Adequacy and effectiveness of a public dental care program for old-age pensioners

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The purpose of the present work was to assess the adequacy and effectiveness of a public dental program for old-age pensioners. The dental care program offered free consultation and treatment at reduced prices to all pensioners (3072) in a municipality near Oslo in 1979. To study treatment need and access to dental care, a random sample of 430 pensioners was drawn from the total population of old-age pensioners; 371 persons were clinically examined. Of the 3072 old-age pensioners 23.7% responded positively and indicated that they were interested in the program, whereas 19.8% accepted, and 14.6% had the treatment carried out. The program adequacy was low and became lower when more restricted criteria for access to dental services were used. The program effectiveness was 18% or 16%, depending on which criteria were used for access. Acceptance of the program was highest among people who were aware of it, had natural teeth, had a dental problem, did not have their own dentist, had limited education, or were among the young pensioners. □ *Geriodontology; program acceptance; public dental service*

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The unsatisfactory dental status of old-age pensioners as recorded by the dental profession (1–6) has put this theme on the agenda of the dentists' international organization (7) and also on the national political scene (8). Increasing interest in elderly pensioners' living conditions (9) and surveys of dental health may therefore have contributed to the development of different local dental care programs (3, 10, 11).

Assuming that low income among old-age pensioners was an important reason for not demanding dental services, the counties of Oslo and Troms reduced the out-of-pocket expenditures by 50–100%. A field project showed that extending a fee subsidy program by including home visits and arrangement with a dentist raised the use rates from 14% to 23% (11). However, public spending should preferably also be evaluated by other criteria than utilization rates. The evaluation should also include policy aspects of the political decision before the program and the objectives of the program. The present study was undertaken in the municipality of Skedsmo near Oslo. The pre-program situation is illustrated by a typology (Table 1). The typology combines need for dental care and access to dental care. The planned program in Skedsmo was supposed to reach those old-age pensioners who were in need of dental treatment but had no access to dental services (cell II, Table 1). Old-age pensioners with access to dental services regardless of treatment need were not given priority. To ensure inclusion of the priority group, eligibility for the program was extended to all old-age pensioners in a trial period. After this period the evaluation should demonstrate the extent to which the problem had been solved (adequacy) and the extent to which an intended amount of attainment had occurred (effectiveness) (12).

The purpose of the present work was therefore to assess the adequacy and effec-

Table 1. Pre-program typology and decision chart regarding public dental care for old-age pensioners in the municipality of Skedsmo

Need for dental care	Access to dental care	Decision chart
Yes	Yes	I. No reason for intervention
	No	II. Intervention needed
No	Yes	III. No reason for intervention
	No	IV. No reason temporarily, need may arise

tiveness of the Skedsmo dental program for old-age pensioners.

Materials and methods

The study was carried out in a medium-sized Norwegian urban municipality near Oslo with 33,000 inhabitants. The study group consisted of 3072 old-age pensioners (Table 3). Skedsmo has a size and a demographic structure like those of many of the medium-sized and larger municipalities and towns in the eastern part of Norway (13).

The dental care program

From the public dental service a written invitation comprising free consultation and treatment with a 50% fee reduction was sent to all old-age pensioners in 1979. If necessary, free transport was offered. The pensioners were requested to return a questionnaire containing questions related to earlier use of dental services, attitudes to dental care, and, in addition, to answer whether they were interested in the program offered.

Those who gave positive responses to the invitation were given an appointment at the closest of three newly established dental clinics for elderly people. Efforts were made to inform the social institutions expected to be in contact with the pensioners about the program.

To study need for and access to dental care in the population, a random sample of 430 persons was drawn from the *total* population of old-age pensioners in the municipality, denoted the S group, at the same time as the invitation was sent out. An exceptional effort was made to examine and interview the S group. Of the selected sample 86% (371) were seen, 60% at the clinic and 26% in their private homes during the time period in which the suggested treatment was carried out. Due to mental or physical debility, 13 elderly were unable to give complete answers, and only a limited clinical examination was performed. Of the 59 non-participants 22 explained that they had some of their own teeth and preferred their own dentist. A comparison between the examined elderly and the non-participants with regard to three independent variables showed no statistically significant differences (Table 2).

