ORIGINAL ARTICLE

Dental health status assessment of Indonesian National Military-Naval Force officers using DMFT index and Chief of Naval Staff Regulation: a descriptive study

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ABSTRACT

Introduction: Military personnel belong to a high-risk group for the development of various pathological conditions in the oral cavity. Based on research, the experience of dental caries in the army population of several other countries was relatively high. The purpose of this study was to describe the assessment of the dental health status of *Bintara* Officer (the NCO) the Indonesian National Military-Naval Force using caries experience index. **Methods:** The descriptive method was used with primary data collection through the caries experience index (DMF-T) examination and assessment of the dental health status of the Indonesian National Military-Naval Force. A purposive sampling technique with a total of 40 members with inclusion criteria, ranked *Bintara* Officer, 10 years of service, male or female, was used. Exclusion criteria were those serving outside the city or abroad and not signing an informed consent form. The data was collected and analyzed descriptively using Microsoft Excel. **Results:** DMF-T index value was 3.7, included in the Stakes I category, which had a maximum number of DMF of 10 teeth: 25.0% in the very low category, 17.5% in the low category, 27.5% in the moderate category, 17.5% in the high category, and 12.5% in the very high category. The dental health status of the Indonesian National Military-Naval Force were 95.0% in the Stakes I category, 2.5% in the Stakes II category, 2.5% in the Stakes III category, and there were no subjects in the Stakes IV category. **Conclusion:** Assessment of the dental health status of *Bintara* officer Indonesian National Military-Naval Force using DMFT index value was in the moderate category, and based on *Perkasal* the majority was included in the Stakes I category.

INTRODUCTION

Dental health is a component of overall health that has an impact on a number of peoples' daily activities, including eating, talking, interacting with others, and making an appearance. Contrary to appearances, oral and dental conditions have a more significant negative impact on life quality. Oral health has a tremendous impact on people's daily lives, making it one of the top global public health issues, according to the World Health Organization (WHO).[1]

Dental caries is one of the diseases occurring from ancient times, and the trend shows there is an increase in its occurrence and gravity in the nineteenth century. Dental caries is a very common infectious disease in the world.[2] Dental caries is a condition that affects the enamel, dentin, and cementum of the teeth and is brought on by the action of microbes found in fermented carbohydrates. The demineralization of the hard tooth tissue and subsequent destruction of the organic components characterize the dental caries process.[3] Unhealthy eating habits and a number of behaviors, including a preference for sugary foods, a lack of fiber, and sticking readily, can contribute to a high percentage of caries.[4] Foods that are cariogenic, like sucrose, can thicken plaque and turn sucrose into acid attributable to the *S. mutans* bacteria. The *S. mutans* bacteria is pathogenic due to the fact that it converts sugar into acid quickly, produces extracellular polysaccharides that cause the acid to adhere to the tooth's surface, and reduces plaque's permeability so that it is more difficult to remove and sticks to the tooth more firmly.[4-6] As a result of demineralization, this acid's reaction with enamel leads to dental cavities.[7]

Dental caries is known as a disease related to lifestyle and behavior.[8] Behavioral factors include lack of dental and oral hygiene, food consumed, and bad habits such as smoking.[5,9] Plaque is a major cause of caries and in practice, total plaque removal is almost impossible especially in less than ideal

situations such as army training or in wartime situations. Dental caries is a very common disease among many military personnel. The high occurrence of dental caries among military personnel will have a detrimental effect on military personnel's readiness.[8] Information about the spread of caries is very important to determine the type of preventive action and the provision of necessary care services. Dental disease causes pain, discomfort, and affects functions such as chewing and speaking.[10] The results of various studies show that dental care can improve quality of life. Because of the significant influence of dental health on everyday life, WHO has identified oral health as one of the most important public health priorities in the world.[11]

Based on research, the experience of dental caries in the army population in several countries is relatively high. The prevalence of dental caries among Malaysian soldiers is very high at 97.2% with a DMF-T index score of 8.15. Research on Australian Army personnel found that the prevalence of dental caries was 84.8%, while the DMF-T index score ranged from 3.6 to 9.0. An oral health study on Croatian soldiers found that the DMF-T index score was 7.32. Another survey of recruits and professionals in the Croatian Army found poor oral health where the prevalence of dental caries was 98.5%.[8] *Tentara Nasional Indonesia Angkatan Laut* (Indonesian National Military-Naval Force) is a member of the military personnel who has responsibility for state defense operations in the Indonesian seas.[12] The health of military members needs to be maintained, one of which is dental health so that they can work optimally, ensure work effectiveness, and be ready to face various work situations.[13] A well-trained and well-equipped military force will be effective if the general and dental health of the military force are at optimal levels.[14]

Research on Croatian soldiers showed that the incidence of caries in the population serving in rural areas was quite high, 71% of the population of soldiers serving in rural areas did not have regular dental check-ups. Smoking habits in Croatian soldiers also affected the high incidence of caries.[15] Another study of the Malaysian army described the same thing, namely the high incidence of caries caused by smoking habits, 70.8% of the Malaysian army population had a smoking habit with 14.1% of the smokers population having a habit of smoking more than one pack per day. In addition, only 13.7% of the Malaysian army population underwent regular dental check-ups even though it is recommended and free of charge.[8] Military members belong to a high-risk group for the development of various pathological conditions in the oral cavity. This is mainly because their activity is subject to certain psychological, physical and environmental conditions during military maneuvers. These three factors influence the condition of the oral cavity which has an impact on the incidence of caries.[9] For soldiers in Indonesia, the conditions of their assignment will certainly affect their dental and oral health, due to the limited facilities and services for dental and oral health due to their assignment locations and their strict schedule.

