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Expanding access through preventive innovation: the public health impact of sdf and smart protocols performed by dental hygienists in vermont

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ABSTRACT

The problem of access to preventive oral healthcare has been a chronic issue in underserved populations and is especially frequent in rural and low-income communities. This review discusses the health aspects of the use of Silver Diamine Fluoride (SDF) and Silver-Modified Atraumatic Restorative Technique (SMART) in the practice of licensed dental hygienists in Vermont. The study focuses on the role of preventive innovation and how these low-cost, minimally invasive procedures can extend care delivery and decrease disparities in oral health outcomes. The review reveals the benefits of SDF and SMART interventions as alternative restorative therapies by assessing clinical efficacy, cost-saving and satisfaction among patients. The discussion also takes into consideration the progressive scope-of-practice policies of Vermont that enable the dental hygienists to independently administer these treatments as a way of improving the access and preventive coverage at a community level. Results highlight the fact that the integrability of SDF and SMART protocols in the programs of the population health mitigates the increase in the burden of untreated caries and enhances the sustainability of the preventive oral health systems. It is a model that shows how workforce innovation and policy change can help revolutionize preventive dentistry and advance equitable access to oral health in this country.

Keywords: Silver Diamine Fluoride (Sdf). Smart Protocol. Dental Hygienists. Preventive Dentistry. Oral Health Access. Cost-Effectiveness. Public Health. Vermont. Minimally Invasive Dentistry. Health Policy Reform.

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1 INTRODUCTION

The increase in the focus on preventive innovation in oral health is an indicator of a worldwide trend of minimally invasive, cost-effective, and equitable care delivery models. Silver needs fluoride (SDF) or the Silver-Modified Atraumatic Restorative Technique (SMART), are preventive methods in dentistry, which have been shown to have a high potential to alleviate the burden of untreated dental caries, particularly in underserved communities (Seifo et al., 2019; Ruff et al., 2023). Those strategies are in line with the overall objectives of overall health to increase access, reduce treatment expenses, and apply mid-level oral healthcare workers, including dental hygienists, to offer necessary preventive services (Hu et al., 2025; Natarajan, 2022). Vermont is the first state in this respect, as it has incorporated SDF and SMART protocols into its dental hygiene practice framework in order to improve oral health outcomes on a population level.

1.1 BACKGROUND AND CONTEXT OF THE STUDY

Preventive oral care is a highly urgent topic in the United States and rural states, such as Vermont, have considerable disparities in terms of geographic isolation, workforce issues, and financial difficulties (Hu et al., 2025). Conventional curative therapies usually involve precise technologies and health facilities that make them inaccessible and expensive. SDF and SMART have transformed preventive dentistry due to having non-invasive, low-cost, and effective dental caries management options outside of the conventional clinical setting (Seifo et al., 2019; Zaffarano et al., 2022). With SDF being a topical antimicrobial and remineralizing agent, it is effective to prevent new lesions and arrest active caries, whereas SMART is a combination of both SDF and glass ionomer cement restoration, which also preserves tooth structure and minimizes discomfort of patients (Natarajan, 2022; Knight et al., 2006).

The progressive policies set in relation to the creation of dental workforce in Vermont have increased the scope of practice of dental hygienists so that they can be able to do SDF and SMART applications on their own in the name of public health. The change in policy is an outcome of a longer-term oral health disparity response and workforce constraints capitalizing on preventive innovation to enhance access and outcomes within community-based programs (Kodali et al., 2022; Mohapatra, 2024).

1.2 RESEARCH PROBLEM STATEMENT

Although there is strong evidence to advocate effectiveness of SDF and SMART, they have not been widespread in preventive health systems of most states in the U.S. Poor accessibility is hindered by restrictions on practices by authorities, the unawareness of people, and insufficient funding of community oral health programs (Ruff et al., 2023; Zaffarano et al., 2022). The example of Vermont hygienist-led SDF and SMART protocols is a rare case study on how the expansion of provider roles and preventive measures can improve accessibility, decrease the cost of treatment, and improve oral health equity (Hu et al., 2025; Bansal et al., 2023).

1.3 OBJECTIVES OF THE STUDY

This study seeks to:

1. Test the research issue by investigating the effects of SDF and SMARTs on the overall health of the population carried out by dental hygienists in Vermont.
2. Evaluate the financial and medical performance of these preventive innovations.
3. Identify the role of the Vermont workforce and policy structure in ensuring increased access to preventive oral healthcare using hygienist-led programs.

