Journal of Pediatric Nursing (2015) **30**, 543–549

Outcomes of a Quality Improvement Project Examining Early Childhood Caries and Improving Identification of At Risk Patients in a Pediatric Medical Home Setting[1,2]

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Received 16 April 2014; revised 19 August 2014; accepted 28 October 2014

Key words:
Early Childhood Caries;
Pediatrics;
Screening;
Primary care;
Quality improvement

Early childhood caries (ECC) is a widespread childhood disease that disproportionately affects children with disabilities, those in lower-income households and minority children. The American Academy of Pediatrics (AAP) recommends that all children be screened for ECC and referred to a dentist by the age of one. This quality improvement project took place at a hospital-affiliated pediatric clinic. A caries risk screening tool was implemented at 9-, 12-, and 18-month well child check-ups for 3 months. A retrospective chart review was performed for comparison purposes. The quality improvement project indicated improvement in identification of children at high-risk for ECC.

Background Knowledge

EARLY CHILDHOOD CARIES (ECC) remains the number one chronic disease affecting young children in the United States (Dye et al., 2007). ECC is defined as the presence of one or more decayed, missing, or filled tooth surfaces in any primary tooth in a child between birth and 3 years of age (Viswananathan, 2010). Children belonging to racial and ethnic minorities are more likely to have dental decay than white children, and typically their decay is more severe (Dye et al., 2007). Children most at risk for developing ECC are those insured by Medicaid, have mothers with dental decay, are premature, or have other special health care needs (Pediatrics, A. A., 2012). Despite ECC being largely preventable, it continues to be five times more common than asthma and seven times more common than hay fever in the pediatric population in the United States. Not only is it the most common pediatric disease, it can lead to physical and psychological disabilities as well as considerable morbidity in adulthood (Szilagyi, 2009).

Thus, there is a need for collaboration among primary care providers and dentists to effectively address the health needs of children most at risk for caries, in particular, those ages birth to 3 years. Pediatric primary care providers are the frontline providers of healthcare for infants and toddlers and see children at high risk for ECC on a regular basis, whereas a dentist may not see children until age 5 (Berg & Stapleton, 2012). Currently, the American Academy of Pediatrics (AAP) recommends all children have their first dental visit by age one (Pediatrics, A. A., 2012). Educating pediatric primary care providers to perform a rapid oral health risk assessment at specific well-child checkups, coupled with anticipatory guidance, fluoride varnish, and referral of high-risk patients to pediatric dentists, are economically viable options for pediatric office visits (Berg & Stapleton, 2012).

Significance to Healthcare

In 2003, the U.S. Department of Health and Human Services (US DHHS) issued a national call to action to

[1] No outside financial or commercial support has contributed to this QI project.
[2] Information from this project was presented to the DNP faculty and students at the Medical University of SC, College of Nursing on April 8, 2014.
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http://dx.doi.org/10.1016/j.pedn.2014.10.020
0882-5963/

promote oral health. A key aspect of this call to action focused on the oral health of the pediatric population, recommending the replication of effective programs and demonstrated efforts that have improved oral health (U.S. Department of Health and Human Services (USDHHS), 2003). Despite this call to action, early childhood caries remain a significant issue in South Carolina and throughout the United States. According to the South Carolina Department of Health and Environmental Control (SC DHEC), 52% of children under the age of eight in South Carolina have experienced tooth decay (2007). Children from economically disadvantaged households are significantly more likely to experience early tooth decay (Dye et al., 2007). Approximately 430,000 children or 42% of those under age of 18 in South Carolina live below 200% of the federal poverty level, thus increasing their risk for early childhood caries [South Carolina Department of Health and Environmental Control (SCDHEC), 2007]. In response to the US DHHS call to action, South Carolina undertook several strategies to address the oral health needs of its population. Two of these initiatives were the establishment of a Children's Oral Health Coalition and the use of Bright Futures in Practice: Oral Health. Bright Futures has been instrumental in South Carolina's efforts to improve children's oral health. (Zimmerman, 2006)

