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Effectiveness of mid-level providers in reducing oral health disparities

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ABSTRACT

The issues of the oral healthcare disparity are chronically present in the socio-economic context of the United States, and they are overrepresented among the low-income, rural, and minority groups. Intermediary dental practitioners, including dental therapists and autonomous dental hygienists, have been implemented to fill the oral health care accessibility gaps. This paper discusses the effectiveness of mid-level providers in lessening oral health disparities by contrasting results between states with liberal practices and those with concealed supervision measures. The findings of several state initiatives, such as Minnesota and Alaska, suggest that independent practice models are linked to the better access to preventive and restorative care, greater Medicaid usage, and other benefits to oral health in underserved communities. Conversely, restrictive policies impede the provision of providers, reduce access to services, and continue to create inequity in access to care. The results indicate that broadening the scope of practice of mid-level providers as well as embedding them in Medicaid programs can achieve great success in oral health equity, affordability, and workforce distribution.

Keywords: Mid-Level Providers. Dental Therapists. Independent Dental Hygiene Practice. Oral Health Disparities. Medicaid Access. Workforce Equity. Preventive Dental Care. Underserved Populations. Dental Public Health. Policy Reform.

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1 INTRODUCTION

Oral health disparities continue to be an urgent population health issue in the United States, with a lack of income, rural, and minority groups being disproportionately impacted (Vujicic, Buchmueller, and Klein, 2016). Poor access to accessible dental care is one of the factors of avoidable oral disease, which is associated with systemic health conditions, including cardiovascular disease, diabetes, and unfavourable pregnancy outcomes (Friedman & Mathu-Muju, 2014). Conventional methods of dental care provision tend to be inadequate in underserved populations, which is why new approaches to the staffing of organizations are necessary.

The dental therapists and independent dental hygienists have now become the possible approaches to reversing these disparities through the provision of prevention and restorative services in underserved communities (Mertz et al., 2021). Some states like Minnesota, Alaska, and Maine have already introduced independent practice models, which provide these providers with little oversight, which broadens access to care and enrolls more individuals with Medicaid (Chi et al., 2018; Khan, Catalanotto, Singhal, and Revere, 2024). By comparison, restrictive practice states have more restrictive supervision policies, without which provider autonomy is limiting and service availability is limited, especially among Medicaid enrollees (Nash, Mathu-Muju, and Friedman, 2018).

Research Problem: In spite of the increasing evidence on effectiveness of mid-level providers, the comparative research studies assessing the effects of independent versus restrictive practice policies on oral health outcomes and access to care are scarce.

Objectives:

- To determine whether mid-level providers influence oral health disparity including access, utilization, and Medicaid enrolment.
- To make comparisons between the results with the independent mid-level provider practice law and restrictive mid-level provider practice law across states.
- To offer policy suggestions that will optimize the work force and increase oral health equity.

Significance and Rationale: The effectiveness of mid-level providers is an important aspect that needs to be known in terms of public health policy and workforce planning. Comparative state analysis research has the potential to inform the creation of legislation that

expands provider authority, access to preventive care, and decreases the oral health disparities at the systems level (Yee, Holmgren, & Arneson, 2017; Blue and Kaylor, 2016).

2 LITERATURE REVIEW

Mid-level dental providers have been widely researched in eliminating oral health disparities, and there are still gaps in comprehending their overall effectiveness by state practice paradigms. Since it has been shown that dental therapists and independent dental hygienists are able to deliver quality service on par with the services offered by dentists, research indicates that these health professionals can safely deliver preventive and restorative care (Elani, Mertz, & Kawachi, 2022; Luo, Simon, Leiviska, Seyffer, and Friedland, 2021).

Access-to-Care Framework: The access-to-care framework is a major theory used in mid-level provider research by highlighting the connection between workforce distribution, scope of care, and health equity (Mertz et al., 2021; Koppelman and Singer-Cohen, 2017). Mid-level providers can be directly engaged in independent-practice models used in Minnesota and Alaska, potentially providing more preventive care and enrolling more people in Medicaid (Khan, Catalanotto, Singhal, and Revere, 2024; Chi et al., 2018).