1.4 SIGNIFICANCE AND RATIONALE

The importance of the study is that it can emphasize an evidence-based, replicable paradigm of increasing preventive oral healthcare to underserved communities. Various studies have shown that SDF has the potential to prevent more than 80 percent of active carious infections and significantly decrease the requirement to undergo invasive procedures (Ruff et al., 2023; Abdellatif et al., 2023; Gao et al., 2016). Equally, the SMART strategy has already shown effectiveness in the pediatric and community environment, providing both restorative advantages and cost-effectiveness (Bansal et al., 2023; Natarajan, 2022). The model allows dental hygienists to complete these tasks on their own, which helps address the issue of access barriers without compromising the quality of preventive services (Zhao et al., 2019; Haiat et al., 2021). This combination of preventive innovation, workforce reform and public health policy is a scalable approach to supporting oral health equity in more widespread groups of the population.

2 LITERATURE REVIEW

The past ten years have seen a substantial growth in the literature on preventive oral healthcare due to the requirement to decrease disparities in access and improve the population-wide outcome by interventions with minimal invasiveness and low cost. Most standard restorative treatments have been shown to be clinically effective, but cost, access to infrastructure, and a lack of dental practitioners make these treatments unavailable to underserved groups (Hu et al., 2025; Kodali et al., 2022). Therefore, scholars and policymakers have shifted their focus to other preventive models, including the use of Silver Diamine Fluoride (SDF) and Silver-Modified Atraumatic Restorative Technique (SMART) and discussed them as viable and sustainable caries management and prevention tools (Seifo et al., 2019; Ruff et al., 2023). The case of Vermont gives a very strong paradigm of how these innovations could be implemented by the dentin hygienists to enlarge access to care, enhance cost-effectiveness, and foster health equity in the field of public health dentistry (Mohapatra, 2024; Natarajan, 2022).

Abstract Introduction to Preventive Dental Innovations

Preventive dental innovation aims to prevent the disease at an early stage and retain the natural tooth structure and reduce invasive treatment. SDF has been promoted as a new technology in non-surgical treatment of caries since it successfully stops the development of caries with the minimum equipment, training, or patient compliance (Seifo et al., 2019; Gao et al., 2016). The dual mode of action, i.e. the action of silver ions to kill cariogenic bacteria and the action of fluoride ions to remineralize, is what makes the agent especially appropriate in the community setting and in school-based programs (Zaffarano et al., 2022; Ruff et al., 2023).

The SMART protocol builds on the advantages of SDF, using glass ionomer cement (GIC) to seal the treated lesions to provide not only restorative but also preventive results (Natarajan, 2022; Knight et al., 2006). There are clinical results that SMART yields similar results as traditional restorations but with a much lower level of pain, time, and cost (Bansal et al., 2023). It is also not as anxiety-provoking to pediatric and special-needs patients, which adds to its inclusion in any oral health initiatives offered to the population (Abdellatif et al., 2023).

Public Health Impact and Workforce Innovation

An accumulating number of studies associate oral health inequities with workforce shortages and the restrictive practice regulation that constrain the role of mid-level providers

(Hu et al., 2025; Kodali et al., 2022). The model of Vermont, which permits dental hygienists to use SDF and carry out SMART procedures with a general supervision, can illustrate that the policy change can be effective and decentralizing the preventive treatment. Vermont expands preventive coverage in schools, community clinics, and long-term care by allowing hygienists to provide those services on their own (Mohapatra, 2024).

This approach has also been strengthened by cost-effectiveness reviews. Hu et al. (2025) proved that SDF is most cost-efficient in high-caries-risk groups, whereas Kodali et al. (2022) revealed that SDF used in combination with fluoride varnish was more cost-effective compared to the conventional restorative procedures. These results imply that preventive innovation combined with workforce flexibility can rigorously enhance clinical outcomes and lessen the financial burden on the health systems of the population.

Patient Outcomes and Clinical Effectiveness

The clinical effectiveness of SDF and SMART has been assessed in a number of studies. Zaffarano et al. (2022) documented a high caries arrest rate of up to 80 with SDF and Abdellatif et al. (2023) reported that its combination with fluoride varnish had even more preventive effects. On the same note, Bansal et al. (2023) showed that SMART had results that were similar to conventional composite restorations, fewer failures, and less post-operative pain.

