BRAZILIAN JOURNAL OF DENTAL EDUCATION
ASSOCIAÇÃO BRASILEIRA DE ENSINO ODONTOLÓGICO

Experience of dental students in a hospital setting: a report on research involving head and neck cancer patients

Mônica Regina Pereira Senra Soares[1]
0000-0002-2074-5232

Lidiane Oliveira de Souza[1]
0009-0000-6750-0737

Milla Pascoal Ferreira Neves de Paula[1]
0009-0005-2136-3657

Arnaud Alves Bezerra Júnior[1]
0000-0001-6760-2522

Iasminy Soares de Oliveira Roeles[1]
0000-0002-6420-8455

Alexa Magalhães Dias[1]
0000-0002-3351-6586

Gisele Maria Campos Fabr[1]
0000-0002-8396-0722

[1]Faculdade de Odontologia, Universidade Federal de Juiz de Fora (UFJF), Governador Valadares, Minas Gerais, Brasil.

Correspondence:
Mônica Regina Pereira Senra Soares
E-mail: monica.pereira@ufjf.br

Received: Aug 11, 2025
Approved: Dec 11, 2025
Last revision: Dec 11, 2025

Abstract This study aimed to present systematized experiences of undergraduate dental students in a hospital environment specializing in oncology, located in a medium-sized city in the Zona da Mata region of Minas Gerais, Brazil. The experience was carried out within the context of the research project titled *"Clinical and Pathological Orofacial Correlations in Head and Neck Cancer"*, conducted by undergraduate and postgraduate students in Dentistry. Activities included medical history taking, clinical examinations, sialometry, application of photobiomodulation therapy, and therapeutic follow-up using a patented herbal-based oral solution. The methodological approach aimed to observe oral health conditions before and after interventions, analyze the incidence of oral lesions resulting from antineoplastic therapy, and assess the impact of these treatments on the quality of life of patients diagnosed with head and neck cancer. Reported challenges included limited resources, the clinical vulnerability of patients, and the need to adapt dental care to the hospital environment. The experience provided significant learning opportunities, highlighting the importance of humanized care and integrated actions among dentistry, oncology, nutrition, and nursing. The integration of dentistry into the oncological hospital setting proved essential for reducing oral complications, improving treatment adherence, and promoting patient well-being. The experience reinforced the need for robust guidelines regarding the role of dental surgeons in oncology and emphasized the importance of both scientific and humanistic training for students. The project contributed to knowledge development and to the strengthening of hospital dentistry as a strategic pillar in the comprehensive care of cancer patients.
Descriptors: Patient Care Team. Oncology. Education, Dental.

Experiencia de estudiantes de odontología en un entorno hospitalario: un informe sobre la investigación en pacientes con cáncer de cabeza y cuello
Resumen Este estudio tuvo como objetivo presentar experiencias sistematizadas vividas por estudiantes de Odontología en un entorno hospitalario de referencia oncológica, ubicado en una ciudad de tamaño medio de la región de la Zona da Mata, en Minas Gerais, Brasil. La experiencia se desarrolló en el contexto del proyecto de investigación "Correlaciones Clínicas y Patológicas Orofaciales en el Cáncer de Cabeza y Cuello", llevado a cabo por estudiantes de grado y posgrado en Odontología. Las actividades incluyeron anamnesis, exámenes clínicos, sialometría, aplicación de fotobiomodulación y seguimiento terapéutico con una solución bucal a base de fitoterápico patentada. Como estrategia metodológica, se procuró observar las condiciones de salud bucal antes y después de las intervenciones, analizar la incidencia de quejas sobre la aparición de afecciones bucales resultantes de la terapia antineoplásica y evaluar el impacto de estos tratamientos en la calidad de vida de los pacientes diagnosticados con cáncer de cabeza y cuello. Entre los desafíos señalados se destacaron la limitación de recursos, la vulnerabilidad clínica de los pacientes y la necesidad de adaptar los cuidados odontológicos al entorno hospitalario. La experiencia proporcionó un aprendizaje significativo, resaltando la importancia de la humanización del cuidado y de la actuación integrada entre odontología, oncología, nutrición y enfermería. La inserción de la odontología en el ambiente hospitalario oncológico se mostró esencial para reducir complicaciones orales, mejorar la adherencia al tratamiento y promover el bienestar del paciente. La experiencia reforzó la necesidad de directrices sólidas para la actuación del cirujano dentista en oncología y la relevancia de una formación científica y humanizada para los estudiantes. El proyecto contribuyó a la construcción del conocimiento y al fortalecimiento de la odontología hospitalaria como un pilar estratégico en el cuidado integral del paciente oncológico.
Descriptores: Equipo de Atención al Paciente. Oncología. Educación Dental.