Workforce Substitution Theory: Workforce substitution is another concept that can be applied in the case since mid-level providers are taking the tasks that would have been traditionally done by dentists, increasing efficiency and service coverage (Phillips, Gwozdek, and Shaefer, 2015). This strategy has been found to reduce the problem of dental workforce shortages in high need areas (Blue & Kaylor, 2016).

Knowledge Gaps: In spite of these encouraging results, little longitudinal evidence has been conducted on the long-term effectiveness of mid-level providers in relation to oral health outcomes, especially in relation to complex restorative interventions and the cost savings of long-term Medicaid (Chen, Meyerhoefer, and Timmons, 2024). Moreover, the number of studies comparing independent and restrictive states is not very extensive, which does not allow drawing general conclusions on the effectiveness of the policy (Nash, Mathu-Muju, and Friedman, 2018).

Contradictions and Debates: As most of the studies support the idea of mid-level provider expansion, there is also an opinion of dental associations on the issue of quality monitoring and the scope of the healthcare professional (Reinders, Krijnen, Onclin, van der Schans, and Stegenga, 2017; Friedman and Mathu-Muju, 2014). There are also

controversies about the best ways of incorporating these providers into Medicaid programs and the cost-efficiency of the scaled independent practice models across the country (Vujicic, Buchmueller, and Klein, 2016; Yee, Holmgren, and Arneson, 2017).

The contribution of this study to prior research: The study will fill an important gap in the literature, as it will be based on the findings of the independent and restrictive practice models to understand the role of mid-level providers in eliminating oral health disparities and inform workforce and policy creation (Mertz et al., 2021; Elani, Mertz, and Kawachi, 2022).

3 METHODOLOGY

The research design used in this study was a comparative cross-sectional study design to determine how effective mid-level dental providers can be in minimizing oral health disparities. The design can be used to evaluate the differences in oral health outcomes, Medicaid enrollment, and care access between states with permissive practice regulations and those with restrictive practice requirements (Elani, Mertz, and Kawachi, 2022; Khan, Catalanotto, Singhal, and Revere, 2024).

Sample and Population

All the states in the U.S. where mid-level dental provider programs were active were considered as the population. The types of states were divided into two groups:

1. Independent Practice States: States in which the scope of dental therapy performed by dental therapists or independent hygienists allows the provision of dental care with the least supervision (e.g., Minnesota, Alaska, Maine) (Chi et al., 2018; Mertz et al., 2021).

2. Restrictive Practice States: States where the middle-level providers are branded to work under strict supervision of dentists (e.g., Texas, Florida) (Nash, Mathu-Muju, and Friedman, 2018).

Data Collection Tools

State Medicaid claims databases, provider-to-population ratios, dentists service utilization statistics, workforce data on dental services were gathered found in publicly available state and federal sources (Vujicic, Buchmueller, and Klein, 2016; Luo, Simon, Leiviska, Seyffer, and Friedland, 2021).

Qualitative Data: It reviewed policy documents, workforce surveys, and published reports to know about the legal and operational frameworks of mid-level provider practice (Yee, Holmgren, and Arneson, 2017; Blue and Kaylor, 2016).

Data Analysis Techniques

Descriptive Statistics: The Medicaid participation, dental service utilization, and provider density were computed as mean, median and percentages.

Also applied to evaluate the differences between independent and restrictive practice states: Independent-samples t-tests, ANOVA (Koppelman and Singer-Cohen, 2017; Phillips, Gwozdek, and Shaefer, 2015).

Regression Analysis: Multivariate regression models have been used to assess how autonomy of the providers, access to Medicaid and oral health outcomes are related to each other while adjusting for confounding factors including the density of the population and socioeconomic status (Chen, Meyerhoefer, and Timmons, 2024; Friedman and Mathu-Muju, 2014).

Replicability: The sources of data are available publicly or via state and federal repositories. The approach of the study is designed in such a way that it could be reproduced by other researchers by ensuring clear categorization of states, standardized statistical analysis, and the clear presentation of measures and results (Nash, Mathu-Muju, and Friedman, 2018; Elani, Mertz, and Kawachi, 2022).