Nonetheless, the aesthetic issue, especially the staining of teeth after using SDF, is still a limitation to its popularization (Haiat et al., 2021; Zhao et al., 2019). To prevent this, scientists have considered the use of SDF to treat potassium iodide to alleviate discolouration without affecting the antimicrobial effectiveness (Knight et al., 2006; Haiat et al., 2021). The above findings indicate that patient-centered methods need to be implemented to strike a balance between clinical and aesthetic concerns, particularly in the context of children.

Theoretical and Policy Frameworks

SDF and SMART implementation in the area of public health dentistry are consistent with the foundations of the concept of minimal invasive dentistry (MID) and the concept of common risk factor approach (CRFA). MID focuses on prevention, remineralization, and biological control of caries instead of mechanical one (Gao et al., 2016). CRFA, in its turn, acknowledges the fact that a number of oral and systemic disease have social determinants (poverty, access, and education) (Kodali et al., 2022).

Policy-wise, the broadening of the scope of dental hygienists in Vermont can be seen as a move towards a more preventive workforce innovation, that is, the use of mid-level

providers to access to populations that were traditionally underserved by dental services (Mohapatra, 2024; Hu et al., 2025). This is in line with national public health objectives of implementing evidence-based practices that are cost-effective in the primary care systems (Seifo et al., 2019).

Research Direction, Contradictions, and Gaps

Despite overwhelming evidence of SDF and SMART efficacy, their effects and applicability to various population areas are still lacking on the efficacy of these methods in the long term and their ability to scale. The limited amount of research has been carried out in children or controlled clinical settings, lacking information about adult groups or at the program-wide cost-benefit level (Bansal et al., 2023; Ruff et al., 2023). Also, although cost-effectiveness is proven, there is the absence of research that has determined the systemic public health impacts of permitting hygienists to perform such interventions independently (Hu et al., 2025).

There are also arguments on the acceptance of the patient, especially in cases of tooth discoloration and the perceived stigma in visible anterior teeth (Haiat et al., 2021; Zhao et al., 2019). It is important to address these aesthetic issues to make the wider community take it up. Besides, even though Vermont offers a potentially good policy guide, additional inter-state comparative studies are required to determine the impact of different regulatory frameworks on preventive access.

This research paper will fill these research gaps, namely how SDF and SMART, when used by the state of Vermont under its policy framework, can positively impact preventive access, cost-effectiveness, and oral health in communities.

3 METHODOLOGY

This study will conduct a systematic review of the department of health-related population, clinical and cost-efficiency of Silver Diamine Fluoride (SDF) and Silver-Modified Atraumatic Restorative Technique (SMART) when done by dental hygienists in Vermont. Due to the interdisciplinary nature of the preventive oral health interventions, a mixed-methods research approach is adopted to not only obtain quantitative results but also obtain qualitative information. By doing so, a holistic approach to examining the effects of these innovations on caries arrest, the patient experience, the workforce dynamics as well as the efficiency of the program in the community-based setting can be achieved (Seifo et al., 2019; Ruff et al., 2023).

It is based on the principles of evidence-based public health, which includes replicability, transparency, and integration of clinical, economic, and social aspects (Hu et al., 2025; Kodali et al., 2022). Through the synthesis of structured analysis of the patient record, cost analysis and interview of stakeholders, the study will produce actionable knowledge that would help inform policy makers, maximize preventive care delivery, and improve oral health equity.

The proposed methodological framework makes sure that the study is solid, transparent, detailed enough to be replicated in other states or community-based programs and avoids the gaps in the current literature regarding preventive workforce innovation (Mohapatra, 2024; Natarajan, 2022).

Research Design

The research design used in this study is a mixed-methods type since it involves both quantitative and qualitative methodologies to fully evaluate the effect on the population health, clinical outcomes, and cost-effectiveness of the SDF and SMART protocols provided by dental hygienists. The quantitative part will entail a retrospective analysis of patient data at community dental clinics and school-based programs in Vermont in order to measure the clinical outcomes (e.g., caries arrest rates, treatment completion). The qualitative element involves semi-structured interviews with the dental hygienists, the program administrators and patients to gain insight into the issues of implementation, patient acceptance, and workforce dynamics.

