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Social class, parents' education and dental caries in 3- to 5-year-old children.

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Key words: dental caries, education, social class, epidemiology.

SUMMARY

The caries prevalence of 127 3-, 4- and 5-y-old white children was determined with mirror and probe under natural light at mother and child clinics. The social class of the family, the educational level of the mother and that of the father were determined from a questionnaire filled in by the accompanying adult at the time of examination. Both social class and parent's education had a statistically significant influence on the caries prevalence: those in the lower social classes and with parents without tertiary education had a much higher prevalence of caries.

OPSOMMING

Die voorkoms van karies in 127 3, 4 en 5 jaar oue blanke kinders is bepaal met 'n spieël en sonde onder natuurlike lig by moeder en kind klinieke. Die sosiale klas van die gesin, die opvoedkundige vlak van die moeder, sowel as die vader, is bepaal volgens 'n vraeboog wat ingevul is deur die volwassene wat die kind vergesel het tydens die ondersoek. Beide die sosiale klas en opvoeding van die ouers het statisties 'n beduidende invloed op die voorkoms van karies gehad: diegene in die laer sosiale klasse en met ouers sonder tersiêre onderrig, het 'n veel hoër karies-voorkoms gehad.

INTRODUCTION

The prevalence of caries has been reported to be influenced by the family's social class (Beal and James, 1970; Milen *et al*, 1981; Colquhoun, 1985; Ruiken *et al*, 1986; Dummer *et al*, 1987) as well as the mother's educational level (Koch and Martinson, 1970; King, Pitter and Edwards, 1983). The effect of social class and the parents' educational level in South African preschool children is not known.

The purpose of this report was to examine the influence of the family's social class and parents' education on the prevalence of caries.

MATERIALS AND METHODS

Sample

Following approval of the project by the University of the Witwatersrand's Committee for Research on Human Subjects, the population examined was selected with the assistance of local health authorities. At mother and child centres in Johannesburg the records of white children within the study ages were randomly selected and the study explained to the parents. If they agreed to join the study they were requested to attend with their children on a specified day. Of the target number of 150 children who were to attend, 127 (85 per cent) were examined, a high response rate in our experience. There are four health centres covering the northern, southern, eastern and western residential areas of Johannesburg. All participated equally to ensure a representative sample of all social classes. In all areas the fluoride in the drinking water was 0,3ppm.

Diagnostics

A total of 127 3-, 4- and 5-y-old children were examined during 1986. The examinations were done by 4 experienced dental epidemiologists who had been calibrated (Cleaton-Jones *et al*, 1989), and about 10 per cent of the children were re-examined to check to reproducibility of diagnosis. The Modified Percentage Reproducibility (Shaw and Murray, 1975) was 94,4 per cent. Mirrors and sharp probes were used under bright daylight together with WHO criteria for the presence of caries (World Health Organisation, 1979).

Social class and education

The accompanying adult, usually but not always the mother, answered a questionnaire which included the nature of the fathers's work, the mother's work, and the educational level reached by the father and mother.

The social class to which the family was classified was according to the British social class index (Office of Population Censuses and Surveys, 1980) which is based on occupations. The occupational listing modified for South African conditions by Schlemmer and Stopforth (1979), with minor adaptations by ourselves for correct job definition using recent terminology, was used. The parents' educational status was divided into 3 levels: primary - up to and including completion of primary school education; secondary - all levels of secondary school education, including secretarial colleges; tertiary - Technical College or University education.

The effect of the social class of the family and the father's and mother's educational level on caries prevalence as expressed by dmft, dmfs and caries severity score - css (Chosack, 1986) was examined.

Statistical analysis was done using the SAS (1985) system; the tests used were the Chi-square for the number of caries-free children, the median test for the caries scores and the critical level of statistical significance chosen was $p<0,05$.