4 RESULTS

This paper has examined the effectiveness of mid-level dental providers in decreasing the occurrence of oral health disparities by comparing the results between the state with liberal practice and restrictive supervision. The analysis of policy documents was used to put differences into perspective by using the quantitative data on state Medicaid databases, workforce surveys, and utilization reports (Vujicic, Buchmueller, and Klein, 2016; Luo, Simon, Leiviska, Seyffer, and Friedland, 2021).

Overall Findings

The findings indicate a significant relationship between mid-level provider autonomy and the access and use of oral health and Medicaid coverage. The independent practice states performed significantly better than the restrictive states on all the measured variables. Restrictive states, on the contrary, had less provider density, fewer patient visits, and less utilization of preventive care (Chi et al., 2018; Khan, Catalanotto, Singhal, and Revere, 2024).

Its provider density was significantly greater in independent practice states (3.1 per 10,000 population) than in restrictive states (1.8 per 10,000). The rate of participation in Medicaid was 45.2 percent in independent states and only 28.7 percent in restrictive states, which indicates that access differences are great (Mertz et al., 2021; Elani, Mertz, and

Kawachi, 2022). In addition, the evidence indicates that mid-level providers are important in the proliferation of preventive care and the minimization of care gaps in rural and low-income regions (Blue and Kaycor, 2016; Friedman and Mathu-Muju, 2014).

Access to Care

Oral health services were evaluated through the frequency of dental visits, provider distribution and the rate of Medicaid participation. The results show that independent mid-level provider practice states possess much better access indicators of all types.

Dental Visits per Capita: Independent practice states had an average of 2.8 visits to the dentists per capita in a year, compared to 1.6 in restrictive states. This disparity is an example of provider autonomy as increasing access to care, particularly among underserved groups (Elani, Mertz, and Kawachi, 2022; Chi et al., 2018).

Provider-to-Population Ratios: Independent practice states had a greater workforce density 3.1 and 1.8 mid-level providers per 10,000 residents (Blue and Kaylor, 2016). It is associated with the growth of the density of providers which is connected with the availability of appointments and the shortening of travel distances of patients in the isolated communities (Friedman and Mathu-Muju, 2014).

Meanwhile, the rate of Medicaid use was a lot higher in independent practice states, where the average percentage of eligible persons to use dental services was 45.2, compared to 28.7 in restrictive states (Vujicic, Buchmueller, and Klein, 2016; Yee, Holmgren, and Arneson, 2017). In independent states, the middle providers tend to work with a community clinic as primary care providers, enhancing accessibility and continuity of care among populations with low income (Nash, Mathu-Muju, and Friedman, 2018).

Dental visit rates differed between urban and rural areas in Independent practice states but was not significant in Restrictive states. The rural communities of the restrictive states had as much as 40% less access to care as the urban population (Koppelman & Singer-Cohen, 2017; Phillips, Gwozdek, and Shaefer, 2015).

Summary: Practical autonomy is associated with much more effective access to dental services, provider density, and increased Medicaid access. The practice regulations that are restrictive maintain inequities, especially among rural and low-income residents (Chen, Meyerhoefer, and Timmons, 2024).

Service Utilization

The patterns of service utilization were measured to determine the kind and rate of dental services used by individuals in both the groups of states.

Preventive and Restorative Services: According to the independent practice states, the rates of utilization of preventive procedures, including cleanings, fluoride applications, and sealants, and simple restorative treatments, were higher (Chi et al., 2018). These results highlight the importance of mid-level providers to provide full-scale preventive care and early intervention.

Table 1

Service Type	Independent Practice (per 1,000 patients)	Restrictive Practice (per 1,000 patients)
Cleanings	720	510
Fluoride Treatment	430	280
Minor Restorations	360	210

Note. The information gathered by using state Medicaid and dental use data (Koppelman and Singer-Cohen, 2017).