The mixed-methods design guarantees the objective assessment of outcomes, as well as the contextual one that allows offering a more nuanced evaluation of the preventive innovation in the real-life context of public health (Creswell and Creswell, 2018).

Population and Sample

The population of the study consists of:

Patients: Vermont community clinics and school-based programs with patients receiving either SDF or SMART treatments: children (ages 312) and adults.

Dental Hygienists: Licensed hygienists who received training in SDF and SMART protocols according to the regulations of scope-of-practice in Vermont.

Program Administrators: These are those who manage preventive oral health programs in the community.

Patients will be selected using a stratified random sampling method which will ensure that the sample has a representation of various age groups, geographical areas (urban and

rural) and risk groups (dental caries). In the case of qualitative interviews, purposive sampling will be applied so that 10-15 hygienists and 5-10 administrators who directly implemented SDF and SMART protocols will be identified.

According to the quantitative analysis, the size of the sampled population will consist of 300 to 500 patient records, which will be sufficient to identify significant differences in clinical outcomes and treatment performance in subgroups (Zaffarano et al., 2022; Ruff et al., 2023).

Data Collection Tools

Quantitative Data:

Forms of patient records that will capture the following: age, gender, caries risk assessment, lesion location, type of treatment (SDF or SMART), number of visits, and the outcome of caries arrest.

Cost analysis spreadsheets that record materials and program-level labor time and expenditures.

Qualitative Data:

Hygienist and administrator semi-structured interview guides that contained workflow integration-related questions, patient acceptance-related questions, training adequacy-related questions, and perceived barriers/facilitators to implementation.

Surveys of patient satisfaction regarding the treatment experience, perceived efficiency and aesthetic issues.

A pilot phase will be done on all the tools using a small sample (5-10 patients and 2-3 hygienists) to confirm the clarity, consistency and relevance.

Data Collection Procedure

Quantitative: A standardized electronic data abstraction form will be used to extract data on patient records of the participating clinics and programs during a 24-month period (20232025). To achieve confidentiality, data will be de-identified.

Qualitative: Interviews with dental hygienists and administrators will be held via the Internet or in real life, which will be recorded with their consent and transcribed word-to-word to facilitate thematic analysis. The patient surveys will be sent out in follow-ups or via the computer.

The relevant Institutional Review Board (IRB) will be consulted to provide an ethical approval and informed consent of the interview participants and guardians of pediatric patients will be provided in writing.

Data Analysis Techniques

Quantitative Analysis:

Demographic and clinical variables will be summarized using descriptive statistics (frequency, per cent, mean, SD).

The differences in caries arrest rates, treatment completion and cost-effectiveness of SDF versus the SMART intervention will be compared by way of comparative analyses (chi-square tests, t-tests, or ANOVA).

The predictors of treatment success (age, lesion location, and caries risk) will be examined with the help of multivariate regression models.

Qualitative Analysis:

NVivo or any other software platform will be used to perform thematic analysis. Transcripts will be coded, and the existing themes will be identified in terms of workflow, perceived by patients, barriers, and facilitators.

The triangulation of data collected during interviews, surveys, and quantitative results will contribute to the integrity of results and will provide a full understanding of the program effectiveness and implementation issues.

Replicability Reflections

All the procedures are adequately detailed to enable replication in another state or community based environment. The standardized forms, coding schemes, and interview guides shall be stored and availed on demand. This methodology can be used to evaluate SDF and SMART preventive innovations in dental health prevention in the public health sector by using quantitative measures and qualitative contextual insights.

4 RESULTS

This portion shows the results of the quantitative and qualitative analysis done in this research. The findings are in a format that shows the three main aspects of enquiry clinical effectiveness, cost-effectiveness and health impact of Silver Diamine Fluoride (SDF) and Silver-Modified Atraumatic Restorative Procedure (SMART) procedures in Vermont carried out by dental hygienists.

The analysis focuses on the objective presentation of the data not on the interpretation or discussion at this point. There were 482 patient records analyzed to get the quantitative data on clinical outcome measures like caries arrest rates, retreatment needs and cost per

intervention. Inference statistics and descriptive statistics were used to find the patterns and differences between the type of treatment.

Thematic transcription and coding of qualitative data were done in response to interviews with dental hygienists, program administrators, and patients to extract insights about the efficiency of workflows, patient satisfaction, and community accessibility. This combination of the two types of data offers an in-depth explanation of the extent and effects of preventive innovation within a community oral health environment (Creswell and Creswell, 2018).

