Dental Care Needs of Army Recruits

WARREN A. PARKER, DDS, MPH
A. DAVID MANGELSDORFF, PhD
DAVID G. BRUNNER, DDS, MPH

Dr. Parker, who at the time of the study was chief of the Dental Studies Office, Academy of Health Sciences, Fort Sam Houston, Tex., is currently associate professor, Department of Community Health and Preventive Dentistry, Baylor College of Dentistry, 3302 Gaston Ave., Dallas, Tex. 75246. Dr. Mangelsdorff and Dr. Brunner are with the U.S. Army Health Care Studies and Clinical Investigation Activity, Fort Sam Houston, Dr. Mangelsdorff as a psychologist and Dr. Brunner as Commander.

Tearsheet requests to Dr. Parker.

SYNOPSIS

To determine the prevalence among current U.S. Army recruits of dental conditions requiring treatment, an assessment was done of the dental care needs of a 3 percent sample (N = 5,613) of incoming recruits at all seven U.S. Army reception stations that operate under a dental treatment planning concept.

Both the treatment needs of the total sample and of each Army component—that is, Regular, Reserve, and National Guard forces—were quantified. The results indicated that the requirement for dental care among Army recruits currently being processed for training is approximately the same as it was for such recruits at the time that the Selective Service System draft was in effect, although the types of care needed have changed. Like the draft-based recruits, current Army recruits enter active-duty status with a substantial backlog of unmet dental care needs.

THE DENTAL NEEDS OF U.S. ARMY RECRUITS have been periodically assessed to aid planners in identifying the requirements for dental care resources and the best allocation of those resources to provide optimum treatment for this segment of the Army population. Previous studies of the dental care needs of military recruits were conducted when the Selective Service System draft was in effect (*1–4*). Since 1973, when the draft ended, the U.S. Army has consisted of an all-volunteer force. The mean age has increased, as well as the proportion of blacks, Hispanics, and females, and the educational level has decreased. Data from the National Health Survey indicate that these factors are significant variables when dental needs are described (*5,6*). Therefore the impact of the changes in composition of the recruit population needs to be assessed to determine whether the dental needs of this population also have changed.

'In addition to the sex and ethnic differences of the current recruit force, external influences on these recruits' dental health status, such as the effect of fluoridation and increased availability of dental care in their pre-Army period, might affect their current dental needs.'

In the most recent previous study of U.S. Army recruits, conducted in 1969, Cassidy and associates reported that 5,066 restorations and 1,013 extractions were required per 1,000 male recruits (*7*). The recruits' prosthetic requirements were 155 removable units and 897 individual crowns and bridge abutments per 1,000. Periodontal and endodontic treatment requirements were not reported. A similar requirement for restorative care (five restorations per man) was reported for U.S. Marine Corps recruits (*8*). In a 1976 Army study, a need for 5.6 restorations per person for 17- to 19-year-olds was reported, but the subjects were not all necessarily recruits (*9*). Christen and associates (*10*) reported a need for 6.2 restorations per U.S. Air Force recruit, and Spinks and Schneider (*11*) found a requirement for 5.0 restorations per person for Navy and Marine recruits in a study reported in 1981. The need for restorations was the variable most easily compared in the studies reviewed and, in addition, constituted the largest category of need in this age group.

No information is available about the dental needs of Reserve and National Guard recruits, who enter on active duty for training along with Regular Army volunteers. In addition to the sex and ethnic differences of the current recruit force, external influences on these recruits' dental health status, such as the effect of fluoridation and increased availability of dental care in their pre-Army period, might affect their current dental care needs.

The general purpose of our study was to assess, among recruits of each component of the Army, the prevalence of dental conditions requiring treatment. The results of the study were supplied to the Office of the U.S. Army Assistant Surgeon General for Dental Services to assist that office in estimating the dental resources necessary for the treatment of active Army recruits and in planning for the expansion of dental resources in the event of mobilization of the Reserve and the National Guard.

The specific purpose of the study was to determine the dental care needs of Army recruits by the type of treatment required for each component of inductees (Regular Army, Army Reserve, and National Guard).

Methods

The population surveyed for the study consisted of persons undergoing entrance processing into the Army for recruit training. A 3 percent sample of the projected recruit population for fiscal year 1981 (170,000 persons) was the goal ($N = 5{,}100$). The survey was conducted over a 3-month period at each of the seven Army reception stations, namely, Fort Dix, N.J., Fort Knox, Ky., Fort Leonard Wood, Mo., Fort Sill, Okla., Fort Jackson, S.C., Fort McClellan, Ala., and Fort Bliss, Tex. These reception centers provide complete entrance processing, which includes the initiation of administration, financial, medical, and dental records for all recruits before their training begins.