Interview and clinical examination

The standardized interview included questions pertaining to oral problems and the use of dental services. In addition, sex, age, social class (14), length of education, and individual ability to pay for dental treatment were registered. Family net income was obtained from the tax rolls and groups as shown in Table 2. General health status and physical fitness were graded as good, reduced, or strongly reduced, in accordance with an index of physical mobility, mental status, and illness (15). The participants were examined clinically (16), including a standardized radiographical examination (17) by two calibrated dentists. The agreement in clinical scores between and within the two examiners varied between 80% and 100%.

Analysis of data

The following dependent variables were measured:

1. Interest in the treatment program was registered when an old-age pensioner wanted to participate in the program.

2. Acceptance of the dental care program was recorded when the pensioner came for consultation and treatment.

3. Access to dental care was measured by means of an additive index composed of

Table 2. Distribution of the examined and the non-participants in the sample in accordance with sex, age and family net income (NOK)

Groups	Examined persons (%) (n = 371)	Non-participants (%) (n = 59)	Chi-square test
Sex			
Men	42	44	0.05 df = 1
Women	58	56	NS
Age, years			
67–69	21	29	3.01 df = 4
70–74	33	34	NS
75–79	27	22	
80–84	14	12	
85+	5	3	
Family net income, NOK			
0–24,000	27	31	4.43 df = 3
24,001–40,000	28	37	NS
40,001–60,000	22	20	
>60,000	23	12	

three dichotomized variables: 1) Self-reported individual ability to pay (NOK 0–500 = 0; >500 NOK = 1; 2) own dentist (no = 0; yes = 1); and 3) need for transportation (yes = 0; no = 1). The index ranged from 0–3 points. No access was defined both as 0–2 points and as 0–1 point (the restricted version).

4. Treatment need present was assessed in accordance with professionally defined criteria (3).

5. Treatment carried out was registered when a patient had at least one part of the suggested treatment completed.

Bivariate and multivariate cross-tabulations were used. The dependent variable acceptance of the service offered was analyzed by means of Multivariate Classification Analysis (MCA) (18). Beta is the adjusted relative weight for each independent variable and can be compared directly with the beta weights of other predictors in a multiple regression analysis. R^2 denotes the total explained variance in acceptance of the program offered. P values <0.05 were accepted as statistically significant.

Results

A total of 23.7% of the old-age pensioners (n = 3072) were interested in the program; approximately 20% accepted it, and 14.6% were treated (Table 3). Only negligible sex differences in interest, acceptance and treatment carried out were found.

The reasons for not being interested in the public program were examined by interviewing the pensioners in the sample group. The reasons were as follows: 1) had acceptable dentures (44%); 2) had own dentist (30%); 3) was too old, not feeling well (12%); 4) was interested but no initiative (4%); and 5) could not afford it (4%). The rest of the answers (6%) were related to recent death, poor previous experience with dental care, and no interest in public programs.

Program adequacy and effectiveness

Knowledge of the total number of persons in need of treatment but without access to dental care is necessary to estimate program adequacy and effectiveness.

The following approach was used to analyse program adequacy: Those persons who accepted the program (A group) were compared with those persons in the S group who were in need of treatment but had no access to dental care. The comparison was made with regard to both background variables

Table 3. Percentage distribution in accordance with sex and age of elderly people in Skedsmo ($N = 3072$), who were interested in a public dental care program, accepted it, and had the treatment carried out

Sex	Age, years	*n*	Interest, %	Acceptance, %	Treatment carried out, %
Men	67–74	738	27.2	22.8	17.2
	75–79	287	24.0	19.8	14.3
	80+	237	14.3	13.5	8.9
Women	67–74	937	27.1	23.7	19.0
	75–79	451	21.4	17.2	11.0
	80+	422	17.6	12.8	7.3
Total		3072	23.7	19.8	14.6

and dental status. Had the program been totally adequate, the pensioners in the A group and the pensioners with treatment need and no access in the S group should have been equally distributed on relevant background variables. Table 4 shows that those pensioners who accepted the program were younger, had higher income, were recruited less often from the lowest social class, and more often had their natural teeth than the persons belonging to the priority group. This means that persons for whom

Table 4. Distribution of persons according to selected variables in the acceptance group (A group) and among those persons in the sample (S group) who had treatment need but no access to dental care

		S group	
	A group ($n = 608$), %	Treatment need + no access ($n = 202$), %	Treatment need + no access (restricted criteria) ($n = 69$), %
Sex			
Men	42	40	40
Women	58	60	60
Age***			
67–74 years	64	50	45
75–79 years	22	25	23
80+ years	14	25	32
Income***, NOK			
0–24,000	23	37	38
24,001–40,000	30	30	39
40,001–60,000	25	19	16
>60,000	22	14	7
Social class***			
High	11	7	1
Middle	36	27	17
Low	53	66	81
Dental status***			
Edentulous	47	69	80
Dentate	53	31	20

*** $P < 0.001$.

the program was not primarily intended had participated.