Evidence Review

Despite awareness of an increase in ECC incidence and of effective prevention strategies, proper infant oral healthcare and the establishment of a dental home by age one have not become standards of clinical practice (Ramos-Gomez, Crystal, Man Wai, Crall, & Featherstone, 2010). The American Dental Association, the American Academy of Pediatric Dentistry, and the American Association of Public Health Dentistry first endorsed caries risk assessment, but its practice by non-dental professionals has become more widespread (AAP, 2012). The AAP now recommends the use of a risk assessment tool during well child visits to all pediatric providers, and many community-based organizations use the tool as an essential portion of their comprehensive infant oral care programs (Ramos & Man-Wai, 2011). A risk-based disease management approach to address ECC has been successfully implemented in hospital-based dental practices and has demonstrated better clinical outcomes than traditional approaches to caries management. At one site, the disease management group experienced a 62% lower risk of new caries (Ng et al., 2012). Interviewers also found parents receptive to use of a disease management protocol and appreciative of explanations why their children may have developed ECC (Ng et al., 2012).

Several current oral health models rely upon collaborative efforts between medical and dental associates to effectively address the pediatric oral healthcare needs. One example is North Carolina's Mouth of Babes Program, which was designed on the concept that the pediatrician's office is an excellent opportunity to initiate oral health interventions. Medicaid reimburses the medical providers for three healthcare visits, prior to 3 and one-half years of age, that specifically focus on risk assessment, anticipatory oral health guidance, and fluoride varnish application. The program has reported an increase in access to preventive services and improved treatment outcomes, with a 49% reduction of ECC before children reach 8 months of age. Medical providers were able to identify oral disease with 88% accuracy, and referral effectiveness increased from 12 to 33% (Berg & Stapleton, 2012).

In a cross-sectional survey examining primary care clinicians in pediatric practices and referral rates based on dental screenings at the clinic, De la Cruz, Rosier, and Slade (2004) found 78% of the providers were likely to refer a child who was at high-risk for future dental disease. However, investigators also found 96% merely gave the primary caregiver the name of a local dentist without additional information. De la Cruz et al. (2004) concluded that, with effective training, pediatric primary health care providers could provide oral health promotion and disease prevention tools to help reduce dental disease in the pediatric population.

Evidence reviewed here suggests that consistent implementation of a risk-screening tool can effectively increase identification and timely treatment of ECC.

Intended Improvement

The objectives of this project were to (a) increase the identification of primary care pediatric patients at high-risk for development of early childhood dental caries and (b) effectively refer those patients to a dental provider. This process improvement project involved implementation of a risk assessment tool at the 9-, 12-, and 18-month well child visit. Children identified as high-risk after screening with the risk assessment tool were then referred to a local pediatric dentist.

Clinical Question

In the pediatric primary care setting, how does the implementation of a risk-screening tool affect the identification and referral of children at high-risk for dental caries?

Methods

Ethical Issues

The purpose of this quality improvement project was to improve the identification and management of pediatric patients at high-risk for dental caries seen during well child visits. All data were de-identified and used solely for quality improvement purposes. Based on 45CFR46.101(b)2 and 46.102(f) and 45CFR164.514(a)-(c) of the Health Insurance Portability and Accountability Act, the project was exempt from institutional review board review. All employees working on the project are bound by HIPAA regulations to retain privacy of the patients involved.

Setting/Sample

The project was implemented in a hospital affiliated pediatric clinic that provides care based on the medical home