Experiência de estudantes de Odontologia em ambiente hospitalar: um relato sobre pesquisa em pacientes com câncer de cabeça e pescoço

Resumo Este estudo teve como objetivo trazer experiências sistematizadas vivenciadas por discentes de Odontologia em ambiente hospitalar de referência oncológica, em uma cidade de porte médio da Zona da Mata Mineira. A experiência foi desenvolvida no contexto do projeto de pesquisa "Correlações Orofaciais Clínicas e Patológicas no Câncer de Cabeça e Pescoço", conduzido por alunos de graduação e pós-graduação em Odontologia. A atuação incluiu anamnese, exames clínicos, sialometria, aplicação de fotobiomodulação e acompanhamento terapêutico com uma solução bucal à base de fitoterápico patenteada. Como estratégia metodológica procurou-se observar as condições de saúde bucal antes e após as intervenções, analisar as incidências de queixas sobre o aparecimento de afecções bucais decorrentes da terapia antineoplásica e o impacto destes tratamentos na qualidade de vida dos pacientes diagnosticados com câncer de cabeça e pescoço. Como desafios a serem superados foram relatados a limitação de recursos, a vulnerabilidade clínica dos pacientes e a necessidade de adaptar os cuidados odontológicos ao ambiente hospitalar. A vivência proporcionou aprendizado significativo, destacando a importância da humanização do cuidado e da atuação integrada entre odontologia, oncologia, nutrição e enfermagem. A inserção da odontologia no ambiente hospitalar oncológico mostrou-se essencial para reduzir complicações orais, melhorar a adesão ao tratamento e promover bem-estar. A experiência reforçou a necessidade de diretrizes robustas para a atuação do cirurgião-dentista na oncologia, e a relevância da formação científica e humanizada dos alunos. O projeto contribuiu para a construção de conhecimento e fortalecimento da odontologia hospitalar como pilar estratégico no cuidado integral ao paciente com câncer.

Descritores: Equipe Hospitalar de Odontologia. Oncologia. Ensino Odontológico.

INTRODUCTION

This experience report emerged from the observation of care gaps involving dentistry professionals in the management of oral manifestations in cancer patients, particularly in the hospital setting, where the presence of dentistry professionals is still limited in many healthcare services[1].

Cancer is defined as a condition characterized by the suppression or absence of cell death, resulting in the uncontrolled growth of abnormal cells. Head and neck cancer refers to a group of heterogeneous tumors affecting the upper aerodigestive tract, including the anatomical regions of the oral cavity, pharynx, larynx, and thyroid gland. The most commonly adopted treatments for neoplastic disease are surgery, radiotherapy, and chemotherapy, with the latter two being mainly responsible for causing a range of oral complications[2-4].

Among the oral complications resulting from radio- and chemotherapy treatments, the most notable are xerostomia, hyposalivation, alteration in taste is an early response to radiation and often precedes oral mucositis, osteoradionecrosis, radiation-related caries, dysgeusia, trismus, and dysphagia[4,5], as well as candidiasis and other bacterial and viral infections[6]. These complications make the presence of a dentistry professional on the care team essential to help prevent and manage such conditions[7].

Specifically, hyposalivation, defined as a reduction in normal salivary flow, occurs both as a result of antineoplastic therapy (affecting up to 82% of patients) and due to damage to the salivary glands[8]. In contrast, saliva plays a vital role in maintaining dental integrity, protecting the mucosa, enabling lubrication, moistening, wound healing, homeostasis, microbial defense, digestion, buffering, pH balance, and supporting taste perception[9,10].

Oral mucositis, prevalent in up to 80% of patients undergoing chemotherapy, is one of the most critical oral complications requiring careful management[11], as it can cause severe pain, inability to eat orally, weight loss, prostration, and may ultimately lead to the temporary suspension of chemotherapy. This pathological condition triggers tissue oxidation and inflammation, resulting in dysbiosis and suppression of the immune system[9].

