DOCUMENT RESUME

ED 137 004 RC 009 782

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TITLE Implementation of a School-Based Fluoride Tablet Program in a Rural Community.
PUB DATE 18 Oct 76
NOTE 10p.; Paper presented at the Annual Meeting of the American Public Health Association, (Miami Beach, Florida, October 18, 1976)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Administration; *Cost Effectiveness; *Delivery Systems; *Dental Health; Elementary Schools; *Program Descriptions; Program Design; Rural Areas; *Rural Schools
IDENTIFIERS *Fluoridation; Pennsylvania

ABSTRACT

A segment of a 3-year dental research project involving 2,000 school children aged 5-13 conducted in a rural Pennsylvania county, this study presents 1 component in a 3-pronged attempt to determine the effectiveness of a school-based dental health delivery system. The implementation procedures of this program are described as involving: sensitivity to community specific constraints; central storage of the fluoride tablets in the school cafeteria with fluoride tray preparation performed by cafeteria personnel; student self-administration of tablets on a daily basis as they enter the cafeteria for lunch; daily program monitoring by teachers on cafeteria duty; parental involvement to encourage program participation (prior to the program, less than 9% or 176 of all elementary school children were receiving a fluoride tablet at home, while after implementation, 90% or 1,846 students were receiving the tablet daily); an annual cost of $1,163 for distribution to 1,846 students during the academic year (trays for tablet distribution were constructed by the local high school's industrial arts department, making the per student cost amount to 63 cents per student for the tablets and about 5 cents per student for the trays). This report asserts that this fluoride program minimizes cost, eliminates any loss in instructional time, secures fluoride tablets to one location, and requires a minimum of trained personnel. (JC)

IMPLEMENTATION OF A SCHOOL-BASED FLUORIDE TABLET PROGRAM IN A RURAL COMMUNITY

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Presented at the annual meeting of the American Public Health Association, Miami Beach, Florida, October 18, 1976

The purpose of this study was to develop a cost-effective, time-efficient procedure for the distribution of fluoride tablets as part of a school-based dental health care delivery program.

It is a segment of a three year dental health research project, consisting of approximately 2000 school children ages 5-13 years, in a rural Pennsylvania county. The larger project is designed to determine the effectiveness of a school-based dental health delivery system and includes the following three components:

1. Education, that is: To assess the effectiveness of a dental health education program which is an integral part of the academic curriculum of a public school system.

2. Delivery System Organization, that is: To determine the relative effectiveness and efficiency of three delivery systems: a team practice, a solo practice, and existing practitioners in the community.

3. Prevention and Therapy, that is: To determine the effectiveness of a prescribed preventive and therapeutic regimen on the elimination or reduction of dental disease. The fluoride tablet program is a part of the preventive component.

Whereas the chronic progression of dental disease can be interrupted through treatment; that is, the loss of teeth can

be minimized by restorative dentistry, the prevalence of the disease can only be reduced by prevention. Prevention can take the form of education which concentrates on reducing the intensity of the attacking agents to the tooth structure, for instance through daily oral hygiene activities or diet modification strategies. Prevention can also take the form of actually strengthening the tooth structure itself so that it becomes less susceptible to decay. To date, this preventive activity can best be accomplished by fluoride. As Horowitz states in his review of systemic and topical fluorides for the prevention of dental caries, "Fluoride is preeminent among measures available to combat the nearly ubiquitous disease of dental caries."[1]

Although community water fluoridation is usually considered the method of choice in exposing a specific population to the preventive effects of fluoride, this is not always possible. The site in which this program is being conducted is rural in nature and, operationally, does not lend itself to community water fluoridation because a large percentage of families obtain their water from private wells.

Because the treatment and education components of the program are school-based in nature, it was decided that the fluoride program could best be implemented in an educational setting. The two alternatives for supplying fluoride to the study population in a school setting were: (1) fluoridating the school water supply, or, (2) initiating a fluoride tablet distribution program. The fluoride

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[1] Horowitz, Herschel; "A Review of Systemic and Topical Fluorides for the Prevention of Dental Caries", Community Dental Oral Epidemiol. 1973: 1: 104-114.

tablet program was chosen over the school water fluoridation approach because of the potential variations in individual water consumption and operational problems associated with a school water fluoridation system.

Although school-based fluoride tablet programs have experienced relative success, home-administered programs have generally been unsuccessful because of the lack of the strict daily regimen required for effective administration. Clinical trials have reported a reduction in dental caries ranging from 20-40% after two or more years of a daily fluoride tablet program.

School-based fluoride tablet programs are not unique in dental public health efforts and are currently being conducted in many school systems throughout the country today. In Pennsylvania alone, over 140 school districts are currently providing fluoride tablets to children with parental permission. Traditional school-based fluoride tablet distribution programs are, however, often an expensive procedure relative to utilization of teacher manpower, involvement of state and local public health officials, and the expenditure of valuable instructional class time.

In collaboration with the administration of the participating school district, a fluoride tablet distribution program was devised which corresponded to the observed needs and operational constraints specific to this school system. This program involved absolutely no loss in instructional class time, minimized teacher involvement, and, assured a high level of tablet compliance. Furthermore, in

this fluoride tablet distribution program, storage and access of tablets were centralized and only one individual actually handled the tablets for a specific school. This is in marked contrast to conventional fluoride tablet programs where each teacher has his or her own supply of tablets. This automatically increases the potential for tablet misuse and necessitates a time-consuming and administrative problem in assuring that each teacher has sufficient tablets.

