

At-Home or In-Office Fluoride Application Does Not Significantly Reduce Subsequent Caries-Related Procedures in Ambulatory Adults of any Caries-Risk Level

SUMMARY

Subjects

Retrospective records came from 2 dental plans. Plan A: 14,859 subjects; mean age of 49.8 years (SD = 13.1); 42% male; a group practice in a *fluoridated* community where at-home fluoride applications were prescribed. Plan B: 30,834 subjects; mean age of 50.5 years (SD = 13.4); 44% male; a group practice in a largely *nonfluoridated* area. Both Plans were in Portland, Oregon, and Minneapolis, Minnesota.

Subjects within each plan had a defined referenced date (the date of the most recent caries risk evaluation). A reference period was constructed around this reference date for each plan. For Plan A, the reference period was 18 months from January 1, 1998, to June 30, 1999, and for Plan B, 12 months from January 1, 2000, to December 31, 2000. There were 3 “subperiods” defined: “Prior Period” = 1 year prior to the reference date; “Wash-out Period” = 6 months after the reference date; and a “Follow-up Period” = 2 years after the end of the Wash-out Period.

At baseline, Plan A had 61% at low risk for caries, 28% at moderate risk, and 11% at high risk. This risk assessment was based on both past and current caries experience. Risk assessment for Plan B was based only on the current caries experience and 55% was at low risk, 41% at moderate risk, and 4% at high risk.

Therapy

The primary treatment of interest in this study was either the at-home or the in-office fluoride treatment. The most frequent at-home fluoride treatment recommendation was a prescription for a 5000-ppm toothpaste. Other recommendations for at-home interventions included prescriptions for fluoride rinses or over-the-counter fluoride rinses. In-office fluoride treatments included the in-office application of fluoride varnish or gel. No data were available as to which fluoride treatment was administered to see if there was a difference in effectiveness between varnishes and gels.

Main Outcome Measure

The primary outcome measure that is used to evaluate the effectiveness of the treatment was called the caries-related procedure. This includes restorative (only intra- and extracoronal), endodontic (only the first root canal treatment), or surgical procedures (only the simple extractions) performed subsequent to the initial caries risk assessment during the 2-year Follow-up Period. Over 95% caries-related procedures were restorative procedures within each Plan.

ARTICLE TITLE AND BIBLIOGRAPHIC INFORMATION

Outcomes Associated with Dentists' Risk Assessment

Brad Rindal D, Rush WA, Perrin NA, Maupome G, Bader JD.

Community Dent Oral Epidemiol 2006;34(5):381-6

LEVEL OF EVIDENCE

2b

PURPOSE/QUESTION

There seem to be two questions addressed: (1) Do dentists provide appropriate fluoride interventions to high caries-risk adults? (2) Does in-office or at-home fluoride intervention significantly reduce the subsequent caries-related procedures?

SOURCE OF FUNDING

Information not available

TYPE OF STUDY/DESIGN

Retrospective Cohort Study

Main Results

In Plan A, at-home fluoride use was not significantly related to caries-related procedures performed during the Follow-up Period irrespective of the caries risk during the Prior Period ($P > .05$). No mean differences were reported.

In Plan B, those who were in low and moderate risk groups and had in-office fluoride treatments were 20% more likely to have at least one caries-related procedure subsequently and those who were at high-risk were 70% more likely to have a caries-related procedure subsequent to in-office fluoride treatment (Odds Ratios and 95% Confidence Intervals: low risk, 1.2 [1.11 to 1.28]; moderate risk, 1.2 [1.15 to 1.33]; high risk, 1.7 [1.33 to 2.18]).

Conclusions

The authors concluded that there was incomplete compliance with guidelines for recommendation or administration of preventive treatment for patients at elevated risk for caries. They also failed to identify any significant reductions in caries-related procedures for individuals receiving a fluoride intervention, compared with those who did not, when stratified by risk level.

COMMENTARY AND ANALYSIS

The investigators are to be complimented for their careful and timely analyses of this extremely robust dataset. They have chosen a clinically relevant therapy and an outcome to measure the effectiveness of the therapy. Furthermore, they evaluated the effectiveness of therapy within each risk group and in fluoridated and nonfluoridated areas. The study sample is large and missing data were minimal (except for data on crowns). Their design allows the evaluation of the treatment effectiveness in a biologically and a temporally meaningful manner. There are 2 questions addressed in this study: (1) Do dentists use treatment modalities based on the caries-risk of the subject? (2) Does at-home or in-office fluoride treatment significantly reduce the subsequent (within 2 years) caries-related procedures performed on the subject? They conclude that the answer to both questions is “no.”

Paradoxically, the in-office fluoride treatment seemed to have increased the risk of having a subsequent caries-related procedure. Compared with those who did not receive any fluoride treatment, irrespective of the nature of the fluoride treatment (at-home or in-office), within each Plan and each risk group, the mean number of teeth that required a caries-related procedure during the Follow-up Period was also higher among those who received

fluoride treatment (except for the high-risk group within Plan A).

One observation that raises questions about the data presented is that the proportion of individuals at high risk within the nonfluoridated area is approximately 3 times lower than the respective proportion in the fluoridated area (only 4% of the cohort were deemed at high risk in a largely nonfluoridated area compared to 11% in the fluoridated area). This could be a reflection of the differential criteria used for the caries-risk assessment within each plan. The caries risk assessment criteria and how they were executed was not specified in the methods section in sufficient detail.

Why would patients who received in-office fluoride treatment need more caries-related procedures subsequently and why is the number of teeth that required subsequent caries-related procedures higher in those who were initially treated with either in-office or at-home fluoride? Before we conclude that fluoride treatment in the prescribed manner does not work (or increases the risk of caries-related procedures), some of the potential alternative explanations for the observed findings should be examined. These include the following:

1. One limitation in interpreting the effectiveness of the at-home treatments was that there were no data available to confirm that the patient filled the prescription or used the fluoride products. It is possible that the at-home group did not comply the way they were supposed to.
2. As pointed out earlier, caries-risk assessment criteria varied within the 2 plans (Plan A used both past and current caries experience, and Plan B, only the current experience). Could the lack of concordance between Plan A's and B's distribution of risk be due to inconsistencies between caries risk assessment used and as a result, misclassifications occurring?
3. Caries-related procedures can also be subjected to incorrect measures, either underestimating or overestimating the association between therapy and outcome. Exclusion of data on crowns (due to missing data) attenuates the magnitude of the real outcome.
4. It was impossible to standardize the way dentists made decisions before performing caries-related procedures. Authors acknowledge the potential bias introduced in this regard.
5. As authors have also pointed out, the length of follow-up may not be adequate to see the full effect of the intervention.

Consequently, the findings from this study should be interpreted with caution before changing the way clinicians perform fluoride interventions within their practices.

REVIEWERS

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