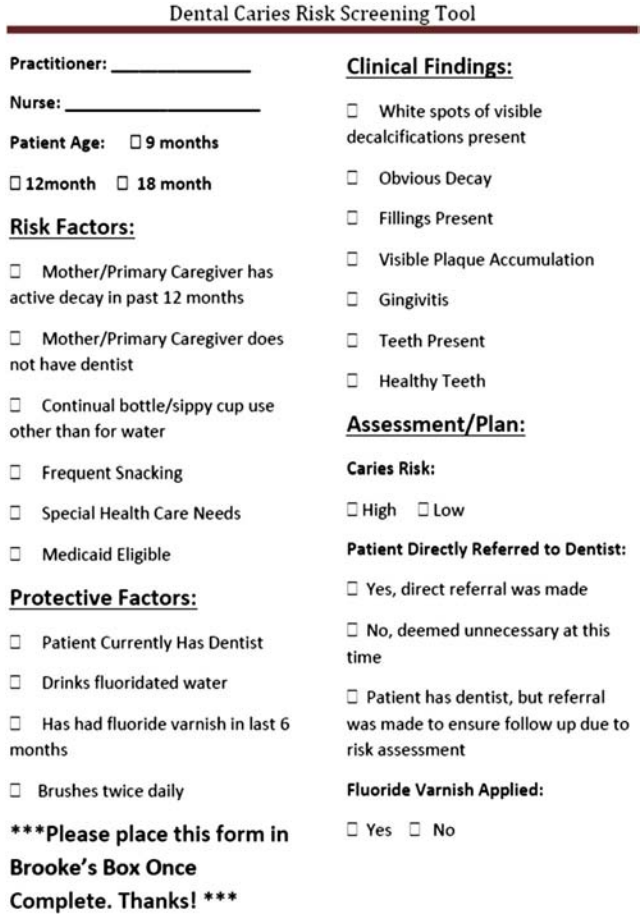
model established by the AAP (Medical Home Initiatives for Children With Special Needs Project Advisory Committee, 2002). Ninety-one percent of the patients at this site are Medicaid-eligible, and 4% are uninsured. Over 50% of the current patient population are Hispanic or non-English speaking. All practitioners at the facility speak both English and Spanish. The sample included all children seen during a 3-month period for 9-, 12- or 18-month well child visits.

Planning the Intervention

The Plan Do Study Act (PDSA) cycle was the theoretical framework used in this project. The PDSA cycle is a widely accepted scientific method used in action-oriented learning to examine change on a small scale (Speroff & O'Connor, 2004). The PDSA cycle examines an idea by initiating a planned change on a provisional and trial basis in order to learn from its impact (Melnyk, 2010). This framework was chosen, based on its previous rapid success in small-scale quality improvement projects.

The project coordinator chose the intervention instrument based on AAP recommendations and on previous studies that indicated the efficacy of the caries risk-screening tool. The AAP Oral Health Risk Assessment Tool created by the AAP includes checkboxes related to risk factors, protective factors, and clinical findings of the patient (Pediatrics, A. A., 2012). For the purposes of this project, the original tool was modified from the AAP instrument and adapted to our setting. Our modified version included the practitioner's name, nurse's name, and patient's age. No patient identifiers other than age were recorded. The caries risk-screening tool used in this project (Figure 1) also included an assessment section for the practitioner to indicate (a) if risk of dental caries was identified, (b) if the patient was referred directly to a pediatric dentist, and (c) whether fluoride varnish was applied during the visit.

The site was chosen based on the project coordinator's previous work at the site and feedback from site practitioners indicating that early childhood caries as well as subsequent problems due to caries were currently prevalent at the location. All practitioners at the practice were included in the study with the exception of any new practitioners who would not have previous data for comparison. The practitioners and nursing staff were counseled on use of the tool during the 3-month time frame of the study. Practitioners were asked to complete the tool, and nursing staff were asked to ensure that completed screening tools were placed in a collection bin for later pick-up by the project coordinator. The practitioners were counseled about elements of the screening tool that indicated a patient having high-risk status for dental caries, based on AAP recommendations. Practitioners were asked to use the tool with all patients seen in the primary care clinic for a 9-, 12- or 18-month-old well child checkup during the designated 3-month period of the project. Those patients identified as high-risk based on the assessment were to receive a direct referral to a pediatric dentist.



Dental Caries Risk Screening Tool

Practitioner: _____

Nurse: _____

Patient Age: ☐ 9 months

☐ 12month ☐ 18 month

Risk Factors:

☐ Mother/Primary Caregiver has active decay in past 12 months

☐ Mother/Primary Caregiver does not have dentist

☐ Continual bottle/sippy cup use other than for water

☐ Frequent Snacking

☐ Special Health Care Needs

☐ Medicaid Eligible

Protective Factors:

☐ Patient Currently Has Dentist

☐ Drinks fluoridated water

☐ Has had fluoride varnish in last 6 months

☐ Brushes twice daily

***Please place this form in Brooke's Box Once Complete. Thanks! ***

Clinical Findings:

☐ White spots of visible decalcifications present

☐ Obvious Decay

☐ Fillings Present

☐ Visible Plaque Accumulation

☐ Gingivitis

☐ Teeth Present

☐ Healthy Teeth

Assessment/Plan:

Caries Risk:

☐ High ☐ Low

Patient Directly Referred to Dentist:

☐ Yes, direct referral was made

☐ No, deemed unnecessary at this time

☐ Patient has dentist, but referral was made to ensure follow up due to risk assessment

Fluoride Varnish Applied:

☐ Yes ☐ No

Figure 1 Screening instrument.

