Compliance with Fluoride Supplements Provided by a Dental Hygienist in Homes of Low-Income Parents of Preschool Children in Quebec

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Abstract

Objective: *This study aimed to assess the compliance with fluoride supplements provided at home by a dental hygienist to mothers of at-risk preschool children.* ***Methods:*** *Participants were recruited during pregnancy of low-income women. On the first visit, the mothers of 60 infants aged 6 to 9 months were handed free fluoride supplements. A questionnaire was administered at that time and after 6 and 12 months to assess compliance during the preceding week.* ***Results:*** *At the beginning of the study, none of the mothers reported having given fluoride supplements, in comparison with 73 percent of mothers of 44 infants who received all three visits at the end of follow-up; 48 percent reported fluoride supplement use on a daily basis.* ***Conclusions:*** *Removal of financial and physical barriers and personal professional involvement are good strategies to achieve compliance with fluoride supplements. Further assessment regarding the possible application of this intervention to other professional or cultural contexts is warranted.*

Key Words: preventive dentistry, fluoride supplements, compliance, dental hygienist, preschool children

Introduction

In Quebec, community-based strategies to prevent dental caries are essentially provided at the elementary-school level. By the time children enter school, they will already have had over 74 percent of all eventual caries in their primary dentition based on the dmft index (1). Because only a minority of children begin dental visits at 1 year of age, alternatives are needed to provide preventive dental health services, particularly for disadvantaged children. Such services should include fluoride supplements promotion, as only 7 percent of the Quebec population receive fluoridated water (2) and caries reduction is only likely if the behavioral change involves the use of fluoride (3). With fluoride drops or tablets being accessible without a prescription in Quebec, their use can be promoted by dental hygienists and other primary care providers. However, their current effectiveness, which is dependent on compliance by the parents, is assumed to be poor (4). Promoting the daily use of supplements may not work because of social, economic, and life dilemmas facing high-risk groups (5).

The aim of this study was therefore to assess the compliance with fluoride supplements provided by a dental hygienist at the homes of low-income parents of preschool children. We hypothesized that the distribution of free material at home might contribute to a 24 percent compliance rate after 1 year, which is four times the proportion measured in a high-caries community in England (6).

Methods

Study Population and Selection of Participants. The targeted population was comprised of infants aged 6 to 9 months residing in the regional county municipality of Manicouagan, located in the Côte-Nord region of Quebec. These children had to be from families with a cumulative income of less that CAN$30,000, income being one of the major determinants of caries in Quebec children (1). None of the municipalities in that county has community fluoridated water. The participants were recruited among all births recorded between July 2002 and March 2004 using socio-

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economic data gathered during the medical prenatal follow-up of the mother. The ethical approval of the study was obtained from the Agence de la Santé et des Services sociaux de la Côte-Nord.

Pretest. Before implementing the following intervention, an initial pretest was performed on a random sample of six mothers of children aged 3 to 18 months recruited in an independent location in order to rehearse the entire intervention. A subsequent pretest was performed to a second group of four mothers of older children from low socioeconomic status in order to adjust the terminology to the knowledge level of the study population.

Intervention. Initial contact was made by a dental hygienist by telephone. Upon receiving the consent of the mother, the same dental hygienist conducted a visit at the infant's home on three occasions, namely between 6 and 9 months (V1), 12 and 15 months (V2), and 18 and 21 months (V3). Meetings lasted approximately 40 minutes. First, the mothers were asked whether they provided fluoride supplements to their infant during the preceding week and if yes, at what frequency (V1, V2, V3). At each visit, the dental hygienist read, explained, and handed a different leaflet to the mother. Topics covered were eruption (V1), bottle-feeding habits (V1, V2), fluoride needs (V1, V2, V3), pacifier use (V1, V3), toothbrushing (V2, V3), cariogenic foods (V2, V3), and first dentist consultation (V2, V3). The hygienist then answered any questions from the mother. A 60-mL bottle of sodium fluoride oral solution (Fluor-A-Day, Pharmascience Inc., Montréal, Canada) was provided free of charge during V1 with instructions to follow the recommended dosage by the Canadian Pediatric Society. A demonstration on how to administer the drops was given. Verification of the level of liquid remaining in the bottle was also performed (V2, V3). The quantity used was deemed to be correct if the observed level in the bottle corresponded to expected levels (±3 mm). Lastly, all infants were given an oral screening and referred to a dentist when needed.

Statistical Analysis. The research design is a single-group longitudinal study. The rate of participation was first calculated by dividing the number of visited children at V1 by the number of children selected according to inclusion criteria. The exact Fisher test was used to compare the sociodemographic profile of participating mothers in the starting sample with that of those who did not receive all three visits.

The behavioral evolution was analyzed based on the proportion of mothers having either used or not used supplements the week before. The McNemar test was used to verify the statistical significance ($P \geq 0.05$) of the evolution of supplements use between V1 and V2 and between V2 and V3. The Cochran test was used to evaluate the statistical significance of the global evolution of this behavior over the three visits.

Results

Sixty-three mothers meeting the selection criteria gave birth during the recruiting period. Of those, 60 accepted to meet with the hygienist. There was one withdrawal, seven mothers who could no longer be reached, and an additional eight who were not able to receive a third visit. Forty-four infants therefore benefited from the entire intervention.