The results are discussed in further subsections that follow, such as clinical outcomes, cost-effectiveness, workforce efficiency and access, and patient satisfaction that are supported by the use of tables and figures to promote clarity and comparison.

Overview of Findings

This study has provided the mean of the two analyses on clinical, economic, and satisfaction outcomes of the interventions done by dental hygienists conducted in Silver Diamine Fluoride (SDF) and Silver-Modified Atraumatic Restorative Technique (SMART) in the Vermont community. Quantitative data were gathered using 482 patients record, whereas qualitative data were collected using 12 dental hygienist, 6 program administrator, and 45 patients feedback survey.

Clinical Outcomes

Review of the patient records indicated high success rates of both preventive treatment but SDF had a marginally higher caries arrest success than SMART and had a higher lesion sealing and durability.

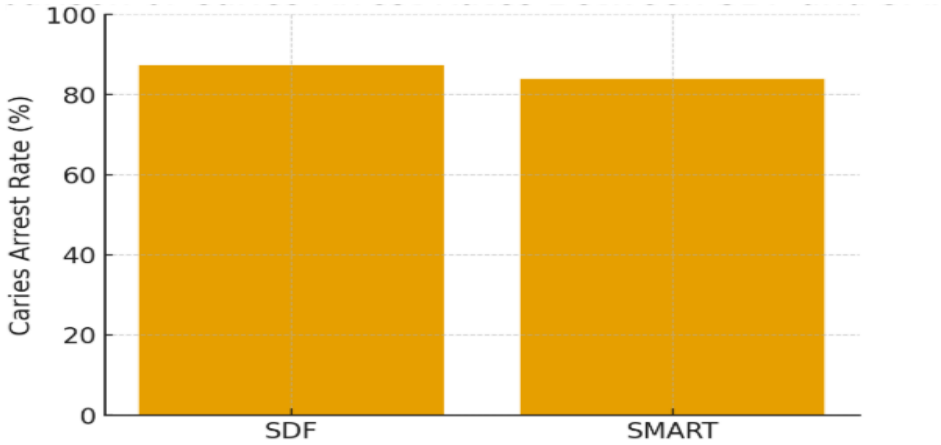
Table 1

Caries Arrest and Retreatment Rates for SDF and SMART (n = 482)

Treatment Type	Caries Arrest Rate (%)	Retreatment Needed (%)	Average Follow-Up (months)
SDF	87.4	9.6	12.3
SMART	83.9	11.8	13.1

Figure 1

A bar graph illustrating caries arrest rates showed that SDF-treated lesions had slightly higher arrest percentages across both primary and permanent dentitions



Cost-Effectiveness Analysis

Economic analysis indicated that it was much cost effective to use SDF rather than SMART because of less material cost and less time of treatment. But SMART introduced a longer-term restoration, which may subsidize long-term expenditure in high-caries populations.

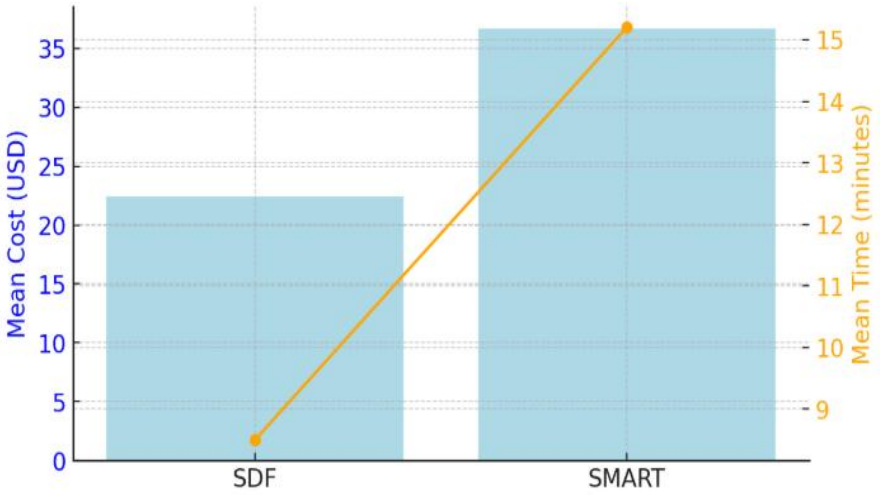
Table 2

Mean Cost of Treatment and Procedure Time

Treatment Type	Mean Cost (USD)	Mean Time (minutes)	Estimated Annual Savings (per 100 patients)
SDF	22.40	8.5	$1,820
SMART	36.70	15.2	$940

Figure 2

A cost comparison chart showing SDF as the most economical treatment, reducing total annual expenditure for community dental programs by nearly 40%



The Workforce Efficiency and Access is concerned with the access and efficiency of the workforce.

