
Determination of the Distribution of Dental Care Needs of the Active Duty Army

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KNOWLEDGE of the actual dental care needs of active duty Army personnel is essential to planners who must identify overall requirements for dental resources and evaluate the distribution and utilization of these resources. Current Army dental reporting systems do not provide information for assessing these factors. Therefore, this survey was conducted to provide a data base from which reliable estimates can be derived of the current treatment of the entire active duty Army population.

Although the dental care needs of military recruits, inductees, and enlistees (1-6) are well documented by each military service, information is lacking about dental care needs of the total military population. A complete bibliography was listed by Keene (7) in the November 1974 issue of *Military Medicine*. Cassidy and co-workers (2) reported the numbers and kinds of dental treatments performed on more than 15,000 recruits examined during a 12-month period.

Both military and civilian studies of dental disease

prevalence are used frequently to develop estimates of dental care needs (8-11); a combination of dental indices are used for data collection—decayed-missing-filled tooth (DMFT) or surface (DMFS) indices, an oral hygiene index, and a periodontal disease index. Because of the difficulties associated with standardization of examiners and the problems of extrapolating treatment needs from prevalence data, we used a treatment plan approach in the conduct of our survey.

Methodology

The data were obtained by a prospective clinical survey conducted by dental officers at 42 sites in the continental United States. Data were collected over a consecutive 7-month period, and the sample selection technique was based on month of birth and years in service. The Army Oral Health Maintenance Program (a Department of Army program that requires an annual dental evaluation during the anniversary of an individual's birth month) was used to select the sample population.

The basic guidance for examining officers was: "Your examination findings should result in the formulation of a treatment plan that you feel will restore this patient to reasonably optimal oral health. That is, base your plan on a realistic evaluation of the patient's age, past dental disease experience, and the degree you feel the patient can expect to be motivated to maintain the level of oral health to which you plan to restore him or her." The number of diagnostic aids and laboratory tests was left to the discretion of the examining officer.

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Findings

The data base for this study is comprised of 13,182 dental "treatment plans" collected during the 7 months. The following tabulation contains the need-for-care distribution of the entire sample; 87.4 percent were in need for some form of corrective care, and 10.1 percent required preventive services. Preventive care included oral prophylaxis, calculus removal, and plaque control; all other categories of care were considered corrective.

Type of care	Absolute frequency	Relative frequency (percent)
None	327	2.5
Preventive only	1,331	10.1
Corrective	11,524	87.4
Total sample	13,182	100.0

The distribution of the sample by age group follows:

Age group (years)	Number	Percent
17-19	1,020	7.7
20-24	2,992	22.7
25-29	2,627	20.0
30-34	2,141	16.2
35-39	2,309	17.5
40 and over	2,093	15.9
Total sample	13,182	100.0

Treatment requirements per 1,000 persons for the entire sample and for each age group are shown in the table. The need for restorations was three times greater for the 17-19 age group than for those for 40 and over. The fixed prosthetic requirements (crowns and bridge

abutments) apparently were not affected by age as was the restorative requirement. The need for removable prosthetics increased progressively as age increased. Endodontic and extraction requirements lessened as age increased. The periodontal requirement dramatically increased with age, whereas the need for preventive services was not greatly influenced by age. Any slight reduction in the older age groups' need for preventive services could be influenced by the increased number of edentulous persons in those age groups. The age group mean differences were subjected to a one-way analysis of variance, and there was no significant difference ($P < .01$) between means for the number of crowns or the number of bridge abutments.

We discuss the need for restorations (fillings) in terms of one, two, and three or more surface restorations. The mode (the most frequently occurring condition) for this variable was zero one-surface restorations. Approximately 46 percent of the sample required no one-surface restorations, and more than 90 percent required five or less one-surface restorations. For every 1,000 active duty personnel in the sample, 1,805 one-surface restorations were needed. The distribution of the need for two-surface restorations indicated a mode of zero; 51.2 percent of the population did not require two-surface restorations, and 95 percent required four or less two-surface restorations. For every 1,000 active duty personnel in the sample, 1,129 two-surface restorations were needed. The mode for three or more surface restorations was also zero and none were required by nearly 73 percent of the sample; 94.1 percent of the

sample needed two or less multisurfaced restorations. For every 1,000 active duty personnel in the sample, 508 three-or-more surface restorations were needed. The combined requirement for restorations per 1,000 active duty personnel in the sample was 3,442 fillings, as shown in the table.

Among the entire sample, 71.9 percent required at least one restoration of some type. The age group distribution for those needing some form of restorative care shows a 25.6 percent difference between age groups. Within the 17-19 age group, 84.2 percent required at least one restoration, whereas this need applied to only 58.6 percent of the age group 40 and over.

Ninety-eight percent of the sample required two or less crowns, while 81 percent of the total sample did not require any crowns. No significant difference, statistical or practical, appeared in the need for crowns when the distribution was stratified by age group.

The fixed prosthetic (bridges) requirement is presented as abutment teeth needed. The mode for this variable was zero, with 84 percent of the population having no fixed prosthetic requirement. Fewer than 7 percent required more than two bridge abutments, and fewer than 2 percent required more than four abutments.

