Dental conditions in a Swedish population aged 45–69 years

A questionnaire study

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A questionnaire study was performed on 3000 randomly sampled individuals aged 45–69 years living in Örebro county, Sweden. The response rate was almost 80%. The purpose was to describe dental conditions in this population, especially differences in dental conditions between various socioeconomic groups. Only 9% of the studied population were totally edentulous, and edentulousness was concentrated to the older age groups. Eighteen per cent of the population had all their teeth remaining. Removable dentures were worn by only 23% of the subjects. The results indicate further improvement of dental conditions in the age group 45-69 years in in Örebro county and presumably in the whole country. The results also indicate an improved gender equality with regard to dental status. On the other hand, socioeconomic inequalities were closely related to variations in dental conditions. □ *Community dentistry; oral health surveys; socioeconomic conditions*

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Epidemiologic studies of adult populations have described a dramatic improvement in dental health during the past three decades, both in Sweden and in other Scandinavian countries (1–10). This change is accompanied by a decrease in the prevalence of edentulousness and removable dentures. It seems important to continue the description of this development, both for epidemiologic surveillance and as a foundation for analyses of risk factors.

Most of the data in epidemiologic studies are obtained from clinical examinations and interviews. The use of questionnaires has been limited, although the validity of some dental status data from questionnaires seems to be reasonably good (13–17). The present paper is based on material from a questionnaire study of a Swedish population aged 45-69 years. The purpose is to describe dental conditions in this population and to note differences in dental conditions between various socioeconomic groups.

Material and methods

Örebro county, situated in the demographic middle of Sweden, has about 275,000 inhabitants. It is an average Swedish county, socially and economically. It is not statistically representative for the whole of Sweden, but it has been used as a 'model county', and there are some previous data on dental conditions available that permit cohort comparisons over time (4).

Among the inhabitants of Örebro county, 3000 persons in the age group 45-69 years were randomly selected from official population registers. A questionnaire was mailed to this sample late in 1989. The subjects were requested to fill out and return it as soon as possible. Those who had not responded within 3 weeks received a reminder. Those who had still not responded in another couple of weeks were sent a second reminder together with a new questionnaire form. After that no further efforts were made to get additional responses.

Table 1. Non-respondents among men and women in various age groups

	45–49 years	50–54 years	55–59 years	60–64 years	65–69 years	Total
Men						
No. of subjects randomly sampled	343	268	276	257	286	1430
No. of non-respondents	97	48	59	37	53	294
Percentage of non-respondents	28.3	17.9	21.4	14.4	18.5	20.6
Women						
No. of subjects randomly sampled	385	280	275	312	318	1570
No. of non-respondents	73	56	67	65	62	323
Percentage of non-respondents	19.0	20.0	24.4	20.8	19.5	20.6

The subjects were informed in the questionnaire that they could call a dental hygienist if they wanted to ask questions, wanted help to fill out the form, or just wanted to make comments. Some of the sampled subjects and some of their family members did so. Reasons for not participating in the study were noted, if given by phone or letter. The number of respondents was 2383, yielding a response rate of 79.4%.

The distribution of non-respondents by gender and age is shown in Table 1. The participation rate was exactly the same for both genders. In men, however, the age group 45-49 years differed from the others by a lower participation rate ($p < 0.001$) and the group 60-64 years by a higher rate ($p < 0.01$).

The subjects were asked about their dental conditions, socioeconomic conditions, attitudes towards dentures, and subjective needs for various kinds of dentures.

The following options on dental conditions were given in the questionnaire: 'All my teeth are remaining'; 'I have one or two single teeth missing and not replaced'; 'I have several teeth missing and not replaced'; 'All my teeth are missing, but I wear no denture'; 'I have fixed partial denture(s) (bridge, bridges)'; 'I have an implant-supported prosthesis'; 'I wear a removable partial denture'; and 'I wear a complete removable denture'.

Separate answers were requested for the maxilla and the mandible. Subjects were instructed that they could mark as many alternatives as they found correct. A tooth should be considered as remaining even if it had an artificial crown. Third molars should be disregarded, present or absent.

Absence or presence of various kinds of dentures was noted separately for the jaws, taking into account that different types could be present simultaneously in the same arch. In a summarized index of dental condition, each subject was assigned to one of seven categories: 1) all teeth remaining (no missing tooth, no denture of any type); 2) all missing teeth replaced by fixed prosthodontics (no missing tooth unreplaced, no removable denture); 3) one or two single teeth missing and not replaced (fixed partial denture(s) might be present as well but no removable denture); 4) several teeth missing and not replaced (fixed partial denture(s) might be present as well but no removable denture); 5) wearing removable partial denture(s) (might have fixed denture(s) as well, not totally edentulous in any jaw); 6) totally edentulous in one jaw (but not in both jaws); and 7) totally edentulous in both jaws.