One of the more innovative aspects of the program is that tablets are distributed daily from the cafeteria setting rather than from the classroom. Students receive their fluoride tablet immediately upon entering the cafeteria for lunch. Trays were developed and constructed by the Industrial Arts department of the local high school and serve as the vehicle for distribution. There is a color-coded tray for each grade level and the names of all students taking fluoride tablets are placed on the tray in alphabetical order. The students enter the cafeteria by class and are monitored by the teacher on duty; it is a simple task for the child to pick-up his tablet, place it in his mouth, and proceed either to buy lunch or eat the lunch he has brought from home. Fluoride tablet trays are located at points in the cafeteria so as to accomodate every child entering the cafeteria and not just those children who purchase lunch.

The fluoride tablets are centrally stored in the cafeteria and the trays are filled daily by a member of the cafeteria staff. This activity is completed at any time in the morning prior to

lunch by cafeteria personnel and takes only a few minutes. Immediately prior to the first lunch period, the appropriate trays are placed on a desk near the cafeteria entrance easily accessible to the incoming classes.

The role of the teacher in this fluoride tablet program is solely one of monitor. Teachers supervise daily fluoride consumption as one of their daily cafeteria duties. It is the teacher's responsibility to see that the process runs smoothly. No member of the school faculty handles the tablets nor is directly involved with individual distribution. This is an important distinction for the State Education Association has publicly declared opposition to teacher participation in a fluoride distribution program and has gone on record in stating that teacher participation is beyond the scope of responsibilities of classroom teachers and that to participate, a teacher would be legally liable for any adverse medical sequellae. Although there is no legal support for the state education association's stand, a fluoride tablet distribution program such as herein described avoids the possibility of teacher conflict and helps to assure a highly reliable and efficient method of fluoride tablet distribution.

IMPLEMENTATION:

Successful implementation of a fluoride tablet program requires careful planning and thorough introduction to all parties involved. This procedure included identifying the elementary school children participating in the program and thus eligible to take fluoride;

informing students of the role of fluoride in the prevention of dental caries, and making students aware of the medical safeguards required when dealing with any type of prescriptive medication.

These procedures were carried out by the two health educators employed by the program and the classroom presentations were designed corresponding to the grade level of the children involved.

Besides introducing students to the fluoride tablet program, it was also necessary to brief school faculty and cafeteria staff as to their responsibilities in the program. Cafeteria personnel were instructed as to proper storage, sanitary procedures, and the specific methodologies involved with filling the trays for daily fluoride distribution. Teachers were advised of their role as monitors in the program as previously described. Again these procedures were performed by the program's health educators.

PARTICIPATION:

Prior to the Rural Dental Health Program's activities, less than 9% (N = 176) of all elementary school children were receiving a fluoride tablet at home, either in combination with a multiple vitamin or as a fluoride tablet alone. This figure is not unusual for elementary school children in rural, unfluoridated sections of this country. Further, prior to program activities, there was no school-based fluoride tablet program in any of the elementary schools of the participating school district. Following implementation of the fluoride tablet program in the cafeteria setting, 90% of all elementary school children (N = 1846) were receiving a fluoride tablet daily in school.

Of the 176 children who were receiving fluoride tablets at home prior to the program, all but 8 parents agreed to allow their children to take fluoride tablets at school rather than at home so as to avoid duplication of efforts. Parents were encouraged to participate in the school tablet program both to assure that students are receiving fluoride tablets daily, and additionally, to establish lasting habits due to the positive effect of peer interactions. The 8 parents who continued fluoride tablet distribution at home assured us that tablets would be consumed daily and, in fact, the reason that they did not want their child to receive the tablet at school was because the home tablet consumption pattern was so well established, the parents were reluctant to see it terminated.

COST:

The cost of fluoride tablets for an academic year for all participating students (N = 1846) in the study population was $1163. Naturally, the cost for fluoride tablets varies according to the type, brand, and quality of fluoride tablet purchased as well as the quantity purchased and the type of transaction negotiated (retail, wholesale, bulk, special consideration).

The construction of trays used for the distribution of fluoride tablets required wood, paint, and name labels. Because the required labor was provided by the students in the local high school's industrial arts department, total cost for the fluoride tablet trays amounted only to the cost for the raw materials - less than $100. The total per student costs incurred for a fluoride tablet program for an academic year was 68¢; 63¢ per student

for fluoride tablets and approximately 5¢ per student for the construction of the fluoride trays.

CONCLUSION:

When annual academic year costs are 68¢ per student for daily fluoride tablet consumption and when daily fluoride consumption is associated with a decrease of from 20-40% in dental caries when fluoride tablets are consumed for at least a two year period, then a school-based fluoride tablet program presents a favorable cost-benefit picture.

The specific method of fluoride distribution should be sensitive to the observed needs of the school district and structured around any operational constraints. School district administrators and faculty are best able to identify their needs and delineate a functional distribution system.

The fluoride tablet distrubution program described today is cafeteria based in nature. It minimized cost, eliminated any loss in instructional time, secured fluoride tablets to one location, and required a minimum of trained personnel.

The program should prove to be a realistic and viable model for replication for any community which has a centralized school system hoping to implement a daily fluoride tablet program.