarize the demographic variables, while the chi-square test was applied to assess the association between the designation of the dentists and their antibiotic prescription trends in liver-compromised patients undergoing dental procedures. A p-value of <0.05 was considered statistically significant.

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RESULTS

A total of 100 dental practitioners participated in the study, comprising 50 general dentists and 50 house officers, with a mean age of 25.46 ± 5.008 years. Among these participants, 53% were male and 47% were female. When evaluating antibiotic prescription trends for dental extractions in patients with liver disease, 34% of house officers reported prescribing antibiotics as prophylaxis, compared to 26% of general dentists. Despite this numerical difference, the association between the designation of the dentist and the prescription pattern for dental extraction was statistically non-significant (p = 0.513). Regarding root canal treatment (RCT) in liver disease patients, most respondents did not prescribe antibiotics. However, 24% of house officers and 20% of general dentists reported doing so. Similar to the extraction results, the association between dentist designation and antibiotic prescription during RCT was not statistically significant (p = 0.810). Although slight differences were noted in the prescribing behavior between house officers and general dentists, no statistically significant trends were observed in either dental extraction or root canal scenarios.

Table 1: Antibiotic prescription trends for extraction in patients with liver disease

		Antibiotics for patients with liver disease undergoing dental extraction		Total	P value
		Yes	No		
Designation	General dental practitioners	13 (26%)	37 (74%)	50 (100%)	0.513
	House officers	17 (34%)	33 (66%)	50 (100%)	

Table 2: Antibiotic prescription trends for root canal treatment in patients with liver disease

		Antibiotics for patients with liver disease undergoing root canal treatment		Total	P value
		Yes	No		
Designation	General dental practitioners	10 (20%)	40 (80%)	50 (100%)	0.810
	House officers	12 (24%)	38 (76%)	50 (100%)	

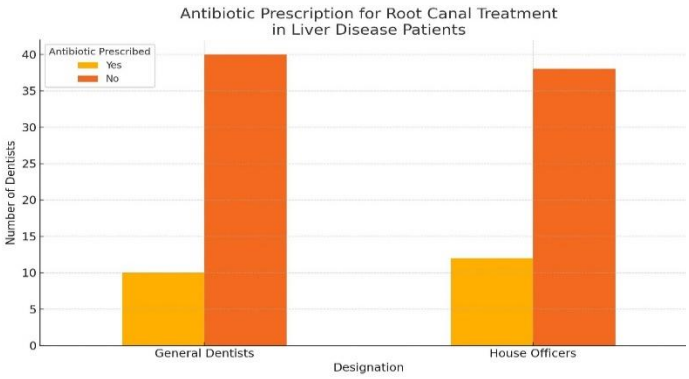

Figure 1 Antibiotic Prescription for Root Canal Treatment in Liver Disease Patients

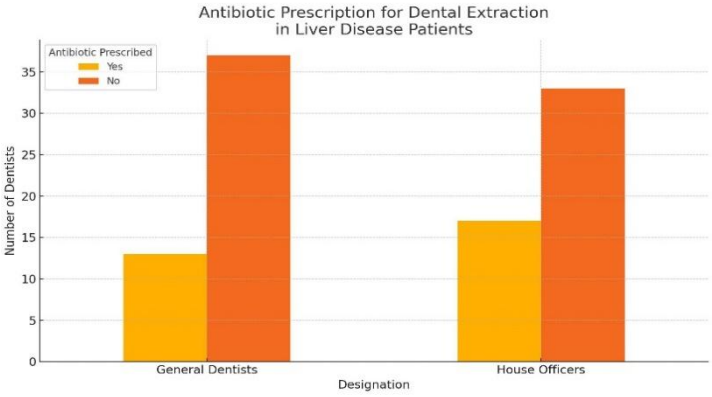

Figure 2 Antibiotic Prescription for Dental Extraction in Liver Disease Patients

DISCUSSION

The present study revealed a statistically non-significant association between the designation of dentists and their antibiotic prescription practices in liver disease patients undergoing dental extraction. Despite the lack of statistical significance (p = 0.513), a relatively higher percentage of house officers (34%) prescribed prophylactic antibiotics compared to general dentists (26%). This trend aligns with previous findings indicating that less experienced dentists, including recent graduates, tend to overprescribe antibiotics in clinical