Planning the Study of the Intervention

The objective of this project was to increase the number of high-risk patients who are appropriately identified as high--risk for ECC during well-child visits in a primary care setting. To establish a basis for comparison, the project coordinator conducted a retrospective chart review to assess data from the same practitioners during the same 3-month period, in the year preceding the intervention. Prior to the initiation of the current project, practitioners used their own judgment to determine if a patient was at high-risk for dental caries. Some providers claimed they utilized AAP recommendations to screen, and others deemed all patients as high-risk. No formal risk assessment process or instrument was in place prior to our current project. Practitioners did not consistently assign a medical code for dental caries risk prior to the current project, although clinicians documented whether patients received dental varnish. In this primary care practice, all high-risk patients had dental varnish applied at their 12- and 18-month well child visits. If a patient was found to be high-risk at a 9-month visit, there was no measurable marker to follow. For the purpose of this project, the retrospective chart review examined records of all patients seen for their 9-, 12-, or 18-month well child visit with special attention to the percentage who received dental

varnish. Those previously identified represented a baseline comparison with those newly identified as high-risk in the current project. During the 3-month time period when the dental caries risk assessment tool was implemented in the current study, all high-risk patients were marked on the assessment tool.

While the main objective of the study was to increase identification of pediatric patients at high-risk for dental caries, additional factors were examined. Data were collected on the number of high-risk patients referred directly to dental providers. The degree of provider adherence when implementing the risk-screening tool was also measured, as this could have a significant impact on the effectiveness of the project as well as further replications of this project. For the purpose of this quality improvement project, provider adherence was measured by comparing the number of 9-, 12-, or 18-month well child visits completed by each of the providers during the assigned time period with the number of dental caries risk screening tools that were actually implemented at those visits.

Methods of Evaluation

Pre-intervention data, collected from a retrospective chart review, compared the percentage of high-risk patients with the total number of patients seen in clinic. In the current project, the percentages were based only on the patients who were effectively screened by providers using the risk-screening tool. Only providers present for the entire project period, as well as the entire retrospective chart examination, were included in the data compiled. The percentage of high-risk patients was compared with the percentage of high-risk patients identified by the dental caries screening tool. We calculated the number of high-risk patients, who were referred directly to a pediatric dentist as a result of identification by the screening tool. With regard to provider adherence with use of the instrument, a retrospective chart audit was again used to determine the number of patients seen by each provider for 9-, 12- and 18-month well child visits during the assigned study time

Analysis

Pre-intervention data were compiled for the 3-month period and categorized by provider and age range of child. These data were analyzed to determine the number of patients seen during each well child visit, and the percentage identified as high-risk due to dental varnish application. The project data were categorized in the same way as the pre-intervention data and examined for number of patients seen during each well-child visit and the percentage identified as high-risk by chart review. A pre-intervention and post-intervention comparison was calculated. Each age range was examined individually to determine if a positive change had occurred. Direct referrals were compared based on number of patients identified as high-risk, vs. the number directly referred to a dental provider. Because direct referrals were not implemented prior to the study period, there was no comparison with the pre-intervention data. Provider adherence was also analyzed based on the number of patients seen by each provider in each age range, and the number of patients who were effectively screened with the instrument. This analysis produced an overall provider adherence percentage rate.

Results

Outcomes

The project was implemented in a 3-month period from September 2013 to November 2013; all pediatric patients who were seen at the clinic were screened using the dental caries screening tool. Prior to initiation of the project timeline, a staff meeting was held including all clinic members to explain the staff's role in the project. After completion of the project, data were compiled utilizing the implemented dental caries risk-screening tools. Data from September 2012 to November 2012 were compiled using a retrospective chart audit.

For the purpose of this project, data were collected from five providers. An additional provider was hired prior to the initiation of the study intervention, and her patients also received the screening tool; however, her data were excluded from analysis due to lack of previous data for comparison. The five providers included three physicians, (MDs) and two nurse practitioners (NPs). A total of 106 patients were screened during the 3-month study period. Of the 106 pediatric patients, 31 were screened at 9-month well visit, 36 at a 12-month visit, and 39 at an 18-month visit.