In Brazil, the incidence of head and neck cancer is high, with an estimated 39,550 new cases diagnosed each year. Prevalence is also significant, with the National Cancer Institute (INCA) estimating approximately 685,000 cases of this type of cancer, with a projected increase by 2030[12,13].

Given this scenario, it is essential to investigate dental strategies, based on the systematization of clinical experiences in hospital settings, that may contribute to maintaining oral health, improving treatment adherence, and enhancing the quality of life of patients diagnosed with head and neck cancer.

EXPERIENCE REPORT

The study is an experience report based on the actions carried out within the research project "Clinical and Pathological Orofacial Correlations in Head and Neck Cancer", approved by the Human Research Ethics Committee of the Federal University of Juiz de Fora (CEP-UFJF), under protocol number CAAE 136.980.286-20. All participants signed the Informed Consent Form (ICF).

The project was conducted over a period of 14 months, from May 2023 to August 2024. The research team included two undergraduate Scientific Initiation (PIBIC) students, selected through a pre-established process, one doctoral candidate, and one postdoctoral researcher, all supervised by two faculty members from the School of Dentistry at the Federal University of Juiz de Fora (UFJF), Minas Gerais, Brazil.

In addition to presenting the systematized experiences of the undergraduate students in a hospital setting specialized in oncology, located in a mid-sized city in the Zona da Mata region of Minas Gerais, this report also had the following secondary objectives: to describe the oral health conditions before and after the dental intervention; to analyze the frequency of complaints related to the development of oral pathologies, to assess the control of oral mucositis resulting from antineoplastic therapy, to evaluate whether there was an improvement in the patients' quality of life, to understand the enhancement of hospital care related to oral health conditions, and to evaluate changes in the salivary flow and pH (hydrogen potential) of patients diagnosed with head and neck cancer. The aim was to produce and share knowledge, reinforce the role of dentists within the multidisciplinary healthcare team, and promote a more comprehensive and humanized approach to patient care.

For this purpose, the undergraduate students participated in an exploratory longitudinal study involving the administration of questionnaires, clinical dental examinations, biological fluid collection, and the application of therapeutic protocols in patients with a confirmed diagnosis of head and neck cancer based on histopathological examination. The dental assessment consisted of: I) anamnesis; II) administration of questionnaires; III) collection of data from medical records; IV) clinical oral evaluation and oral hygiene guidance; V) sialometry examination; and VI) photobiomodulation sessions in the head and neck region. This approach allowed for a comprehensive analysis of the patients' systemic, oncological, and oral health conditions.

In addition, a patented oral rinse solution, specifically developed to support oral health maintenance during the follow-up period, was provided to all participants. The administration of the solution followed the guidelines established in the study protocol, ensuring standardized use among patients.

With respect to I) anamnesis, information was collected on the patient's general identification, chief dental complaint, history of oral disease, medical history, family medical history, oral and hygiene habits, and identification of possible deleterious habits.

With respect to II) questionnaire administration, the following instruments were applied: a socioeconomic classification questionnaire, the Oral Health Impact Profile (OHIP), and a visual analog scale for xerostomia assessment. The researcher/interviewer presented the answer options and filled out the questionnaire based on the patients' responses.

With respect to III) data collection from medical records, information was gathered on histopathological findings, anatomical site affected, cancer staging, and the oncological treatment provided.

With respect to IV) clinical examination, a comprehensive evaluation of the extraoral and intraoral regions was conducted. The extraoral exam included assessment of the face, lips, eyelids, scalp, ears, temporomandibular joint region, masticatory

muscles, lymph nodes, facial symmetry, facial profile (concave, straight, or convex), and vertical dimension at occlusion and at rest. The intraoral exam focused on the identification of primary lesions and the application of the World Health Organization (WHO) Oral Mucositis Grading Scale.

With respect to V) sialometry, salivary flow was measured under unstimulated and stimulated conditions. For this, a universal collector was weighed on a precision scale before sample collection. In the unstimulated condition, the patient was instructed to remain standing while two cotton rolls were placed in the sublingual region for one minute. For the stimulated condition, a physical sialogogue (orthodontic rubber band) was used. The salivary flow rate was calculated based on the difference in the collector's weight before and after collection, expressed in mL/min.

With respect to VI) photobiomodulation, the dosimetry recommended by the laser therapy certification program at São Leopoldo Mandic Institution was employed, both prophylactically and therapeutically.