The adequacy of the program was lower when the restricted criteria of no access (0–1 point) were used to identify the priority group from the sample (Table 4). Thus the differences in distribution of persons on the independent variables between the compared groups increased.

Program effectiveness was assessed as the percentage of the priority group who were actually reached by the program. In the sample (S group) the size of the priority group was calculated to 202/358 = 56%. This means that the total number of priority pensioners in the municipality could be estimated to be 3072 × 56/100 = 1720. As can be seen in Fig. 1, only 312 of the 543 persons who accepted the program and had treatment need belonged to the priority group, which resulted in a program effectiveness of 18% (312 × 100/1720).

When the more restricted criteria were used to categorize access—that is, no access = 0–1 points on the access index—the priority group calculated by the sample was reduced to 69 persons (19.3%). Accordingly, the number of priority pensioners in the population was estimated to be 3072 × 19.3/100 = 583 persons. Applying the restricted criteria of no access to the A group, only 95 of 543 persons fulfilled the requirements for having treatment need but no access, which resulted in a program effectiveness of 16% (95 × 100/583).

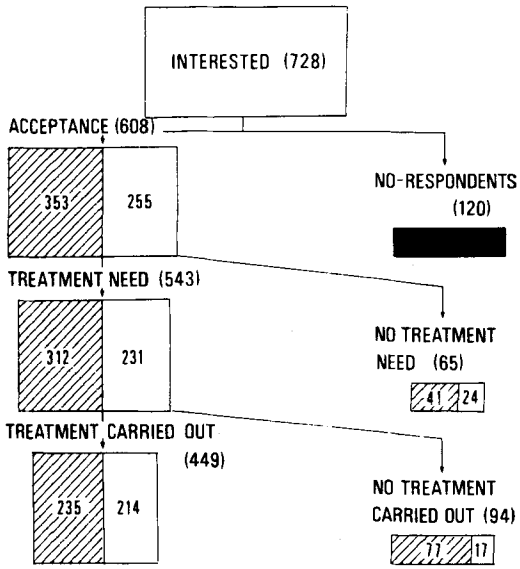

Fig. 1. The distribution of elderly in Skedsmo with and without access to dental care, in accordance with program acceptance, treatment need, and treatment carried out.

Program acceptance

Program acceptance (yes/no) was analyzed further by applying multivariate analysis in the S group (Table 5). The acceptance rate was higher among pensioners who were aware of the program, had natural teeth, were among the young pensioners, were among those with no dentist, had limited education, and were among those who reported having dental problems. The variables physical mobility, general health and preference as to dental care were not significantly related to acceptance of dental care. (Two variables not presented in Table 5.) Nor were income, payment ability, and time since last visit important predictors. Thus, the perception of not having one's own dentist was an important predictor, even though acceptance was not related to recent use of dental services. Altogether 31% of the population had visited the dentist last year (estimated in the S group). Of the 608 elderly pensioners who accepted the program 371 said that they would not have visited the dentist without the program.

Most of those who accepted the program had treatment need regardless of sex and age (Table 6). However, when the treatment was to be carried out, the drop-out rate increased with age for both sexes.

The average estimated treatment time was 2.4 h per person needing treatment (543), excluding time for clinical and radiographic examination. Of the total number of hours (1291) necessary to carry out the treatment, 63% were spent on removable denture work and 37% on maintenance treatment of natural teeth. When the same time estimates were used for treatment need as for treat-

Table 5. The effect of 10 selected independent variables on acceptance of the dental service program offered, using a multivariate analysis (MCA); $n = 358$; S group