Outcome Measures

The proportion of patients identified as high-risk differed only slightly among the three age groups: 19 of 31 (62%) in the 9-month screening group, 28 of 36 (78%) in the 12-month screening group, and 24 of 39 (62%) in the 18-month screening group. This reflected an increase across all groups from those identified as high-risk in the retrospective chart review that occurred during the pre--intervention time period: 0 of 128 (0%) in the 9-month group, 53 of 127 (42%) in the 12-month group and 12 of 44 (27%) in the 18-month group respectively (Table 1 and Figure 2). Concerning direct referrals made for high-risk patients, 25 of 71(35%) were directly referred to a dental provider. Of these referrals, 1 of 19 (5%), 14 of 28 (50%), and 10 of 24 (42%) were the referral rates for 9-, 12- and 18-month visits, respectively. For the purpose of this quality improvement project a direct referral was defined as the provider completing the clinic established referral process for the patient to a dental office. Those findings are summarized in the post-intervention data table (Table 2).

Process Measures

Provider adherence was assessed during the intervention stage. The overall proportion of provider adherence was 109 of 189 (58%). As assessed by patient age, 31 of 68 (46%) of

9-month visits, 36 of 55 (58%) of 12-month visits, and 39 of 66 (59%) of 18-month visits were appropriately screened using the modified screening tool (Table 3 and Figure 3).

Discussion

The AAP now recommends that providers complete risk assessment for ECC by age 6 months. They recommend using the Caries Risk Assessment Tool that was created and updated by the American Academy of Pediatric Dentistry (Hale & American Academy of Pediatrics Section on Pediatric Dentistry, 2009); the screening instrument in this project was a modification of that tool. Initiatives for effective ECC prevention have occurred nationwide, and many initiatives have led to significant improvements in identification of high-risk patients and in the referral process following implementation of a screening instrument (Berg & Stapleton, 2012). The Oral Risk Assessment Tool was originally piloted in 20 pediatric offices and found to increase identification of high-risk patients who needed oral health referral, from 11 to 87.5% with proper use of the instrument (Hagan, Shaw, & Duncan, 2008). Our project depicted a similar increase in identification of high-risk patients. Overall, our project depicted an increase from a pre-intervention rate of 23% for all groups to 67% of patients who were screened and identified as high risk. We calculated a rate of 38% when data from the 9-month group were excluded due to lack of a pre-intervention indicator for high risk. The resulting data from the current study showed an increase in high-risk patient identification when the tool was correctly implemented. The addition of our small-scale project supports findings of the AAP regarding the effectiveness of the tool and the need for further research regarding implementation on a larger scale.

Summary

The implementation of a dental caries risk-screening tool provides a reliable and accessible device for evaluating risk and identifying patients at high-risk for the development of ECC. In the current project, with proper implementation, use of a dental caries screening tool proved effective on a small scale. Although change is difficult in any practice and not always well received by practitioners, this project showed with proper staff education and planning, an accepted screening tool could serve as a user-friendly adjunct to evaluate risk and identify patients at high-risk for the development of ECC. In the current project, use of a dental caries screening tool, when properly implemented, proved effective on a small scale. The project also indicated that lack of provider adherence can hinder effective implementation of the risk screening tool and that further education may be needed regarding the link between identification of children at high-risk for ECC and need for referral to pediatric dentistry.

Table 1 High risk children pre and post intervention.

Age	Pre-intervention	Post-intervention
9 months	0%	62%
12 months	42%	78%
18 months	27%	62%

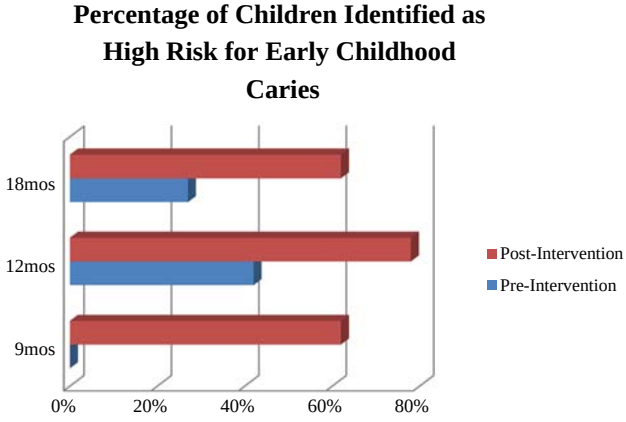


Figure 2 High risk children pre and post intervention.