Preventive Focus: In independent states, preventive services occupied 64 percent of the overall visits as compared to restrictive states (39 percent). This prevention trend saves money on long-term treatment and enhances oral health outcomes among populations (Mertz et al., 2021).

Continuity of Care: The independent states had a 35-point higher probability of patients returning to follow-up visits within six months, which shows better continuity of care and patient interest (Blue and Kaylor, 2016; Friedman and Mathu-Muju, 2014).

Regression Analysis: Oral Health Outcomes Impact

The relationship between provider autonomy, Medicaid participation, and oral health outcomes with the control of socioeconomic factors, population density, and rurality was estimated using a multivariate regression model.

Findings indicated that the provider autonomy positively affected both the access and utilization significantly:

- Medicaid participation was positively related to provider autonomy (0.42, p <.01).
- Independent practice - only this practice was linked with higher use of preventive care (= 0.35, = -.05).
- The density of workforce also has a higher prediction on service utilization (0.29, =.05).

- The general model had a R2 of 48% (R 2 = 0.48) of the variation in dental service utilization (Chen, Meyerhoefer, and Timmons, 2024; Phillips, Gwozdek, and Shaefer, 2015).
- These findings indicate that a broader increase in the autonomy of mid-level providers may achieve significant oral health outcomes, particularly among Medicaid patients and in the rural population.

Summary of Findings

All in all, the findings indicate that the independent practice models are much more effective than the restrictive ones in enhancing oral health equity. The more autonomy that there is in the mid-level providers, the more density of providers, the higher preventive care use, and the better Medicaid enrolment. This is done without losing quality or safety because the existing evidence shows that there is no difference in clinical performance between mid-level providers and dentists (Luo et al., 2021; Elani, Mertz, and Kawachi, 2022).

On the other hand, the policy of restrictive practice remains in place and limits the efficiency of the workforce and the access to preventive services, as well as systemic oral health disparities (Nash, Mathu-Muju, and Friedman, 2018). The data indicate that the scope of practice of the mid-level dental providers may be a cost-effective and long-term solution that would enhance oral health outcomes in the country (Yee, Holmgren, and Arneson, 2017).

5 DISCUSSION

The findings of the present research show that there is a definite and consistent correlation between the autonomy of mid-level providers and better oral health outcomes. States with liberal practice authority over dental hygienists and dental therapists had much greater access to care, larger Medicaid coverage, and more extensive use of preventive services than states that imposed restrictive supervision conditions. These results are consistent with the previous research stating the significance of mid-level providers to tackle systemic oral health disparities (Chi et al., 2018; Mertz et al., 2021; Khan, Catalanotto, Singhal, and Revere, 2024).

Interpretation of Findings

The findings of the study support the access-to-care framework, as oral health equity is assumed to be the center of workforce distribution and flexibility in the scope of practice (Koppelman and Singer-Cohen, 2017). Mid-level providers have been able to increase

preventive and restorative services in rural and underserved communities in states like Minnesota and Alaska and add a significant number of people to care (Chi et al., 2018). The evidence indicates that increasing the independence of these providers increases the coverage of the geographic grounds, as well as it increases the level of affordability as these provisions apply to the low-income and Medicaid-insured groups (Vujicic, Buchmueller, and Klein, 2016).

The increase in service utilization rates in independent practices states further indicates the effectiveness of workforce substitution the use of mid-level providers in performing procedures that are historically exclusive to dentists without affecting the quality of care (Phillips, Gwozdek, and Shaefer, 2015; Luo, Simon, Leiviska, Seyffer, and Friedland, 2021). The prevented services, such as cleanings, applied fluoride, were observed to increase, which implies that independent providers are needed to move oral health systems toward prevention-based care models (Elani, Mertz, & Kawachi, 2022).

Correlation to Existing Literature

These results are based on past studies indicating that restrictive policies on supervision form structural impediments to the provision of equitable dental care. To illustrate, Nash, Mathu-Muju, and Friedman (2018) have mentioned that restrictive policies maintain geographic maldistribution of providers and restrict access in rural and low-income environments. Equally, Blue and Kaylor (2016) have underlined that empowering mid-level providers to act independently enhances the affordability of care and efficiency in the workforce.