The distribution in dental categories was studied for subjects grouped by age (45–49 years; 50–54 years; 55–59 years; 60–64 years; 65–69 years), gender (male; female), marital status (married; unmarried; divorced;

Table 2. Distribution of subjects in various dental categories. Corrected percentage figures for the total and for the sexes separately

Dental categories	Men (n = 1119)	Women (n = 1228)	All (n = 2347)
1. All teeth remaining	18	19	18
2. All missing teeth replaced by fixed prosthodontics	11	10	11
3. One or two single teeth missing and not replaced	20	20	20
4. Several teeth missing and not replaced	27	28	28
5. Wearing removable partial denture(s)	8	6	7
6. Totally edentulous in one jaw	8	7	7
7. Totally edentulous in both jaws	7	10	9

widowed), place of residence (city; village; rural), individual income (0–84,000; 85,000–120,000; 121,000–150,000; ≥151,000 SEK per year before taxes), and education (short, up to 9 years of schooling; medium, 10–12 years; and long, more than 12 years).

Internal non-response varied for different questions, which means different n values for different analyses. For example, 36 subjects did not give sufficient information about dental conditions, and 271 subjects did not report their income. However, no significant differences in dental conditions were noted between non-response groups and the other subjects.

The validity of answers about dental conditions has been studied separately (18). In 100 subjects the answers to the questionnaire were compared with findings in a clinical examination. For edentulous persons not wearing dentures, dental conditions were generally reported to be better in the questionnaire than those found clinically. Therefore, data on dental conditions have been corrected for this bias in accordance with a method described elsewhere (19). The bias was considerably smaller for the presence of removable dentures, for which reason these data have been left uncorrected. Differences between groups were statistically tested by means of the chi-square test.

Results

Eighteen per cent of the subjects had all their teeth remaining, and only 9% were totally edentulous (Table 2). Altogether 23% of the population were in the categories wearing removable dentures. There were no significant differences in dental conditions between the sexes except for total edentulousness in both jaws: 10% of the women were edentulous, as compared with 7% of

Table 3. Percentage of totally edentulous (both jaws) men and women in the various age groups

	45–49 years		50–54 years		55–59 years		60–64 years		65–69 years	
	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%
Men	(244)	2	(218)	3	(215)	6	(214)	9	(228)	17
Women	(308)	2	(224)	4	(203)	8	(245)	15	(248)	23

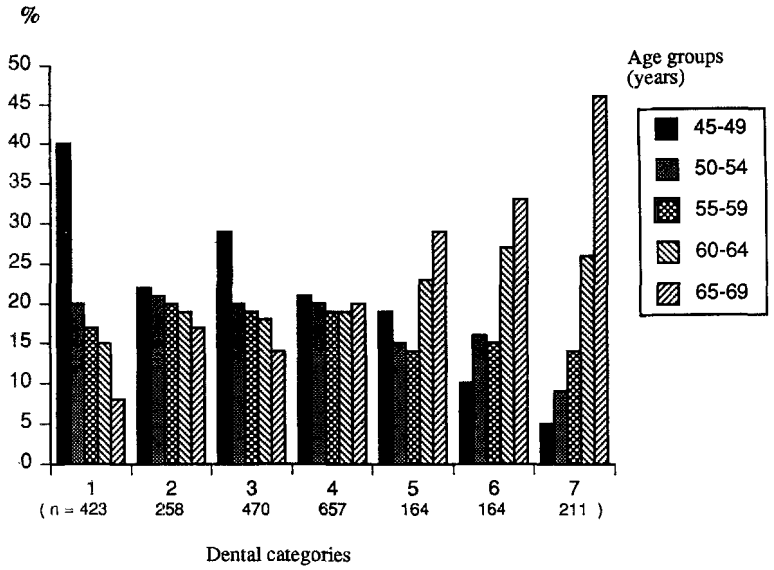

Fig. 1. Percentage distribution in each dental category of subjects grouped by age.

the men ($p < 0.05$). However, an obvious difference was present only in the two oldest age groups (Table 3).

Considerable differences in dental conditions were noted between the age groups (Fig. 1). Most significantly, the percentage of subjects having all teeth decreased with increasing age, whereas the percentage of those totally edentulous in one or both jaws increased with age ($p < 0.001$).