Variable		*n*	Adjusted rate	Beta
Age (years)	67–69	70	0.46	
	70–74	119	0.42	
	75–79	97	0.27	
	80+	72	0.24	0.18**
Education in years after ground level	<1 years	242	0.34	
	1–2 years	57	0.51	
	>2 years	39	0.24	0.16*
Own evaluation of payment ability for dental care, NOK	0–500	69	0.36	
	501–2000	63	0.40	
	>2000	226	0.34	0.05
Dental status	No teeth	193	0.24	
	1–9 teeth	65	0.40	
	10–19 teeth	54	0.56	
	>20 teeth	46	0.47	0.23**
Last visit to a dentist	<1 year	114	0.35	
	1–4 years	59	0.34	
	5+ years	185	0.35	0.01
Own dentist	Yes	91	0.18	
	No	267	0.41	0.20***
Physical mobility	Normal	274	0.37	
	Reduced	84	0.29	0.03
Reported dental problems	None	245	0.28	
	Yes	113	0.50	0.19***
Family net income (NOK)	0–24,000	93	0.36	
	24,001–40,000	105	0.37	
	40,001–60,000	77	0.33	
	>60,000	83	0.32	0.04
Awareness of the program	Good	193	0.49	
	Poor	165	0.19	0.32***

$R^2 = 0.23$.
* $P < 0.05$.
** $P < 0.025$.
*** $P < 0.001$.

Table 6. Treatment need and treatment carried out among persons who accepted the program ($n = 608$), in accordance with sex and age

Sex	Age, years	*n*	Treatment need (%)	Treatment carried out (%)
Men	67–74	168	92	76
	75–79	54	96	76
	80+	32	91	66
Women	67–74	222	90	80
	75–79	78	85	65
	80+	54	80	57
Total		608	89	74

ment carried out, 849 h were used for the 449 treated persons.

Discussion

The present dental program and the Troms program (11) had certain similarities. They were both based on a publicly subsidized and organized delivery model combined with out-reach services. Despite this, the programs did not increase the use of dental services in the target groups.

Achieving equity of access to health care

Table 7. Distribution of old-age pensioners in accordance with group priority and program participation

		Priority group		
		+	−	Total
Reached by the program	+	312	231	543
	−	1408	1121	2529
Total		1720	1352	3072

Sensitivity: 312/1720 = 0.18.
Specificity: 1121/1352 = 0.83.

has been the objective of most programs in the past. So far, access has been a political idea rather than an operational idea. Few attempts have been made to provide systematic conceptual and empirical definitions of access that would permit policy makers to monitor various programs (19). In the present study no access to dental care was a criterion of eligibility for the priority group. However, in the trial everybody had access, and the low response should therefore be explained by other mechanisms.

The present dental care program was evaluated in terms of its adequacy and its effectiveness. The degree of inadequacy was measured by frequency distributions, which were compared (Table 4). The dental care program was least adequate with regard to the dental status of the priority group. Thus, in accordance with both the unrestricted and the restricted access criteria, mainly edentulous persons (69% and 80%, respectively) should be included in the priority group. In fact, more dentate (53%) than edentulous (47%) pensioners responded to the program invitation. These findings illustrate what may be considered a dilemma in dental care for the present old-age pensioners. The policy of public spending in Skedsmo was to help those in need of treatment who had no access. The results from the survey of the random sample showed that those with treatment need were found among the oldest, the poorest, and the edentulous pensioners. Since they were socialized in an earlier historical period, their expectations of dental care may have been modest, and they may even have preferred other social assistance (20). Yet, in a recent report by Rö (20), a low response was found to several social support measures. The level of the response may be explained by the self-help attitude of this generation, resulting in a negative attitude to public assistance (21).

The inadequacy of the Skedsmo dental program is also reflected in the low effectiveness, which is also an expression of program sensitivity. Thus, the sensitivity was low (18%) but the specificity high (83%) (Table 7). When the restricted access criteria are applied, both the sensitivity and the specificity were even lower (16% and 82%, respectively). Thus, the program was not an incentive for old-age pensioners in general to use dental services. The economic consequences of providing full eligibility seem not to be overwhelming compared with an expected political benefit.

The results of the present study seem to indicate that the most important point for today's cohort of old-age pensioners is to know that they are eligible for dental care when a dental problem is perceived. In conclusion, therefore, awareness of having access when a dental problem occurs may be both the most adequate, the most effective, and the most cost-saving program objective. The greater the generalization potential of this contention, the greater the bearing on a newly passed Norwegian Act on Dental Health (22). The Act states that groups of elderly people are target groups of the Public Dental Service and that dental care for these groups should be included in the plan to be approved by regional government and the Department of Health and Social Affairs.

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