Limitations

This project was implemented on a small scale in one pediatric medical home clinic affiliated with an academic health science center in the Southeastern United States. This clinic population is composed of 91% Medicaid-eligible and more than 50% Spanish-speaking patients. The positive results shown in this project may not be reproducible in larger pediatric clinics or in those serving different patient populations. The sample size was relatively small, and the intervention was implemented for a 3-month timeframe. The providers worked varying schedules and did not see the same number of patients. When implemented over a longer period of time and with a larger sample size, a more thorough evaluation of the individual provider use of the assessment instrument could be ascertained.

Table 2 Data results table.

Column 1	MD1	MD2	MD3	NP1	NP2	Total
9 month (*n*)	3	1	0	23	4	31
12 month (*n*)	8	6	5	17	0	36
18 month (*n*)	6	5	16	10	2	39
Total (*n*)	17	12	21	50	6	106
High risk 9 (*n*)	2	0	0	17	0	19
High risk 12 (*n*)	7	1	3	17	0	28
High risk 18 (*n*)	4	4	6	8	2	24
High risk total (*n*)	13	5	9	42	2	71
High risk total (%)	76	42	43	84	33	67
Referral 9 (*n*)	1	0	0	0	0	1
Referral 12 (*n*)	7	1	0	6	0	14
Referral 18 v	3	0	4	1	2	10
Referral total (*n*)	11	1	4	7	2	25

Table 3 Provider adherence with use of caries risk screening tool.

Column 1	Number of patients seen (for 9, 12, 18 month well-visit)	Number of patients screened (using ECC screening tool)	Percent compliance
MD 1	30	19	63
MD 2	36	12	33
MD 3	29	22	73
NP 1	82	50	61
NP2	12	6	50
All practitioners	189	109	58

Interpretation

All providers present for the pre-intervention and intervention period saw a positive increase in identification of high-risk patients. The increase was largest in the 9-month old screening group, but this may have been related to the lack of pre-intervention data for this age group. However, even if these data were excluded, an overall increase in the identification of high-risk patients occurred. It is important to recognize that the most practical method to calculate the number of high-risk patients during the pre-intervention chart preview was to use the number who received dental varnish. This was due to the lack of a dental caries risk billing code or other indication in the chart that could identify patients at high-risk for ECC. Thus, at the very least, this project indicates the need for improved documentation of ECC risk status in the patient's chart.

The level of provider adherence was lower than expected. One possible reason for this is that the screening tool was implemented as a paper form in a practice that uses EMR exclusively. In a future project, use of the instrument in electronic form could potentially increase provider adherence. Another possible reason for non-adherence by some providers may be the lack of initial buy in by all practitioners in the practice. There was some resistance toward changing the way patients were currently being screened, and some providers believed they were already effectively screening for patient risk. All providers agreed to participate in the quality improvement project based on the previously established relationship with the project coordinator. The project coordinator also generated incentives to motivate provider adherence to consistent screening tool use during projects timeline. Only one group meeting at the beginning of the project timeline was utilized to gain provider support. Future use of the screening tool might be enhanced by organizing multiple meetings with providers prior to implementation, to educate all personnel on the importance of universal screening.

Finally, the link between high-risk patient identification and patient referral to a dental provider was less than expected. The providers were educated at the beginning of the implementation process about the referral process and the need to refer all high-risk patients directly to a dental provider. It was discovered, post-intervention, that patients indicated as "referred" on the screening instrument had not actually been referred according to the process outlined prior to beginning the project. Thus, further education for the providers appears necessary regarding the importance of and the reasons for, direct referrals to pediatric dentistry.

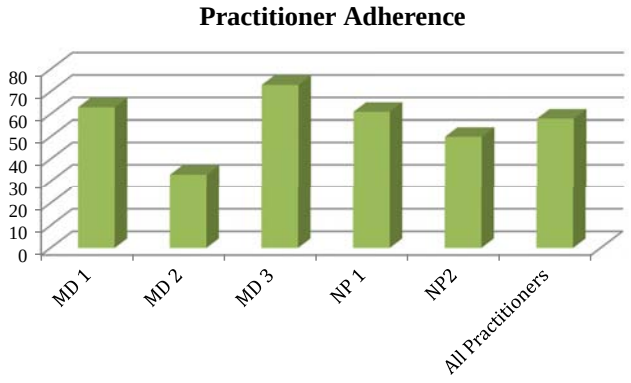


Figure 3 Practitioner adherence with use of caries risk assessment screening tool.