With regard to the distribution in dental categories, the pattern differed for the sexes when the subjects were grouped by marital status (Table 4). Married men showed better dental conditions than other men ($p < 0.01$). There was no significant difference between

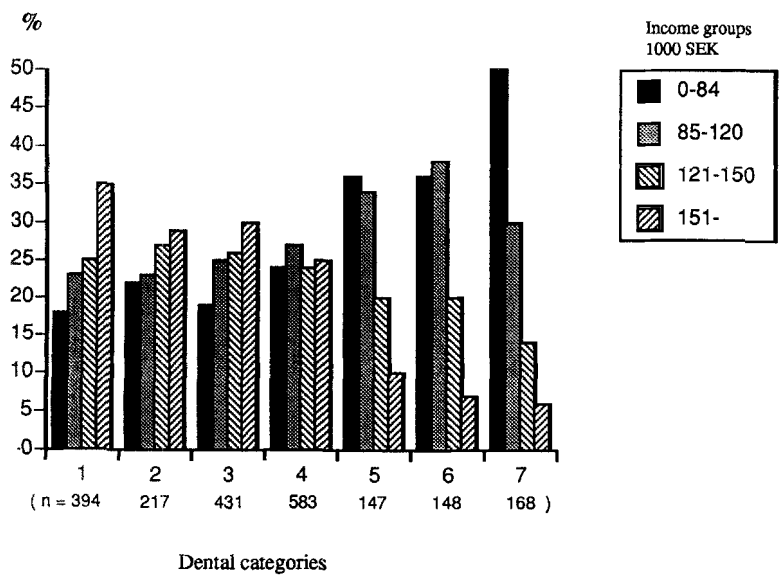

Fig. 2. Percentage distribution in each dental category of subjects grouped by income.

Table 4. Distribution in dental categories by sex and marital status. Corrected percentage figures

Dental categories	Men				Women			
	Married ($n = 936$)	Unmarried ($n = 67$)	Divorced ($n = 77$)	Widowed ($n = 32$)	Married ($n = 914$)	Unmarried ($n = 67$)	Divorced ($n = 121$)	Widowed ($n = 119$)
1. All teeth remaining	19	14	13	10	19	23	22	10
2. All missing teeth replaced by fixed prosthodontics	10	9	12	11	10	12	10	9
3. One or two single teeth missing and not replaced	21	16	19	16	21	23	19	14
4. Several teeth missing and not replaced	28	20	29	31	29	34	21	23
5. Wearing removable partial denture(s)	8	11	11	9	6	2	9	11
6. Totally edentulous in one jaw	8	12	8	9	6	3	10	13
7. Totally edentulous in both jaws	6	18	9	13	9	5	9	20

the groups unmarried, divorced, and widowed men. Widowed women showed the poorest dental conditions compared with both the married and the unmarried women ($p < 0.001$). The unmarried women tended to have better dental conditions than even the married women, but the difference was not statistically significant.

The subjects in lower income groups reported poorer dental conditions than those in higher income groups (Fig. 2). Those with short education had the poorest dental conditions; those with long education had the best (Fig. 3). The differences were highly significant ($p < 0.001$).

When the subjects were stratified by place of residence, there were practically no differences in dental conditions between the groups, with one exception. Women living in villages or rural areas had a prevalence of total edentulousness double that among women residing in cities: 14% and 7%, respectively ($p < 0.001$). No such difference was noted in men.

The prevalence of complete dentures in the lower jaw (Table 5) showed the same age distribution as complete edentulousness (Fig. 1). The prevalence of removable partial dentures increased with age both in the maxilla ($p < 0.001$) and in the mandible ($p < 0.01$), showing about the same percentage figures for both jaws. Complete dentures were much more frequently reported for the maxilla than for the mandible ($p < 0.001$). The same pattern was noted for fixed partial dentures: they were about twice as common in the upper arch as in the lower arch ($p < 0.001$). However, for fixed partial dentures there was no difference between the various age groups except for the youngest group, which showed a lower prevalence of FPDs ($p < 0.001$ for both the maxilla and the mandible). Implant-supported dentures were present in low frequency.

Discussion

Comparisons with earlier studies (1–7) indicate a further improvement of dental conditions. In the early 1960s 53% of the Swedish population in the age group 45–64

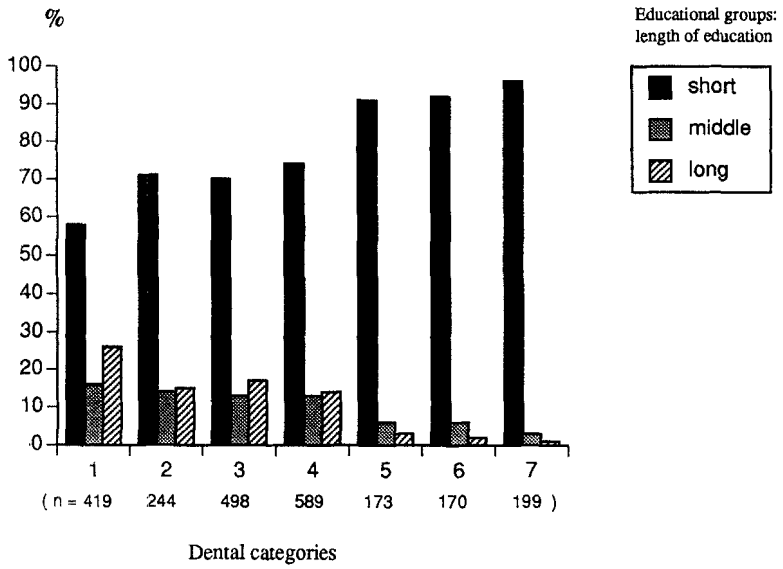

Fig. 3. Percentage distribution in each dental category of subjects grouped by education level.

