CAN A DENTAL HEALTH EDUCATION PROGRAM USE SELECTION CRITERIA BASED ON ORAL HEALTH STATUS TO IDENTIFY STUDENTS WITH LOW LEVELS OF DENTAL HEALTH KNOWLEDGE?

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INTRODUCTION

Dental health education is a requirement of the Healthy Growth and Development Program mandated under the Ontario Ministry of Health Mandatory Health Programs and Services Guidelines[1].

The Community Dental Services (CDS) Division of the North York Public Health Department provides prevention and education services to students from Junior Kindergarten to Grade 8, and treatment from Junior Kindergarten to Grade 6.

Dental health education is an integral component of the North York CDS Division's philosophy that combines prevention, education and treatment programs to improve the oral health status of target populations. Current public health thinking in Ontario favours an integrated approach with respect to health promotion that encompasses traditional education, environmental and public policy initiatives[2].

The **goal** of the North York CDS Dental Education Program is to improve the dental health of the target population through the provision of dental education[3]. The **objectives** of the program are:

a) to provide high quality education programs delivered in a cost effective manner for target populations,

b) to increase the percentage of the target population practising good dental health behaviours,

c) to increase the dental health awareness, knowledge and skills of the target populations.

Prior to 1992, the CDS Division provided a universal education program consisting of an annual 30-minute classroom presentation for all students from Junior Kindergarten to Grade 8 and oral hygiene instructions for designated ages of students. A program review in 1992 resulted in a change in the program to a targeted

intervention for individual high risk students. Justification for a targeted program included changes in a Ministry of Health directives and trends in North York oral health status data. Ministry of Health rescinded mandated annual classroom dental education sessions for all students and annual data gathered by the North York Public Health Department indicated that the vast majority of children have virtually no dental disease. With 20% of children appearing to have 80% of dental disease, the management of the CDS Division decided that a targeted dental education/prevention program aimed at these 20% of the elementary school population was justifiable.

The CDS Division sought to identify those students with the worst oral health status as their top priority for targeted dental education, assuming that these students would benefit the most from the education. As past dental caries experience is the best, if somewhat less than perfect predictor for new disease[4,5], criteria based on oral health indicators were chosen to select students for dental education.

Dental hygienists screen North York students from Junior Kindergarten to Grade 8 and select for dental education those who meet one or more of the following criteria outlined in the CDS Policy and Procedure Manual[3]:

1) an urgent need for treatment (open lesions, pain, infection, trauma, or haemorrhage) as defined by the Children in Need of Treatment Program (CINOT), or

2) a need for fluoride therapy defined as having now or in the last year having had a smooth surface carious lesion, or

3) a score of 1 or more on the Community Periodontal Index Treatment Need (CPITN).

The delivery of the program was changed from one classroom education session for all students and one small-group oral hygiene instruction session, designated by age, to a small-group participatory learning session with follow up reinforcement. This change is consistent with current dental education literature which favours small group activities over those carried out in the classroom[6,7].

A literature review indicates positive impact of increased frequency of dental health education exposure[6,7,8]. However, budgetary constraints within the Public Health Department allowed two sessions to be offered per identified child. Universal classroom-based dental education continues to be offered to students in Senior Kindergarten and Grade 1 because oral health data indicate that the highest DMF/dmf ratio occurs in Grade 2.

This report examines whether the above mentioned selection criteria, based on dental health status indicators, are sensitive enough to select students with low levels of dental health knowledge.

METHODOLOGY

Data collection

Information on oral health knowledge and toothbrushing habits was collected in a survey of 25,974 students, aged nine to thirteen, attending all public, separate and private elementary schools in the City of North York. For the purpose of this study, data were analyzed for the 2623 students attending twenty randomly selected schools. This sample was representative of the elementary school population in North York, for Grade 4 to Grade 8. The data collection procedure have been described in detail in the Community Dental Health Services Research Unit's report: "Oral health knowledge and toothbrushing among North York school children"[9].

All students completed a 10-item questionnaire concerning the risk factors and the methods of prevention of tooth decay and periodontal disease and reported their toothbrushing habits (Appendix 1). For the purpose of this study, data relating to the nine items concerning oral health knowledge were analyzed. These items were selected from the existing instrument[10]. They were considered relevant to the program's educational objectives. The items were either questions or statements with multiple choice responses. The response "I don't know" was included as an option in order to prevent students from guessing the correct response. The list of students

from these twenty schools who had been selected for dental education was obtained from the CDS Division's dental records for the school year 1992/93. This information was matched to the students responses to the questionnaire items.