RESULTS

The percentage of caries-free children and mean dmft, dmfs and css scores at 3, 4 and 5 y of age are shown in Table II. No

statistically significant difference were found between results in the three age groups. Table III lists the results by social class of the family. Representatives of each class were present in the sample studied, the lowest number being in class V. No results are given specifically for this group because of the small sample size. For mean dmft, dmfs and css there was a clear demarcation into two broad groups. Children in social classes I, II and IIIN had a caries prevalence approximately one-third of that in classes IIIM, IV and V. The lowest prevalence of all was in social class IIIN but numbers in this group were low, lessening the importance of this observation. The children were therefore subdivided into the two broad groupings described. Statistical analysis showed significantly fewer children with caries, and significantly lower dmft, dmfs and css scores in the upper three classes compared to the lower three.

The caries prevalence data are presented by fathers' as well as mothers' educational level grouped up to secondary school and technical college or university in Table IV. There was close similarity of the results for fathers and mothers within the same education groups. Between educational level groups however there were significantly fewer children with caries as well as significantly lower dmft, dmfs and css scores when parents had been to a technical college or university.

In order to investigate untreated and treated (filled or extracted teeth) dental caries, the dt, ds, mft and mfs results are presented in Table V subdivided by social class and educational grouping. The main component of the dmft and dmfs scores was untreated decayed teeth which in 5 out of 6 comparisons was significantly higher in lower social classes and in the lower education group. In all groups the amount of dental treatment was low.

DISCUSSION

The present investigation has shown two clear, statistically significant, trends in the population studied. Firstly, there is less dental caries, in fewer children, in high social classes than in lower. Secondly, the educational level of father and mother is an important factor. When a technical college or university has been attended, fewer children have less dental caries than when education has not extended beyond secondary school. This significant difference is important because it has been illustrated with a relatively small total sample size of 127 children.

Various definitions of social class have been used in the dental literature, most of which are vague, subjective and unexplained. The system used in the present study is based on defined occupations and has been used in investigations of dental caries in groups in the United Kingdom. In that country studies in preschool children (Beal and James, 1970; Holt, Joels and Winter, 1982; Bradnock, Marchment and Anderson, 1984; Mansbridge and Brown, 1986) have shown higher caries prevalences in lower social classes. Our study has confirmed this in a population of white Africans. We found the social class classification by occupation convenient to use and had no difficulty in obtaining the relevant information from the children or their parents. A recent medical study on community health in South Africa (Katzenellenbogen *et al*,1988) also found the system useful. A recent study in Finland (Milen, 1987) which reported higher caries risk in the primary teeth of children in lower social classes, has also successfully used occupation as a basis for categorizing social class. Nonetheless, to allow future comparisons of dental caries between ethnic groups in South Africa, a multi-faceted social class classification which takes into account such factors as occupation, education, income and social conditions needs to be developed.

Educational level is easily defined in terms of school grades attended. Evaluation of our data showed that no differences interface was reached. At this level, striking differences emerged. What was interesting to us was the finding that grouping by mothers' and fathers' education at the same level showed similar results. Neither parental effect appear dominant. We had expected the maternal effect to dominate. A high caries prevalence, that is high dmft or dmfs, does not indicate the severity of the caries lesions but the css score does. For example, a low css score can be recorded for an individual with high dmft or dmfs scores. The present investigation has shown greater caries severity in lower social class and education groups.

Table I: **Broad occupational categories used in study**

Social Class	Occupational Group
I	Independent and high professional and equivalent status.
	High managerial, executive and administrative in large organisations and equivalent status.
II	Salaried professional and equivalent status.
	Semi-professional and equivalent status.
	Lower executive and administrative and equivalent status.
	Production managers, technical executives, works foremen, executive inspectors and equivalent status.
	Representatives, agents, salesmen and equivalent status.
IIIN	Owners and executives in small commerce and services and equivalent status.
	Owners and executives in small technical and equivalent status.
	Senior clerical and equivalent status.
	Less senior clerical and equivalent status.
IIIM	Working proprietor in small commerce and services and equivalent status.
	Farmers (excluding very large and industrialised operators).
	Manual foremen and highcraft and status equivalent.
	Skilled artisan/craft in manufacturing.
	Skilled artisan craft in construction.
IV	Routine non-manual and equivalent status.
	Semi-skilled manual and equivalent status.
V	Unskilled manual and equivalent status.
	Menial routine and labour activities.