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situations involving immunocompromised patients (17). Such tendencies often stem from a heightened sense of caution, fear of clinical complications, and reduced confidence in independently managing complex cases, which may lead to defensive prescribing behaviors (18). These patterns of antibiotic overuse, although driven by good intent, contribute to broader issues such as antimicrobial resistance and underscore the need for enhanced training in clinical judgment and evidence-based decision-making (19). A similar non-significant association was observed between dentist designation and antibiotic prescription trends in liver disease patients undergoing root canal treatment ($p = 0.810$). The majority of respondents in both groups refrained from prescribing antibiotics, with 80% of general dentists and 76% of house officers following this approach. While this trend supports global recommendations discouraging unnecessary antibiotic use for endodontic procedures in medically compromised individuals, it also reflects a notable deviation from earlier research where antibiotics were commonly prescribed in such contexts regardless of practitioner experience (20,21). This conservative approach may indicate increased awareness of antimicrobial stewardship but could also point to gaps in knowledge regarding appropriate indications for prophylaxis in patients with liver dysfunction (22). The findings suggest that while awareness of guideline-based practice may be improving, the underlying rationale and pharmacological understanding required for safe prescribing in hepatic impairment remain insufficiently addressed during training.

Overall, the study highlights a cautious and inconsistent pattern of antibiotic prophylaxis among dentists managing liver disease patients. The reluctance to prescribe antibiotics, though partially aligned with international recommendations, may also be attributed to inadequate familiarity with pharmacokinetic considerations in liver-compromised individuals. Previous literature has emphasized that certain antibiotics, due to their complex hepatic metabolism, can accumulate in the systemic circulation, leading to toxicity in such patients (23). Inappropriate prescription in these scenarios often stems from limited understanding of drug metabolism, which calls for reinforced pharmacological education within dental curricula and continuing professional development programs. Notably, senior practitioners have demonstrated greater adherence to guidelines, suggesting that clinical maturity plays a significant role in rational prescribing (24). The variation observed in this study across designations underscores the need for structured and continuous education to ensure uniformity in clinical practice. One of the strengths of this study lies in its focused evaluation of prescribing behavior in a specific patient population that presents unique clinical challenges. The use of a validated questionnaire with a high reliability index further adds to the credibility of the data collected. However, certain limitations must be acknowledged. The single-institution scope and relatively small sample size may limit the generalizability of the findings to broader dental populations. A more diverse, multi-center approach involving practitioners from varied specialties and geographic locations would provide deeper insights into the influence of clinical background and institutional protocols on antibiotic stewardship. The findings of this study emphasize the critical need for bridging the educational gaps in antibiotic prescription for medically compromised patients, particularly those with hepatic disorders. Incorporating dedicated modules on managing liver disease patients into undergraduate and postgraduate dental programs, as well as promoting interprofessional collaboration with hepatologists, may foster a more informed and consistent clinical approach. Future research should explore the impact of targeted educational interventions on prescribing behaviors, with larger sample sizes and comparative analysis across institutions to build a more robust evidence base.

CONCLUSION

The findings of this study concluded that while the designation of dentists did not show a statistically significant influence on antibiotic prescription practices for liver disease patients undergoing dental procedures, noticeable differences in prescribing behaviors were observed. House officers appeared more inclined to prescribe antibiotics for extractions, reflecting a cautious approach when managing medically compromised patients. Conversely, a more restrained prescription trend was seen overall during root canal treatments, with general dentists more frequently prescribing among those who did. These variations highlight the need for reinforcing evidence-based guidelines and targeted educational interventions to ensure consistent and rational antibiotic use across all levels of dental practice, ultimately contributing to safer and more informed patient care.

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AUTHOR CONTRIBUTION

Author	Contribution
Ayesha Basharat	Substantial Contribution to study design, and Manuscript Writing Has given Final Approval of the version to be published
Abdul Moeez Zafar	Substantial Contribution literature review Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Saman Fatima	Substantial Contribution to literature review and Manuscript Writing Has given Final Approval of the version to be published
Hafsa Lateef	Contributed to Manuscript writing and literature review Has given Final Approval of the version to be published
Summaya	Contributed to Manuscript Writing and critical review Has given Final Approval of the version to be published
Midhat Fatima	Substantial Contribution to literature review, Manuscript Writing Has given Final Approval of the version to be published
Hira Butt*	Contributed to study concept, Data collection, Data Analysis, Manuscript writing, Critical Reviw Has given Final Approval of the version to be published

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