Conclusions

With regards to this specific practice, it is the hopes of the project coordinator that the presentation of the findings will demonstrate the need for continued use of a collective dental caries risk screening tool. The ultimate goal would be that the clinic could further benefit from the incorporation of the screening tool into the current electronic medical record system.

Individual pediatric primary care practices can benefit from the use of a properly implemented and APA-recommended dental caries risk-screening tool. This project showed an increase in our identification of patients at high risk for ECC, even with a moderate level of provider adherence with using the tool. A practice improvement intervention such as this most likely will succeed in sites where practitioners are motivated to implement a universal screening tool to improve identification and management of patients at-risk for ECC.

References

Berg, J., & Stapleton, B. (2012). Physician and dentist: New initiatives to jointly mitigate early childhood oral disease. *Clinical Pediatrics*, *51*, 531–537, http://dx.doi.org/10.1177/000992281143567.

De la Cruz, G., Rosier, G., & Slade, G. (2004). Dental screening and referral of young children by pediatric primary care providers. *Pediatrics*, 642–652.

Dye, B. A., Tan, S., Smith, V., Lewis, B. G., Barker, L. K., Thornton-Evans, G., et al. (2007). Trends in oral health status, United States, 1988–1994 and 1999–2004. National Center for Health Statistics. *Vital and Health Statistics*, *11*, 1–91.

Hagan, J. F., Shaw, J. S., & Duncan, P. M. (2008). *Oral health risk assessment tool* Bright Futures: Guidelines for health supervision of infants, children, and adolescents (3rd ed.). Elk Grove Village, IL: American Academy of Pediatrics [Retrieved from: http://brightfutures.aap.org/Oral_Health_Risk_Assessment_Resources.html].

Hale, K. J., & American Academy of Pediatrics Section on Pediatric Dentistry (2009). Oral health risk assessment timing and establishment of the dental home. *Pediatrics*, *111*, 1113–1116.

Medical Home Initiatives for Children With Special Needs Project Advisory Committee (2002). The medical home. *Pediatrics*, *110*, 184–186.

Melnyk, B. M. -O. (2010). *Evidence-based practice in nursing and healthcare: A guide to best practice.* Lippincott Williams & Wilkins.

Ng, M., Torresyap, G., White, B., Melvin, P., Graham, D., Kane, D., et al. (2012). Disease management of early childhood caries: Results of a pilot quality improvement project. *Journal of Health Care for the Poor and Underserved*, 193–209.

Pediatrics, A. A. (2012). Children's oral health. Retrieved from American Academy of Pediatrics. http://www2.aap.org/oralhealth/index.html.

Ramos, G. F., & Man-Wai, N. (2011). Into the future: Keeping healthy teeth caries free: Pediatric CAMBRA Protocol. *Journal of the California Dental Association*, 723–733.

Ramos-Gomez, F., Crystal, Y., Man Wai, N., Crall, J., & Featherstone, J. (2010). Pediatric dental care: Prevention and management protocols based on caries risk assessment. *Journal of the California Dental Association*, *38*, 746–761.

South Carolina Department of Health and Environmental Control (SCDHEC) (2007). Early childhood decay in South Carolina—A fact sheet. Retrieved from SCDHEC. http://www.scdhec.gov/health/mch/oral/data.htm.

Speroff, T., & O'Connor, G. T. (2004). Study designs for PDSA quality improvement research. *Quality management in health care*, *13*, 17–32.

Szilagyi, P. G. (2009). Oral health in children: A pediatric health priority. *Academic Pediatrics*, *9*, 372–373, http://dx.doi.org/10.1016/j.acap.2009.09.021.

U.S. Department of Health and Human Services (USDHHS) (2003). *National call to action to promote oral health.*

Viswananathan, K. (2010). Infant oral exam and first dental home. *Texas Dental Journal*, 1195–1205.

Zimmerman, B. (2006). South Carolina's Bright Futures story. *Health systems research*, 1–5.