The data were entered using Epi-Info (V5) program and analyzed using the Statistical Package for the Social Sciences (SPSS/PC+).

Data analysis

The responses were dichotomized as "correct" and "incorrect", with the "I don't know" response being considered as incorrect. The sum of correct responses represented the knowledge score, ranging from 0 to 9, for each child. The same weight was attributed to each response. On the basis of the number of correct responses, the students were classified as having low, medium or high level of knowledge. Students in the low knowledge group had between 0 and 3 correct responses, those in the medium knowledge group from 4 to 6, and in the high knowledge group 7, 8 or 9 correct responses. Those having low and medium knowledge scores were considered as students with insufficient oral health knowledge.

The difference in the level of knowledge between students who were and were not selected for the education was examined using the Students t-test. The probability level used in this study to determine the significance of difference was an *alpha* of 0.01.

RESULTS

Proportion of students with low, medium and high knowledge scores selected for education

Eighteen percent (18.3%) of students surveyed had been selected for dental education based on the aforementioned health status criteria. Table 1 shows the number and the percentage of the students from each of the knowledge groups: low,

medium, and high, who had been selected for education.

Twenty-eight percent (28.3%) of students with low knowledge scores, 17.6% of students with medium knowledge scores and 14% of students with high knowledge scores were chosen for education based on the results from dental screening. Therefore, only 19.9% of students with insufficient dental knowledge (low or medium knowledge scores) were selected for education, while 14% of students with high knowledge scores, who could not be expected to benefit greatly from dental education, were also selected for education.

The proportion of students with low, medium and high knowledge scores, who had been referred for education, is also presented in Figure 1.

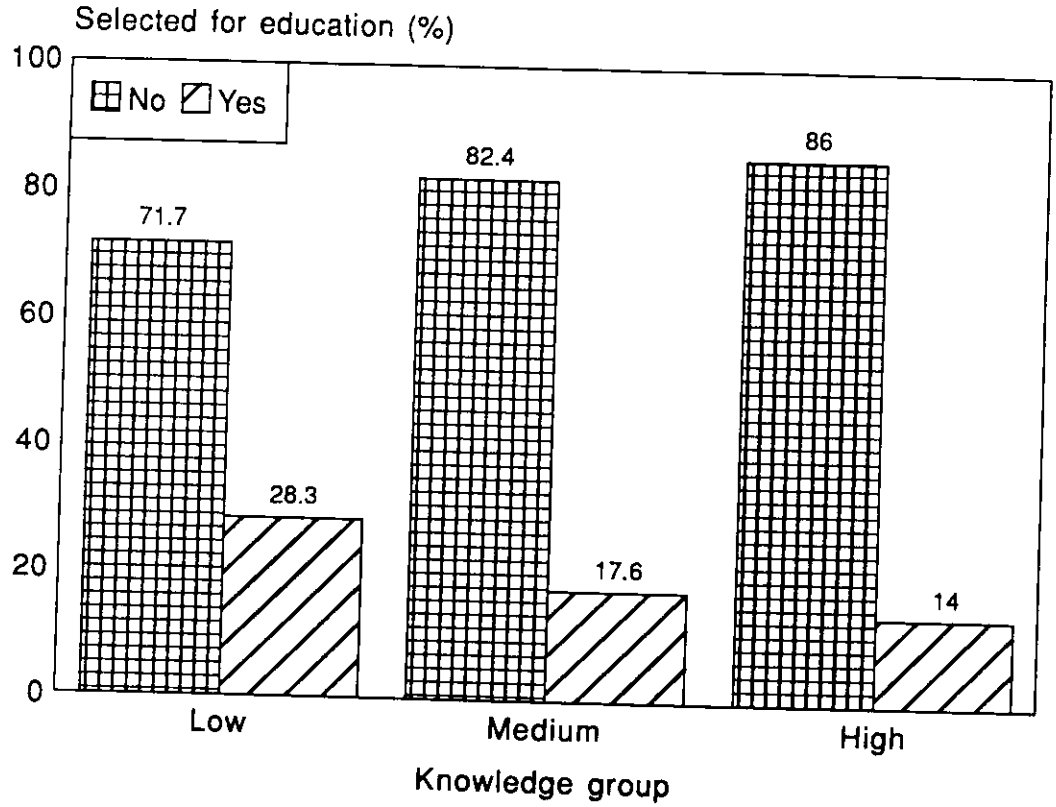
Table 1 Selection for dental education by level of dental knowledge (%)

Knowledge group	Selected for education			
	No		Yes	
	Number	%	Number	%
Low	294	71.7	116	28.3
Medium	1235	82.4	263	17.6
High	615	86.0	100	14.0
Total	2144	81.7	479	18.3

Difference in the levels of knowledge between students selected and not selected for education

The mean knowledge score among students who were selected for oral health education was significantly lower than among those who were not selected ($p<0.0001$). However, we cannot consider the difference important since the average knowledge scores of the two groups were very similar: 4.8 and 5.3 respectively.