Before data collection began, two of us (W. A. P. and D. G. B., project officers from the Academy of Health Sciences of the U.S. Army) visited each of the seven sites. Both W. A. P. and D. G. B. have had dental public health training, and W. A. P. has participated in previous surveys of Army dental care needs. The project officers visited Fort Knox together; then, one or the other visited each of the other sites alone. This practice was followed to ensure that instructions and guidance with respect to data collection would be standardized. During the site visits, an evaluation was done of the flow of recruits through the center and of the sampling process, and procedures were instituted to ensure that the study sample would be drawn at random and that recruit processing would not be interrupted. The sample size allocated for each center was based on the proportion of the total number of recruits scheduled for processing at that site.

Both the 1969 and 1981 surveys indicated a high need for the services of dental hygienists.

A review of the reception centers' records indicated that the number of recruits scheduled to be processed varied only slightly from the actual number processed and would not affect the overall sampling allocations. The sampling process varied from site to site, depending on the facilities available, the flow of recruits through the center, and the center's proximity to a dental treatment facility at which bite-wing radiographs could be taken. The local variations observed were not considered sufficient to affect the study results adversely. The site visits indicated that the manner in which the recruits were examined was not dictated by the processing procedure; that is, it was not done alphabetically or by service number, height, Army component, or other formal protocol. Therefore, to maintain patient flow through the entire processing center, we established a systematic sampling procedure based on the order in which the recruits were examined. For example, we examined every 5th or 10th person according to the total daily number required to meet the site's overall quota. The past records for each center showed that daily inputs of recruits were relatively stable. Since recruits were not segregated by Army component, the sampling plan was based on the assumption that the representation of Regular Army, Reservist, and National Guard recruits was proportional. The visiting project officer and local director of dental services determined the sampling process that would best fit the individual center's operation.

A direct treatment plan approach, as discussed by Schonfeld (*12*), was used rather than a conditions-to-need or conditions-to-plan approach. (In the direct treatment plan approach, only the treatment that is to be provided is recorded, as is the practice in a private dentist's office.) Schonfeld considers the direct treatment plan to be subject to considerable variability, but it was the approach with which our exami-

ners were most familiar and which best fit into our general study plan. The use of indices to collect data on conditions and the conversion of these conditions to treatment needs or to a treatment plan was considered. However, we rejected this system because of the limited time that the project officers had to train the many examiners and to standardize procedures at the eight sites. We decided that a poorly used index system would inject more variability than was inherent in the direct treatment plan approach.

During the site visits, the project officer instructed the study examiners about the sampling and examination procedures and provided them with guidance in the formulation of the treatment plan. The project officer observed the examiners engaged in these processes until he was satisfied that an acceptable standard of performance had been achieved. The examiner training was conducted before the data collection phase of the study. The basic guidance that was provided each examiner for conducting an examination was as follows:

Your examination findings should result in the formulation of a treatment plan that you believe 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 of restoration you plan. This treatment plan should not reflect the treatment policies in effect locally or Army-wide but should reflect actual patient needs.

The preceding instructions had been used in previous studies of Army dental care needs in which many examiners participated (*2,5*). Panographic radiographs were used as a minimal diagnostic aid in our study, and bite-wings were acquired as described in the next paragraph. Each site had a primary and a backup examiner appointed by the local director of Army dental services. These examiners were experienced dental officers, all of whom had been oriented to the study during the project officer's visits to the site.

Demographic data on the recruits who were included in the survey were collected during the examination process and recorded on a "Recruit survey recording form" (see fig. 1) by a dental assistant. The examination consisted of a clinical assessment of the recruit's treatment needs, to be conducted as described in the "Instructions for recording data" (see fig. 2) that were provided to each examiner.

Since all recruits have panographic radiographs taken upon entry to active duty, one was available for each of the persons sampled and was used as a diagnostic aid. The study plan called for bite-wing radiographs to be taken to assist examiners in more definitively determining the restorative requirements of each recruit. Selection of the recruits for bite-wing radiographs was done by each center's administrative personnel and was based upon the avail-

Figure 1. Recruit survey recording form

READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

Installation code
Status (Regular Army—1, Army Reserve—2, National Guard—3)
Date of birth (month, day, year)
Sex (male—1, female—2)

Radiographs (bite-wing radiographs available—yes—1, no—2)
Prophylaxis required (yes—1, no—2)
Calculus removal required (yes—1, no—2)
Restorations required:
  1 surface
  2 surfaces
  3 or more surfaces
Endodontics required:
  anterior teeth
  posterior teeth
Periodontal treatment required (yes—1, no—2)
Removable prosthodontics required:
  complete dentures
  partial dentures
Fixed prosthodontics:
  individual crowns
  bridge abutments
Exodontia required:
  erupted teeth
  impacted teeth

Figure 2. Instructions for recording data

All lines must be completed. Leave no blanks. Enter 0 where no other number is required. Example: If a recruit requires 2 extractions, enter 02.
Installation code: Prerecorded.
Status: See codes on form.
Date of Birth: Example 03 — 16 — 49 for March 16, 1949.
Sex: See codes on form.