years were totally edentulous (1). In 1983–84, the corresponding figure was 18% for the age group 50–69 years in Northern Älvsborg county (7). In our material the totally edentulous subjects constituted 6% of the age group 45–64 years and 11% of the age group 50–69 years. Comparisons with regard to Örebro county can be made for the age group 65–69 years in 1982–83 (4) and in 1989–90 (the present study). The prevalence of total edentulousness in this age group was 31% in 1982–83 and 20% in 1989–90.

Dental conditions were similar for men and women, except total edentulousness in

Table 5. Prevalence of fixed and removable dentures in various age groups and totally. Percentage figures for the maxilla and the mandible

	45–49 years (n = 552)	50–54 years (n = 442)	55–59 years (n =418)	60–64 years (n = 459)	65–69 years (n = 476)	Total (n = 2347)
Maxilla						
Fixed partial denture	15	23	21	23	25	21
Implant-supported denture	0.9	0.9	1.0	0.9	0.6	0.8
Removable partial denture	3	5	5	6	9	5
Removable complete denture	4	9	12	20	32	15
Mandible						
Fixed partial denture	6	12	11	14	11	11
Implant-supported denture	0.2	0.7	1.0	0.4	0.4	0.5
Removable partial denture	3	4	5	8	10	6
Removable complete denture	2	4	6	12	20	9

both jaws, which was commoner in women. The difference in this respect was previously significant in Sweden (1–7), but in the present material the difference was only 3%. Moreover, the difference was significant only for the two oldest age groups, which should be interpreted as a gradual disappearance of this inequality between the sexes.

When men and women were grouped by martial status, the pattern was quite different. Married men had better dental conditions than unmarried, divorced, and widowed men taken together, and there were no significant differences between these latter groups. Widowed women had the poorest dental conditions, which distinguished them from both married and unmarried women. The unmarried women tended to have even better dental conditions than the married women. This pattern has previously been reported for older age groups (3, 11).

There seems to be little variation in dental conditions related to place of residence. This is in accordance with a previous report on elderly people in the county (11), and it also supports earlier evidence of decreasing differences in dental status between residence groups in Sweden (1, 2, 4, 5).

However, dental conditions differed markedly among various income and education groups. The subjects with high income and long education had the best dental conditions, whereas those with low income and short education had the poorest. This is in agreement with earlier reports (1–5, 8–12). From those reports, in combination with the present data, one can conclude that there is no tendency of increasing equality in this socioeconomic pattern, in spite of the general improvement of dental conditions in Swedish society.

There was a difference between the arches in the frequency of fixed partial dentures and complete removable dentures. This difference has been observed previously (4). The percentage of subjects wearing removable dentures increased with age, but fixed partial dentures did not increase in the same manner. Only the youngest age group differed from the others by lower percentages of FPDs in both the maxilla and the mandible. Implant-supported dentures were present, although with low frequency, in both jaws and in all age groups.

The present data must on the whole be judged as valid. A response rate of about 80% is satisfactory, especially in view of the debate in Sweden and elsewhere about personal integrity, social control, and data registers. Some respondents who contacted the investigators found the questionnaire rather difficult. One might therefore suspect a lower response rate among subjects with low education level and, presumably, poorer dental status than the average. However, this could not be checked, as no information was available about the education of non-responders. On the other hand, there was no clear age gradient in the response rate. Since age and educational status are clearly related, this may indicate that there were no major differences in education between responders and non-responders.

As pointed out, a clinical study (18) showed an overestimation of the reported dental status by the participants in the questionnaire study. Therefore we decided to present the corrected percentage figures for subjects in various dental categories. The correction factor in the present material cannot be estimated individually, but a population-based correction factor was used (D. Arneberg, S. Palmqvist, B. Söderfeldt. Unpublished observations). The overestimation was limited to subjects not wearing removable dentures. The bias does not affect the conclusions, since the overall pattern remained the same despite the correction.

To conclude, the present study indicates further improvement of dental conditions for those aged 45–69 years in Örebro county and presumably in the whole country. There also seems to be an improving gender equality as to dental conditions. Socioeconomic inequalities, however, seem to be as important as ever for dental conditions. The relative importance of the various socioeconomic factors in today's society needs to be further analyzed.

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