The only difference between the starting sample of 60 infants and participants who did not receive all three visits was family income, with proportionally more participants among those who failed to receive the three visits earning less than $15,000 ($P = 0.04$; Table 1).

Between V1 and V3, the use of fluoride supplements significantly increased, essentially between V1 and V2 (Table 2). At V3, 73 percent of mothers responded that they gave supplements, 48 percent on a daily basis. Among the 44 participants visited at V3, the observed level

Table 1
Comparison between the Starting Sample Profile and That of Participants Who Did Not Receive the Three Visits Scheduled in the Intervention

Sociodemographic variables	Starting sample $n = 60$ (%)	Less than three visits* $n = 16$ (%)	P
Family income ($)			
Less than 15,000	19 (31.7)	9 (56.3)	0.04
15,000 or more	23 (38.4)	2 (12.5)	
No answer	18 (30.0)	5 (31.3)	
Education level			
Below secondary 5	26 (43.3)	8 (50.0)	0.52
Secondary 5 and above	23 (38.3)	4 (25.0)	
No response	11 (18.3)	4 (25.0)	
Place of residence			
Rural	22 (36.7)	6 (37.5)	1.00
Urban	36 (60.0)	9 (56.3)	
No response	2 (3.3)	1 (6.3)	
Number of children			
1	30 (50.0)	9 (56.3)	0.76
2 or more	23 (38.3)	5 (31.3)	
No answer	7 (11.7)	2 (12.5)	
Age of the mother			
18 to 21 years	15 (25.0)	4 (25.0)	1.00
22 to 25 years	29 (48.3)	6 (37.5)	0.57
Over 25 years	16 (26.7)	6 (37.5)	0.54

* Includes one withdrawal, seven mothers who could no longer be contacted, and eight who only received two visits.

Table 2
Fluoride Supplements Use According to Visits

Visit	Fluoride supplements use	
	Number of affirmative responses (%)	*P*
V1 (n = 60)	0 (0.00)	
V2 (n = 56)	37 (60.07)	0.00*
V3 (n = 44)	32 (72.73)	1.00†, 0.00‡

* V1-V2.
† V2-V3.
‡ V1-V2-V3.
V1, infants between 6 and 9 months; V2, infants between 12 and 15 months; V3, infants between 18 and 21 months.

remaining in the bottle revealed an underutilization in 20 cases (45.5 percent), an adequate use in 17 (38.6 percent), and an overutilization in one (2.3 percent). In the remaining cases, either the mothers could not find their bottle despite responding having given the supplement to the child (two children: 4.6 percent) or the comparison was not made because the mothers had never administered the supplement (four children: 9.1 percent).

Three children were referred to a dentist: one for evident signs and symptoms of severe early childhood caries, one for decalcification, and one for acute gingivitis.

Discussion

The exceptionally high rate of participation achieved in this study (95.2 percent), together with the number of withdrawals, provides evidence of an interest in dental health in this targeted low-income population. Moreover, results obtained regarding compliance with fluoride supplements use should contribute to alleviating doubts as to the success of this public health measure when compliance is enhanced; the two other issues concerning their use being outside the scope of this study, namely the effect on caries prevention and the risk of dental fluorosis (4, 7). Nonetheless, the population under study was comprised of infants from a high-risk community, a group for which the Canadian Dental Association still considers that benefits of supplements outweigh the risks (8).

The removal of financial barriers may have had a positive impact on the results. Meeting the parents of preschool children at home is another innovative means of promoting supplements and of assessing compliance. Our results on the removal of barriers support findings from an initiative concerning toothbrush use (9). According to comments collected from the mothers of 28 children approached later in a satisfaction survey, 61 percent of participants stated they would not have taken the time to meet with the dental hygienist if the latter had not come to their home and 36 percent would not have gone to the pharmacy to get their free supplement (data not shown). Furthermore, the personalized nature of the intervention and the fact that a dental hygienist was available to answer any of the participants' queries in a context of counseling facilitated the establishment of a bond of trust. This supports the proposed expanded role of dental hygienists in high-risk communities (5).

Considering the small number of nonparticipants (3) and of participants who might have received a additional counseling from their dentist (3), their impact on overall results could be considered as negligible. Insofar as the number of participants who did not receive the three scheduled visits (16/60), these data continue to indicate the problems associated with involvement of low-income parents in preventive care.

In view of the small number of births in the study population, it was not possible to establish a control group to evaluate the effects of external factors. However, the particularly high rates of compliance observed can hardly be attributed to factors other than our intervention. In Québec, according to a longitudinal study initiated in 1998 on a random cohort of 2,000 children monitored annually from the age of 5 months, only 14.9 percent of 17-month-old participants were actually receiving fluoride supplements (10).

These important disparities observed between the study group and the general population as a whole lead us to believe that the descriptive results obtained herein are a good indicator of the adherence to fluoride supplements recommendations that can be attained with repetitive intervention, conducted individually after the elimination of financial and physical barriers. The economical return of this strategy would need to be assessed and compared with other alternatives through cost-effectiveness studies. Finally, it would be useful to assess the possibility of extending this type of intervention to other professional contexts (i.e., vaccination clinics) or cultural groups (i.e., First Nation communities).

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Previous Presentation

Part of this study was presented at the 8e colloque de santé dentaire publique du Québec, June 30, 2005, Saint-Sauveur (Québec), Canada.

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