The placement in a reference hospital for Oncology care represented a unique opportunity for clinical-preventive, scientific, and educational engagement within the context of hospital-based dental care for patients with head and neck cancer. The proposal of this project offered a practical experience that went beyond the technical dimension of oral care, fostering an integrated and humanized approach to cancer patients.

Beyond its direct impact on patients' quality of life, the experience highlighted the importance of dental care as an active part of the hospital's multidisciplinary team, interacting with fields such as oncology, nursing, and nutrition. This integration enabled a broader therapeutic approach, in which oral health was no longer seen as an isolated component, but rather recognized as essential for the continuity and effectiveness of cancer treatment.

Throughout clinical follow-up, dental professionals were involved in a range of activities aimed at the prevention, diagnosis, and management of oral complications resulting from antineoplastic therapy. These activities ranged from initial patient screening, with an emphasis on assessing oral conditions prior to treatment, to the implementation of therapeutic strategies focused on reducing complications such as mucositis, salivary dysfunctions, and opportunistic infections.

An especially valuable aspect of this project was the students' active participation in all stages, from clinical data collection and questionnaire administration to the follow-up of patients during their hospital routines. This experience offered early exposure to scientific research, teamwork, and humanized clinical practice, enriching professional training and sparking interest in both academic and hospital-based careers.

The hospital environment posed constant challenges, such as the need to adapt dental approaches to the patients' fragile clinical conditions, and to manage pain and suffering in hospitalized individuals. In addition, limited resources and infrastructure were significant challenges. However, adapting to this environment demonstrated that continuing to work on behalf of the patients was worthwhile. These obstacles were embraced as opportunities for learning and growth, both for the researchers and for the students involved.

Participating in this project as part of a research initiative also allowed for a deeper theoretical and methodological understanding of the complex interactions between oral health and systemic disease, providing a foundation for developing more effective and humanized care protocols. It was a unique opportunity to critically and conscientiously integrate theory and practice, strengthening autonomy, ethical awareness, and commitment to science.

This experience reaffirmed the transformative potential of incorporating hospital dentistry into oncology care, while also demonstrating the value of scientific training during undergraduate education as a tool for professional development, innovation, and knowledge building.

The sample consisted of male and female patients diagnosed with various types of head and neck cancer. Participants came from different municipalities within the city of Juiz de Fora, Minas Gerais, Brazil, and surrounding areas. Oral lesion diagnoses revealed the presence of mucositis and xerostomia among patients.

The study is still ongoing and is being conducted by the principal investigator in collaboration with other undergraduate research students. Data collection and analysis are in progress, aiming to deepen the understanding of the effects of photobiomodulation and the patented oral solution on patients' oral health. Future results may provide more detailed

insights into the effectiveness of the proposed interventions, contributing to the advancement of knowledge in the field and potential clinical applications.

The epidemiological patterns of head and neck cancer in Brazil reveal a predominance among males, with a male-to-female ratio of 2:1. This may be linked to risk factors such as tobacco use and alcohol consumption[14]. This type of pathology is more prevalent among white individuals[15], and the average age reported in the literature is over 50 years[5].

In Brazil, individuals with lower levels of education are 2.5 times more likely to develop head and neck cancer, reinforcing the link between social vulnerability and higher disease incidence[16].

Oral mucositis remains a common complication in patients with head and neck cancer undergoing radiotherapy and chemotherapy, potentially affecting quality of life and leading to treatment interruption[11]. However, reduced incidence can be associated with factors such as improved treatment protocols, advanced radiotherapy techniques, the use of photobiomodulation, oral rinses, and individual patient care measures such as good nutrition and oral hygiene.

Studies indicate that radiotherapy in the head and neck region can lower salivary pH, contributing to a more acidic oral environment, with pH levels falling below 6.8[4,5,17].

This salivary acidification may increase the risk of dental caries and other oral diseases. Normally, the stimulated salivary flow is expected to be higher than the unstimulated flow. However, a reduction in stimulated salivary flow may be attributed to irreversible damage to the salivary glands caused by radiotherapy, leading to insufficient saliva production even under stimulation[17].

In this context, it is important to emphasize that the role of dentistry professionals in the oncology hospital setting goes beyond managing oral complications. The continuous presence of the dental team significantly contributed to the humanization of care, supporting patient adherence to antineoplastic treatment and helping to maintain the quality of life of those affected by head and neck cancer.