Table II: **Percentage of caries free children and caries prevalence by age**

Age Yrs	n	Caries free %	dmft mean	dmft SD	dmfs mean	dmfs SD	css mean	css SD
3	51	43	3.0	4.3	5.2	9.6	1.34	1.74
4	41	51	2.3	3.6	3.5	5.9	1.15	1.58
5	35	48	2.3	3.4	3.7	7.2	1.02	1.41

Table III: **Caries prevalence in children by the social class of the family**

Social Class	n	Caries free %	dmft mean	dmft SD	dmfs mean	dmfs SD	css mean	css SD
I	24	50	1.4	1.7	1.9	2.5	0.89	1.10
II	20	55	1.2	1.9	1.3	2.1	0.62	0.77
IIIN	12	67	0.7	1.2	0.8	1.2	0.50	0.80
IIIM	47	38	4.2	4.8	7.6	10.9	1.71	2.07
IV	14	43	3.3	4.8	5.4	8.0	1.71	1.66
V	3							
I+II+IIIN	56	55	1.2	1.7	1.4	2.1	0.71	0.93
IIIM+N+V	64	38	4.0	4.0	7.1	10.2	1.70	1.94
		Chi-square			Median test			
p value		<0.05		<0.01		<0.01		<0.01

Table IV: **Dental caries prevalence by the educational level of parent (F = father, M = mother, * = not statistically significant)**

Educational level	Caries Free				dmft				dmfs				css			
	F	M	F %	M %	F mean	F SD	M mean	M SD	F mean	F SD	M mean	M SD	F mean	F SD	M mean	M SD
Secondary school	78	88	44	42	3.5	4.5	3.2	4.3	6.0	9.6	5.3	9.0	1.42	1.83	1.37	1.70
Technical College/University	46	36	54	64	1.1	1.5	1.1	2.0	1.4	2.0	1.7	3.9	0.75	0.96	0.67	1.20
		Chi-square									Median test					
p values		<0.001	<0.001	<0.08*	<0.05						<0.05	<0.02	<0.15*		<0.05	

Table V: **Untreated caries (d) and treated caries (mf) for teeth (t) and surface (s) by social class and educational level of parent (* = not statistically significant.**

Social class	dt mean	dt SD	mft mean	mft SD	% treated	dt mean	dt SD	mfs mean	mfs SD	% treated
I+II+IIIN	0.8	1.3	0.4	1.1	33.3	0.9	1.5	0.5	1.6	36.0
IIIM+IV+V	3.4	4.3	0.6	1.8	15.0	6.0	9.4	1.1	3.2	10.9
		median test			Chi-square		median test			Chi-square
p value		<0.001		<0.8*	<0.05		<0.001		<0.6*	<0.01
Father's education										
Secondary school	3.0	4.0	0.5	1.6	14.3	5.2	8.7	0.8	2.9	13.3
College/University	0.7	0.9	0.4	1.2	36.4	0.8	1.1	0.6	1.6	42.8
		median test			Chi-square		median test			
p value		<0.1*		<0.36*	<0.01		<0.001		<0.49*	<0.001
Mother's education										
Secondary school	2.7	3.8	0.5	1.5	15.6	4.6	8.1	0.8	2.8	14.8
College/niversity	0.6	1.0	0.5	1.3	45.5	1.0	3.5	0.7	1.8	41.2
		median test			Chi-square		median test			
p value		<0.01*		<0.54*	<0.001		<0.01*		<0.67*	<0.01

Subdivision by treated and untreated caries showed a significantly higher relative level of treated caries in higher social classes and education groups (indicated by percentage treated caries of dmft and dmfs) although the absolute components of mft and mfs did not differ significantly.

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