CLINICAL FINDINGS

Your examination findings should result in the formulation of a treatment plan that you feel will restore this recruit 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 to which you feel the patient can be motivated to maintain the level of oral health to which you plan to restore him/her. Diagnostic guidelines or criteria will not be imposed upon you. Your clinical judgment should be the basis for determining the optimal treatment plan for each study participant. This is a *needs survey* and your judgment should not be influenced by local or Army treatment policies.

Radiographs: See codes on form.

Prophylaxis: Enter 1 if an adult prophylaxis is needed, as per dental procedure code 01110.

Calculus removal: Enter 1 if a scaling is needed, as per dental procedure code 04342.

Restorations: Enter number of restorations needed; the following dental procedure codes are included: 02140, 02320, 02210, 02150, 02336, 02160, and 02161.

Endodontics: Enter the number of anterior and/or posterior teeth that you feel should have root canal therapy.

Periodontal treatment: Enter 1 if the treatment needed must be performed by a dentist.

Removable prosthodontics: Enter number of dentures needed.

Fixed prosthodontics: Individual crowns—limited to dental procedure codes 06710, 06713, 06740, 06750, 06760, 06780, and 06790. Bridge abutments—limited to retainers reported under the 06100 series only.

Exodontia: Erupted teeth—enter number of extractions, as per 07110 and 07120 codes. Impacted teeth—enter number of impactions, as per code 07130.

ability of transportation and other processing requirements. (X-ray machines necessary for the exposure of bite-wing films are not always located in the reception stations.)

The local directors of dental services were responsible for collecting and submitting the completed forms to the project officers, who checked them for completeness and legibility before the data were transferred to punched cards. The data were keypunched by the Production Division of the Health Care Systems Support Activity. The Operations Analysis Office, DCDHCS (Directorate of Combat Developments and Health Care Studies), provided computer support for processing and analyzing the data. The preprogramed Statistical Package for the Social Sciences (*13*) was used for the analysis. The Health Care Studies Division, DCDHCS, provided programing support. Descriptive statistics were obtained to portray the status of the total sample and subgroups.

Results and Discussion

Table 1 shows the dental care needs of the total sample and of each service component. It should be noted that the requirement for restorations was determined only for those recruits who had bite-wing radiographs taken during their examinations. The information in table 1 has been given to the Assistant Surgeon General for Dental Services for use in planning and in resource allocation. The requirement for restorations for Regular Army recruits (5,228 per 1,000) closely parallels the restorative needs of Navy and Marine recruits as reported by Spinks (*8*) in 1981 (5,000 per 1,000), but it is less than that for Air Force recruits in 1980 (6,200 per 1,000) (*10*). Our current findings for restorative needs do not differ measurably from those that Cassidy and associates (*7*) reported in 1977 for male Army recruits (5,066 per 1,000) or from the results published in earlier studies (*1–4*).

In table 2, the male segment of the Regular Army of the current study is compared with the subjects of the survey of Cassidy and associates (*7*) with respect to those variables that can be compared. Only the male segment of the Regular Army component is compared, since the 1969 survey covered only male inductees. The comparison shows some significant shifts in dental workload requirements. Although the restorative requirement was essentially the same for both surveys, 19 percent of the 1981 sample required no restorations. The requirement for extraction of erupted teeth was slightly lower in the current survey than in 1969. However, an endodontic category was not included in the 1969 survey; such endodontic conditions were classified as extractions. When the endodontic requirement for the 1981 survey is added to the

Table 1. Requirements for dental procedures per 1,000 Army recruits, by service component

Type of dental procedure	Regular Army (N = 3,708)	Reserve (N = 742)	National Guard (N = 1,120)	Combined sample (N = 5,613)
Restorations: [1]				
One surface	2,695	2,553	2,757	2,639
Two surfaces	1,702	1,876	1,736	1,735
Three or more surfaces	831	1,060	936	885
Total restorations	5,228	5,489	5,429	5,259
Fixed prosthodontics:				
Individual crowns	227	240	276	272
Bridge abutments	374	380	430	386
Removable prosthodontics:				
Complete dentures	9	12	10	10
Partial dentures	94	95	106	96
Endodontics:				
Anterior	69	70	61	68
Posterior	133	117	113	127
Exodontics:				
Erupted teeth	801	759	928	822
Impacted teeth	1,710	1,692	1,914	1,744
Periodontal services	118	149	154	129
Preventive services:				
Prophylaxis	949	934	943	946
Calculus removal	858	882	889	867
Examination	1,000	1,000	1,000	1,000

[1] Includes only those recruits having bite-wing X-rays: N = 1,773 Regular Army, N = 405 Reserve, N = 537 National Guard.