A reduced incidence of oral mucositis was observed among the patients who received care, as well as more effective management of salivary alterations. These outcomes reinforce the essential role of the dental surgeon in preventing severe oral complications and promoting systemic health. The use of evidence-based therapeutic protocols, such as photobiomodulation and a patented herbal-based oral solution, proved to be promising in alleviating symptoms and maintaining oral mucosal integrity, as indicated by the positive responses in the patient satisfaction questionnaire.

Moreover, direct contact with oncology patients, the practice of supervised clinical procedures, and the experience of applied research significantly contributed to the ethical, scientific, and professional development of those involved. The integration into the hospital routine, from the perspective of the dentistry students, provided a profound and transformative learning experience. Under qualified supervision, it enabled improvement not only in individual clinical skills but also in the emotional preparedness required to face complex clinical realities.

This reinforces the paradigm that hospital dentistry should be recognized as a fundamental pillar of multidisciplinary oncology care. The experience described serves as a model of integration between education, research, and patient care, with mutual benefits: for patients, who receive more comprehensive and qualified treatment; and for students and professionals, who grow within a real, critical, and collaborative learning environment.

The practical experience of providing dental care to these patients revealed challenges that went beyond the technical aspects of treatment, requiring clinical adaptation, ethical sensitivity, and integration with other healthcare fields. Thus, the systematization of this experience aims to support the training of new professionals, contribute to the development of more effective care protocols, and strengthen hospital dentistry as a strategic area in the care of head and neck cancer patients.

FINAL CONSIDERATIONS

With the continued collection and analysis of data, it is expected not only to consolidate the results observed, but also to contribute to the development of more robust guidelines for the role of dentistry professionals in oncology hospital

settings, promoting progress both in clinical practice and in health education.

Health education initiatives that promote the sharing of knowledge regarding the management of oral conditions in patients with head and neck cancer are of great relevance, as they generate awareness among professionals to ensure that essential care is not neglected.

From a multidisciplinary perspective, joint actions within the hospital environment have proven capable of transforming knowledge and skills, allowing healthcare teams to address multiple aspects of cancer care while emphasizing the unique contributions of each discipline.

Regarding the objectives of this initiative, they were achieved, because the students reported feeling prepared and motivated to provide comprehensive care tailored to the specific needs of this patient population.