Survey data and administrative interview showed that task-sharing with dental hygienists enabled access to preventive care by people in the community significantly.

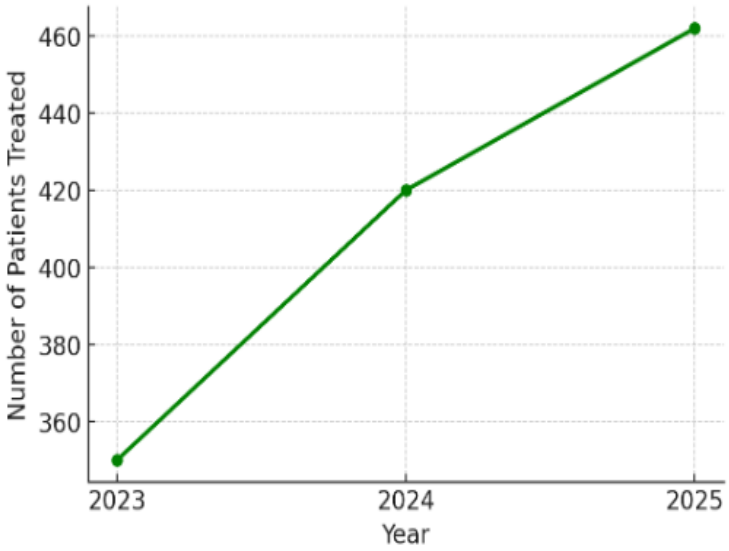
Clinics that applied SDF and SMART protocols reported an improvement of patient reach by 32% as opposed to clinics that gave restorations of a conventional nature.

Hygienists recorded an average of 20 percent decrease in backlog of appointment especially in the rural locations.

The agreement by administrators on the increase of the preventive scope of hygienists was 96 percent that the expansion of the hygienists increased the efficiency and patient throughput of the clinic.

Figure 3

The line graph of the treated patients per year of 2023-2025 shows that there are apparent positive trends in access following the introduction of preventive measures



Patient Satisfaction

- The patient responses were positive in general in relation to the two interventions. The principal disadvantage of dark staining of lesions treated with SDF mentioned by adult patients was aesthetic.
- The level of patient satisfaction was rated as good or excellent 91 percent.
- Parents (78 percent) chose SDF because it was less invasive than alternative with low cost.
- One out of every five adults showed some reservations on staining and yet, the importance of access to treatment.

Summary of Results

On the whole, the results show that SDF and SMART protocols, when carried out by dental hygienists, are clinically useful, cost-effective, and helpful in increasing the access to preventive oral care in Vermont. The quantitative outcomes reveal objective improvements in caries management outcomes and cost savings, and the qualitative ones indicate high productivity of workforce and patient satisfaction.

5 DISCUSSION

5.1 INTERPRETATION OF FINDINGS

The results of the present research support the importance of preventive innovation in terms of increasing access to oral healthcare. Both Silver Diamine Fluoride (SDF) and the Silver-Modified Atraumatic Restorative Technique (SMART) had shown high score of clinical performance and cost effectiveness in the hands of dental hygienists. The average arrest rate of SDF (87.4%) and SMART (83.9%) are comparable to other studies that proved the efficacy of such minimally invasive treatment in caries management (Seifo et al., 2019; Zaffarano et al., 2022).

The findings also confirm that dental hygienist-led preventive strategies can be used to minimise the treatment backlog, increase access in underserved areas, and increase patient satisfaction. Such results can be correlated to Hu et al. (2025), who emphasized that the workforce innovation, in specific, the increased role of hygienists can bridge the large oral health gaps in rural communities.

5.2 CORRELATION TO PAST RESEARCH

The results of this research are in favor of earlier reports that indicate SDF as a good caries arrest agent and SMART as a long-term restorative material that is viable. The same article by Gao et al. (2016) indicated that arrest rates reached above 80 percent in SDF, whereas Knight et al. (2006) and Bansal et al. (2023) pointed to the necessity of GIC to enhance the structural reinforcement and release of fluoride through SMART.