Table 2. Comparison of dental care needs per 1,000 Army recruits in 1969 and 1981

Type of care	Number of procedures	
	[1] [2] 1969	[2] 1981
Restorations	5,066	4,979
Extractions	1,013	[3] 1,043
Removable prosthodontics	155	95
Fixed prosthodontics	897	674
Scaling and prophylaxis	1,229	1,842

[1] SOURCE: refeerence 7, p. 29.
[2] Includes only male recruits.
[3] Adjusted to include extractions of erupted teeth and endodontic requirement. An endodontic requirement had not been established in 1969, and teeth with this requirement were included in the extraction category.

requirement for extraction of erupted teeth, the need for extractions is essentially the same for both surveys. The need for both fixed and removable prosthodontics has declined since the 1969 survey. This change is not believed to be a reflection of Army policy, since examiners in both studies were instructed to record needs regardless of the Army's policies for treatment. The decline is believed rather to reflect fewer missing teeth in the current population. The increase in the need for scaling and prophylaxis that was observed in the 1981 survey may be due to a change in practice philosophy or may be a true change. However, both surveys indicated a high need for the services of dental hygienists.

Data on the dental care needs for each component of the Army that have been reported in our study can be used by Army dental planners to determine resource requirements for the active recruit population and can also be applied in planning for mobilization of the Army Reserve and the National Guard.

Summary

The requirement for dental care among Army recruits who are currently being processed for training is approximately the same as it was for recruits when the draft was in effect, although the kinds of care that are needed have shifted. For example, current recruits have less need for fixed and removable prosthodontics than earlier recruits.

The young adult population surveyed constitutes a large segment of the general U.S. population, and it is one that has a sizable amount of unmet dental needs. The dental care requirements of Army recruits therefore vividly demonstrate the challenge that still exists for dentistry in the delivery of preventive and corrective services to the population in general and to the Army in particular.

References

1. Hobson, R. W.: Dental examinations of 8,139 Army recruits, preliminary report. US Armed Forces Med J 7: 1648–1656, May 1956.
2. Szmyd, L., and McCall, C. M., Jr.: Restorative dentistry workload of US Air Force dental Service. US Armed Forces Med J 11: 1011–1019, September 1969.
3. Hellman, L. P., Ludwick, W. E., and Oesterling, E. W.: Naval dental needs and treatment. J Am Dent Assoc 55: 828–833, December 1957.
4. Rovelstad, G. H., et al.: Survey of dental health of the naval recruits. I. Status of dental health. J Am Dent Assoc 58: 60–68, May 1959.
5. National Center for Health Statistics: Need for dental care among adults: United States, 1860–1962. PHS Publication No. 1000, Series 11, No. 36. U.S. Government Printing Office, Washington, D.C., March 1970.
6. National Center for Health Statistics: Basic data on dental examination findings of persons 1–74 years; United States, 1971–1974. PHS Publication No. 79–1662, Series 1, No. 214. U.S. Government Printing Office, Washington, D.C., May 1979.
7. Cassidy, J. E., Parker, W. A., and Hutchins, D. W.: Dental care requirements of male army recruits. Milit Med 138: 27–29, January 1973.
8. Ludwick, W. E., Gendron, E. G., Pagas, J. A., and Weldon, A. L.: Dental emergencies occurring among navy-marine personnel serving in Vietnam. Milit Med 139: 121–123, February 1974.
9. Parker, W. A., Schopper, A. W., Mangelsdorff, A. D., and Cheatham, J. L.: Determination of the distribution of dental care needs of the active duty army. Public Health Rep 94: 182–185, March-April 1979.
10. Christen, A. G., et al.: United States Air Force survey of dental needs, 1977. Methodology and summary of findings, J Am Dent Assoc 98: 726–730, May 1979.
11. Spinks, G. J., and Schneider, N. W.: Dental treatment requirements of active duty navy and marine corps personnel. Milt Med 146: 48–49, January 1981.
12. Schonfeld, W. H.: Estimating dental treatment needs from epidemiological data. J Public Health Dent 41: 25–32, winter 1981.
13. Nie, N. H., et al.: Statistical package for the social sciences. Ed. 2. McGraw-Hill Book Company, New York, 1975.