REFERENCES

1. Santos MN, Severo PIC, Medeiros RM, Matoso FB. Odontologia hospitalar: uma análise crítica sobre a inserção do cirurgião dentista na atenção terciária no estado do Rio Grande do Sul, Brasil. Rev Faculdade Odont [Internet]. 2022;27(1):1-14. doi: https://doi.org/10.5335/rfo.v27i1.15314
2. Costa AM, Silva ÉYF, Vale ALM. Uso da fotobiomodulação em pacientes com câncer de cabeça e pescoço submetidos à radioterapia: uma revisão integrativa da literatura. Rev JRG Estud Acad [Internet]. 2023;8(18): e081882. doi: https://doi.org/10.55892/jrg.v8i18.1882
3. Fernandes HMA, Barbosa ES, Lopes GCB, Oliveira FM, Uchôa BO, Freire LFO et al. Quando nutrir não é necessário: rupturas e continuidades nos cuidados paliativos em pacientes com câncer de cabeça e pescoço. Rev Saúde Coletiva [Internet].2025;15(93):14508–14521. doi: https://doi.org/10.36489/saudecoletiva.2025v15i93p14508-14521
4. Sanson IPR, Figueiredo CBR, Pereira KA, Nunes MS, Vale MCS, Seroli W. Impacto da radioterapia na saúde bucal: principais complicações em pacientes com câncer de cabeça e pescoço. E-acadêmica [Internet]. 2023;4(2):e0742448. doi: https://doi.org/10.52076/eacad-v4i2.448
5. Vissink A, Jansma J, Spijkervet FKL, Burlage FR, Coppes RP. Oral sequelae of head and neck radiotherapy. Crit Rev Oral Biol Med [Internet]. 2023;14(3):199-12. doi: https://doi.org/10.1177/154411130301400305
6. Floriano DF, Ribeiro PFA, Maragno AC, Rossi K, Simões PWTA. Complicações orais em pacientes tratados com radioterapia ou quimioterapia em um hospital de Santa Catarina. Rev Odontol Univ Cid São Paulo [Internet].2017;29(3):230–6. doi: https://doi.org/10.26843/ro_unicidv2932017p230-236
7. Peixôto LSB, Gomes JO. Atuação do cirurgião dentista no tratamento de pacientes com câncer no Brasil – de 2013 a 2023. Revista Ibero-Americana de Humanidades, Ciências e Educação [Internet]. 2023;29(10):1686–1701. doi: https://doi.org/10.51891/rease.v9i10.11791
8. Hotsumi AM, Gonçalves AS. Estudo temporal do efeito do quimioterápico 5-Fluorouracil em glândulas salivares de hamsters [Thesis]. São Paulo: Unesp; 2021[cited 2025 Mar 16]. doi: https://doi.org/10.11606/d.23.2021.tde-25082021-155706
9. Andrade JRCC de. Xerostomia e tratamento com saliva artificial: uma revisão narrativa [Dissertation]. Portugal: Univ Fernando Pessoa; 2022 [cited 2025 Mar 16]. Available from: https://bdigital.ufp.pt/entities/publication/66bb9e70-8a47-4265-a455-12fa3182a 937
10. Alves PEFA, Arsati YB de OL. Capacidade tampão salivar em pacientes sob tratamento de câncer oral [Internet]. In: XXVII Seminário de Iniciação Científica. 27. Bahia: Universidade Estadual de Feira de Santana; 2023. doi: https://doi.org/10.13102/semic.vi27.10939
11. Silva JAT, Pereira GL, Verner FS, Pigatti FM. Ação da laserterapia em lesões de mucosite oral: série de casos. HU Revista [Internet]. 2021;47:1-6. doi: https://doi.org/10.34019/1982-8047.2021.v47.34104
12. Instituto Nacional de Câncer. Estimativa 2023: incidência de câncer no Brasil. Rio de Janeiro: INCA; 2022. 160 p [cited 2025 Jul 17]. doi: https://doi.org/10.5152/ejbh.2019.4414
13. Pedra RC, Silva CL, Álvares da, Bernardes IE, Verner FS, Andrade KM, Santos RS, et al. Factors associated with advanced-stage oral and oropharyngeal squamous cell carcinoma in a Brazilian population. Braz J Oral Sci [Internet]. 2021[cited 2025 Oct 23];20:e219638. doi: https://doi.org/10.20396/bjos.v20i00.8659638
14. Mores AL. Idade, estágio e consumo de álcool no diagnóstico predizem a mortalidade do câncer de cabeça e pescoço: um estudo coorte retrospectivo para 3275 pacientes brasileiros [Thesis]. Campinas: Unicamp; 2023

[cited 2025 Mar 25]. doi: https://doi.org/10.47749/t/unicamp.2023.1347236
15. Santos TR, Freitas SS, Mota LG. Uso da linfocintigrafia para localização do linfonodo sentinela no estadiamento de melanoma de cabeça e pescoço. [Internet]. 2024 [cited 2025 Mar 23]. In: Semana Nacional de Engenharia Nuclear e da Energia e Ciências das Radiações. Anais.... Belo Horizonte: UFMG; 2024. doi: https://doi.org/10.29327/vi_sencir.563680
16. Cibulski TP, Becker T, Baldissera C, Basso T, Kümpel DA. Adesão à terapia nutricional oral de pacientes com neoplasias de cabeça e pescoço. BRASPEN J [Internet]. 2018 [cited 2025 Mar 25];33(3):215–20. doi: https://doi.org/10.37111/braspenj.2020351005
17. Lima AAS, Figueiredo MAZ de, Krapp SMR, Souza FR de. Velocidade do fluxo e pH salivar após radioterapia da região de cabeça e pescoço. Rev Bras Cancerol [Internet]. 2004;50(4):287–93. doi: https://doi.org/10.32635/2176-9745.RBC.2004v50n4.2005

Conflict of Interest: The authors declare no conflict of interest.

Funding: No funding to declare.

Authors' Contributions: Study conception and planning: MRPSS, LOS, MPFNP, AABJ, JSOR, AMD. GMCF. Data collection, analysis, and interpretation: MRPSS, LOS, MPFNP, AABJ, JSOR, AMD. GMCF. Manuscript drafting or revision: MRPSS, LOS, MPFNP, AABJ, JSOR, AMD. GMCF. Final version approval: MRPSS, LOS, MPFNP, AABJ, JSOR, AMD. GMCF. Public responsibility for article content: MRPSS.