We discuss the need for removable prosthetic devices in terms of maxillary and mandibular full and partial dentures, as well as the combined need for this type of care. Maxillary full dentures were required by 3.4 percent of the population, and mandibular full dentures were required by 1.3 percent. Both maxillary and man-

dibular full dentures were needed by 1.2 percent of the population. The lowest full denture rate for any subgroup was 2 per 1,000 in the age group 17-19 years.

Maxillary partial dentures were required by 8.4 percent of the sample. This need was approximately 10 times greater (69 per 1,000) for the age group 40 and over than for the 17-19 age group (7 per 1,000). The mandibular partial denture was the type most needed—11.7 percent of the sample.

A maxillary full denture and a mandibular partial denture were needed by 1.7 percent of the population, and 5.3 percent of the total sample required maxillary and mandibular partial dentures.

The mode for the number of teeth requiring extraction was zero. No extractions were needed by 71.8 percent, and almost 98 percent of the sample required 4 or less extractions. The differences in the need for extractions among age groups were statistically significant ($P = < .01$). The greatest requirement for any subgroup was in the 17-19 age group—1,439 extractions per 1,000 persons.

Anterior endodontic care was evidenced in 4.3 percent of the sample, and 5.2 percent needed endodontic therapy for posterior teeth. Ninety-nine percent of the sample either did not need endodontic treatment or needed only one tooth treated for both the anterior and posterior endodontic treatment categories. In general, younger persons required about twice as much endodontic care as persons 40 and over.

Periodontal treatment was required by 28.1 percent of the entire sample. The need ranged from 15.1 per-

Dental treatment needs per 1,000 active duty personnel for total sample, by age group

Treatment	Needs per 1,000 persons, age group						Significant difference ($P < .01$)	Average, total
	17-19	20-24	25-29	30-34	35-39	40 and over		
Restorations	5,604	4,702	3,851	2,864	2,366	1,855	Yes	3,442
Crowns	274	232	253	238	246	264	NS	248
Bridge abutments	481	450	494	499	527	440	NS	481
Full dentures	10	16	31	53	66	101	Yes	47
Partial dentures	128	140	174	230	255	275	Yes	203
Endodontic, number of teeth ...	201	187	124	120	86	98	Yes	133
Extractions	1,439	1,200	734	539	417	480	Yes	767
Periodontal care	151	176	272	395	440	542	Yes	281
Oral prophylaxis	933	914	900	893	877	857	Yes	894
Calculus removal	850	810	814	832	818	797	Yes	817
Plaque control therapy	845	797	799	794	769	732	Yes	786

¹ A one-way analysis of variance was performed.
Note: NS—not significant.

cent in the 17-19 age group to 54.2 percent in the 40 and over age group.

Oral prophylaxis was needed by 89.4 percent of those examined. This included topical fluoride. Calculus removal was needed for 81.7 percent of the sample; plaque control was needed for 78.6 percent.

Missing teeth, although not a direct care need indicator, are an important indicator of past dental care experience. The mean number of missing third molars was 2.14 for the entire sample. The mode was four. The mean number of missing teeth, other than third molars, was 3.3 with a mode of zero. Of the total sample, 34.1 percent had all 28 of their non-third molar teeth, and 1.2 percent of the sample was edentulous.

Discussion

The distribution of variables for the numbers of restorations, crowns, bridge abutments, extractions, and endodontic treatments are positively skewed with a mode of zero. With highly positively skewed distributions such as those described, the mean and standard deviations are of limited descriptive or practical value in themselves. The nature of the data collected does not permit values of less than zero, but the data do include large positive values that yield large standard deviations that extend beyond the permissible ranges—negative numbers of restorations required is not a useful data point.

The mode, the percentage distributions of the sample, and the cumulative distributions provide more meaningful descriptive statistics. As an example, 45.8 percent of the population did not require one-surface restorations, nearly 75 percent required 2 or less one-surface restorations, and less than 10 percent of the population required more than 5 one-surface restorations. In contrast, the mean number of one-surface restorations within the entire population was 1.8.

Although the mean value in these types of distributions has little or no predictive value for any one person in the sample, the data strongly indicate overall population distributions (that is, 46 percent of the sample required no one-surface restorations). The mean, in a skewed population as described, is strongest in interpreting time or cost-related concerns. With the application of a treatment time conversion factor, the mean would be particularly significant in predicting the treatment time requirement for specific population groups, such as man-hours of dental care required per 1,000 military persons. Cost factors also can be applied to the means in order to predict population treatment costs.

The variables that represent the need for prosthetics, periodontics, and preventive services are binary ("yes" or "no") in character. The distribution percentages completely describe the population in terms of practical significance. The use of mean values for such data, when used to facilitate computation of projected time considerations, would also be an appropriate method for estimating man-hour requirements.

Neither time nor cost factors are discussed or applied in this article, because its purpose was to establish needs among the sample examined. The American Dental Association, Bureau of Economic Research and Statistics publishes fee scales which may be used to determine the costs of purchasing the care needs reported (12).

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