FIG.1 Selection for education by knowledge group



DISCUSSION AND CONCLUSION

The findings from this study indicate that the current selection criteria, which are based on clinical findings, have very low sensitivity when used to detect students with low knowledge scores, since they identify only a small proportion of those with low and medium levels of knowledge, i.e. those who are likely to benefit most from dental health information. Therefore, while the targeted program is reaching those with poor oral health, it is not reaching many students who know little about risk

factors for, and methods of prevention of dental diseases. Sensitivity would remain low even if the clinical criteria were relaxed to allow any student requiring any treatment or preventive work to be referred to the education program.

This study also found the specificity of the selection criteria to be low. Of the students with high knowledge scores (i.e. those likely to benefit least), 14.0% were selected for dental education. The above findings indicate that for accurate targeting, i.e. accurate selection of those most likely to benefit from dental education, the assessment of the student's oral health knowledge is necessary.

The questionnaire used in this study has certain limitations which have been outlined in the Community Dental Health Services Research Unit's report: "Oral health knowledge and toothbrushing among North York school children"[8].

The relationship between an individual's dental preventive knowledge and behaviour is very complex. The findings from many studies indicate a weak positive correlation between them[9,10,11,12,13,14]. However, other studies have suggested that increased knowledge does not necessarily lead to behaviour change but is just one among many factors that predict dental preventive behaviour and, consequently, the oral health of the individual[14,16,17,18]. Other studies have found either no correlation[18,19,20], or an inverse relationship between knowledge and behaviour and oral health[22].

The results presented in this report indicate that using clinical criteria alone for selection of students for education would not satisfactorily identify those most likely to benefit from the knowledge component of a dental education program.

It is always desirable to increase the sensitivity of selection criteria, in order to ensure that the students with insufficient oral health knowledge are identified and referred for additional education. However, an extensive review of the dental education literature provides no guidelines for the selection criteria for dental education programs. This report indicates that there is a need for further research to help to develop selection criteria that are both sensitive and specific.

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ESL ☐

TEACHER ☐

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DENTAL HEALTH EDUCATION

NAME:_____ GRADE:_____ CLASS:_____

SCHOOL:_____

CHOOSE THE BEST ANSWER AND CIRCLE IT:

1. **What does fluoride do?**
   a) It makes teeth white
   b) It helps protect teeth from decay
   c) It makes teeth grow
   d) I don't know

2. **Which snack food is best for the teeth?**
   a) Raisins
   b) Candy bars
   c) Popcorn
   d) Ice cream
   e) Nuts
   f) Cheese
   g) I don't know

3. **The best time to eat foods containing sugar is:**
   a) At meal times
   b) Just before bedtime
   c) Never
   d) I don't know

4. **What is plaque?**
   a) A toothpaste
   b) A layer of germs on the teeth
   c) A plastic coating on the teeth
   d) I don't know

5. **What combines with plaque to form an acid which causes cavities?**
   PLAQUE + _____ = ACID
   a) Germs
   b) Sugar
   c) Fluoride
   d) I don't know

6. **Blood on your toothbrush may be a sign of:**
   a) Plaque
   b) Gum disease
   c) Tooth decay or cavities
   d) I don't know

7. **The best way to keep from getting gum disease is to:**
   a) Eat good foods
   b) Clean your teeth every day by brushing and flossing
   c) Take vitamins
   d) I don't know

8. **Plaque should be removed:**
   a) At least once a day
   b) Only by a dentist
   c) Never
   d) I don't know

9. **When is the best time to brush your teeth?**
   a) After eating
   b) Before you visit the dentist
   c) Before you go to sleep
   d) Before you go to school
   e) I don't know

10. **How often do you brush your teeth?**
    a) Once a day
    b) Twice a day
    c) Three or more times a day
    d) Not every day, but at least once a week.
    e) I don't know

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