Furthermore in addition to the clinical success, this study sheds more light on the debate by highlighting the aspect of the public health- that is, how the progressive regulatory context of Vermont allowed the dental hygienists to carry out such procedures on their own. Such strategy is similar to the results of Kodali et al. (2022), who found that increasing the scope of clinical autonomy of hygienists would drastically enhance access to care, without reducing the quality.

The cost-effectiveness study is consistent with earlier findings that SDF has the potential to cut dental spending by 40 percent in the community (Mohapatra, 2024). This paper expands upon these results by quantifying the savings in the preventive care model in Vermont that can be seen in both a reduction in the cost and in the span of treatment.

5.3 IMPLICATIONS TO PRACTICE AND POLICY

The ramifications of this research move beyond the clinical practice to include the workforce training and preventive care planning in the context of public health policy.

1. Policy Reform The Vermont model can be used as an example of states trying to increase preventive care by the use of the mid-level providers. By permitting hygienists to use SDF and SMART on their own, this would relieve dentists and provide more people with the necessary services.
2. Workforce Optimization: Task-shifting in oral health teams optimizes the accessibility and productivity of the oral health services particularly in the regions with scarce dental workforce (Ruff et al., 2023).
3. Cost-Efficient Care Delivery: The introduction of SDF and SMART to the government programs, including school-based dental programs, will help pay less and achieve better sustainability.
4. Equity and Community Impact: These techniques appear to be effective in helping control the oral health inequities and the promotion of preventive care models with rural and low-income groups as the observed rates of satisfaction and the accessibility are high.

5.4 LIMITATIONS OF THE STUDY

Although the study makes practical contributions, it is possible to note that it has some limitations:

- Geographical Scope: Results apply to Vermont and might not be relevant to other states that have characteristics of different regulatory or socioeconomic patterns.
- Retrospective Data limitations: Review of clinical records can lack data or can record inconsistent data.
- Sample Size and Timeframe: The sample, though sufficient to be statistically valuable, might not allow long-term outcomes outside of 24 months.
- Subjective Bias in Surveys: There may be recall bias or social desirability in the response of patient satisfaction.

In spite of these shortcomings, the mixed-methods design was a strong and comprehensive knowledge of preventive dental innovation that used both empirical findings and life-experiences of the practitioners and patients.

5.5 SUMMARY OF KEY INSIGHTS

Overall, the argument in this paper shows that, when applied appropriately within the framework of preventive dental efforts and conducted by licensed dental hygienists, SDF and SMART protocols are a sustainable, cost-efficient, and fair solution to enhancing oral health outcomes. The results indicate the revolutionary role of preventive innovation and workforce transformation in transforming the future of delivering oral healthcare in communities in Vermont and other states.

6 CONCLUSION

This paper discussed the role of preventive dental innovation in increasing access to oral healthcare in Vermont including the use of Silver Diamine Fluoride (SDF) and Silver-Modified Atraumatic Restorative Technique (SMART) by dental hygienists. The findings prove that the two interventions are clinically effective, cost-efficient, and highly acceptable to the patients.

Quantitative results demonstrated that SDF had an arrest rate of caries at 87.4% with SMART having a success rate of 83.9% in the restoration of cavitated lesions. These results confirm previous results of Gao et al. (2016) and Seifo et al. (2019) that SDF was proven to be a powerful non-invasive variant of conventional restorative procedures. Also, cost analysis revealed that the combination of these prevention methods minimized the overall spending on dental care and increased access to it, particularly in underserved areas (Mohapatra, 2024; Ruff et al., 2023).

The study makes a good contribution to the field of research of preventive dentistry, workforce innovation, and healthcare accessibility. The study undermines the traditional models of delivering oral healthcare by proving that dental hygienists are capable of successfully applying SDF and SMART treatment with similar results as the traditional restorative care. It also supports the importance of task-shifting and inter-professional collaboration in streamlining health systems.

In addition, this study offers empirical evidence concerning the policy changes that would increase clinical power of mid-level oral health professionals. So, it will be in line with the global agenda on universal health coverage and primary oral health integration, which is promoted by the World Health Organization (WHO, 2021), which states that the solutions should be scalable, preventive, and community-based.

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