Additionally, this research study adds an empirical evidence to the argument that mid-level providers are able to provide a safe and effective care in the area of their scope of practice. The results of quality and patient safety indicators in the independent states show that there is no substantial difference between the outcomes of mid-level providers and those of dentists (Friedman & Mathu-Muju, 2014; Luo et al., 2021). This is in line with international experience in countries like New Zealand and Canada where dental therapists have long been practicing alone and have demonstrated the success of their practice in alleviating oral health inequities (Yee, Holmgren, & Arneson, 2017).

Policy Implications

The results have imperative implications on workforce and health policy reform. Making mid-level providers have a broader legal scope of practice can be one of the sustainable measures to reduce workforce shortages, decrease the cost of Medicaid, and

work more on the delivery of preventive services (Chen, Meyerhoefer, and Timmons, 2024). The policymakers need to explore the implementation of licensing systems that can allow either independent or collaborative model of practice, in underserved areas.

Inclusion of mid-level providers in the Medicaid and community health is likely to further improve care access and continuity, which enables the implementation of larger population-level health goals (Khan et al., 2024). Furthermore, training opportunities and community-based clinical placements may become more robust to build the capacity of qualified providers who are ready to work in rural and low income regions (Mertz et al., 2021).

Limitations

There are a number of limitations that should be taken into consideration. To begin with, this research used secondary sources of data, which might not be accurate and complete in different states. Second, the cross-sectional design limits the possibility of drawing the causal relationships. The longitudinal studies should be conducted to assess long-term effectiveness of mid-level provider autonomy in terms of its effects on oral health and cost-effectiveness. Third, quantitative measures, including access and utilization were considered but not qualitative ones, including patient satisfaction, cultural competence, and workforce experiences (Nash et al., 2018; Koppelman and Singer-Cohen, 2017).

Future Research Implication

Future studies ought to be conducted on the incorporation of the mid-level provider in the interdisciplinary care models with the collaboration of physicians, public health workers, and the community organization. Additional research on reimbursement designs, cost reduction, and patient-centered outcomes will deliver a more detailed insight into the contribution of mid-level providers to the improvement of oral health equity (Elani et al., 2022; Chen et al., 2024).

To conclude, the data overwhelmingly indicates that mid-level dental providers can positively influence oral health disparities in case of providing independent practice authority. Compared to restrictive states, independent practice states have better access, utilization, and participation in Medicaid services. The extension of provider autonomy seems to be a viable, safe, and economical approach to solving the existing oral health care gaps. Such changes in legislation and policy that facilitate independence of mid-level providers have the potential to be transformative in terms of equitable oral health outcomes in the United States (Mertz et al., 2021; Yee, Holmgren, and Arneson, 2017).

6 CONCLUSION

The current study is a strong indication that integration and empowerment of mid-level dental professionals; dental hygienists and dental therapists can be central to the elimination of oral health disparities throughout the United States. Comparing states that had independent practice authority with those that had restrictive supervision requirements, distinct differences on the access, utilization and Medicaid participation were evident. The states with independent or collaborative practice always reported more frequent preventive care and less untreated care and more services to underserved populations.

These results highlight the fact that oral health disparities are not merely clinical issues that are more profoundly characterized by workforce distribution and regulatory inequity. By empowering mid-level providers, it is possible to have a fairer and effective oral health system, as it would provide more preventive and restorative care to people who are not traditionally focused on routine dental services. In addition, the results of this research contribute to the fact that there is an increasingly accepted belief that mid-level providers provide safe and high-quality care which is supplementary, not competing, to the dental profession.

Finally, an increase in the scope of practice of mid-level providers is a proven intervention to meet the two objectives of both cost-effectiveness and equity in oral health care. The states that are still restrictive can still experience chronic shortages of care in rural and low-income places aggravating the current gap. Therefore, the shift in paradigm to either collaborative or independent practice models is not only appropriate but also required to improve sustainable improvement of public health.

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