Based on this, the author was interested in conducting research with the aim of identifying the distribution of dental caries using the DMF-T index and assessing the dental health status of Indonesian National Military-Naval Force Non-Commissioned Officers at Bandung Indonesian National Military-Naval Force Base. The results of this study are expected to be used to complete health data and become the basis for maintenance treatment for the prevention of oral diseases in military personnel. The purpose of this study was to describe the spread of dental caries and to assess the dental health status of the *Tentara Nasional Indonesia Angkatan Laut* (Indonesian National Military-Naval Force) of the NCO (*Bintara* Officer) at *Pangkalan* Indonesian National Military-Naval Force Bandung in order to improve dental health of soldier and planning.

METHODS

The type of this research is descriptive research using survey methods. This research was conducted by taking primary data, namely an overview of the spread of dental caries and an assessment of the dental health status of the Peraturan *Kepala Staf Angkatan Laut* (*Perkasal*) on members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung. This study was a description of the spread of dental caries among members of the Indonesian National Military-Naval Force and an assessment of the dental health status of the Indonesian National Military-Naval Force. Using the DMF-T Index. The population was 40 members. The sampling technique was purposive sampling, namely a sampling process using several criteria with the sample inclusion criteria, namely members of the Bandung INDONESIAN NATIONAL MILITARY-NAVAL FORCE Base, rank, 10 years of service, male or female, willing to be research subjects and cooperative. The exclusion criteria were serving out of town or abroad and not signing the informed consent form. The sampling technique used was the total sample because the sample size was minimal and all members (40 people) met the inclusion and exclusion criteria. The examination of the subjects was done by one calibrated examiner. The tools and materials used in this study were an informed consent form, an adapted caries examination form World Health Organization (WHO), Personal Protective Equipment (PPE), examination tools (WHO probe, sonde, mouth mirror, tweezers), stationery, Microsoft excel.

This research was conducted at *Pangkalan* Indonesian National Military-Naval Force Bandung (Lanal Bandung) namely on Jalan Aria Jipang No.8, Citarum, Kec. Bandung Wetan, Kota Bandung, Jawa Barat 40115. The research was conducted on June 10, 2022 and June 20, 2022. The study began by explaining the procedures and research objectives on the subject being sampled and then providing an informed consent form to request the subject's approval of the research to be carried out. Furthermore, ensuring the sterilization of inspection tools and materials to maintain health safety for the parties concerned in the study.

An examination of the description of the spread of caries was carried out using the DMF-T index and an assessment of the health status of the Indonesian National Military-Naval Force based on the Peraturan Kepala Staf Angkatan Laut (*Perkasal*). Examination of the description of the spread of caries was carried out by filling out the caries adaptation examination form from the World Health Organization (WHO). The examination form was filled in according to the status code and criteria according to WHO as follows, 1) Code 0: Healthy teeth; 2) Code 1: Tooth decay/caries; 3) Code 2: Filling with caries; 4) Code 4: Filling without caries.[16]

The DMF-T index assessment was a tooth that's decayed (D), or if it was treated it was extracted (M) or filled (F).[7] Calculation of individual DMF-T index = total number of D + M + F in individuals, and calculation of group average DMF-T index = total number of individual DMF-T index of the total sample examined divided by the total number of samples examined. The DMF-T assessment category according to the World Health Organization (WHO), is as follows. Very Low: 0.8-1.1; Low : 1.2-2.6; Moderate: 2.7-4.4; High: 4.5-6.5; Very High: > 6.5 .[17]

The distribution of DMF-T categories based on INDONESIAN NATIONAL MILITARY-NAVAL FORCE dental health status based on *Perkasal*, is as follows. stakes I (Dental Health Status) G1. The maximum number of DMF is 10 teeth. Stakes II (Dental Health Status) G2.The maximum number of DMF is 12 teeth. Stakes III (Dental Health Status) G3,The maximum number of DMF is 16 teeth; Stakes IV Dental Health Status) G4., The number of DMF is more than 16 teeth.[18]

Data depicting the spread of dental caries and assessment of the dental health status of the Indonesian National Military-Naval Force based on *Perkasal* at the Strata *Bintara* at the *Pangkalan* Indonesian National Military-Naval Force FORCE Bandung that had been collected were to be analyzed descriptively and presented in tabular form using Microsoft Excel.

RESULTS

Research on the members of the *Bintara* Officers at the *Pangkalan* Indonesian National Military-Naval Force Bandung based on the DMF-T index assessment and the assessment of the dental health status of the Indonesian National Military-Naval Force based on Stakes (dental health status) by *Perkasal* was presented in tabular form. The characteristics of the subjects of the Strata *Bintara* members are shown in Table 1.

Table 1. Characteristics of research subjects. N=40

Variable		Number of samples (n)	Percentage (%)
	25 - 29 years	5	12.5
	30 - 34 years	1	2.5
	35 - 39 years	2	5.0
Age	40 - 44 years	7	17.5
	45 - 49 years	9	22.5
	>50 years	16	40.0
Gender	Male	33	82.5
	Female	7	17.5
	Peltu	10	25.0
	Pelda	3	7.5
Rank	Serma	3	7.5
	Serka	4	10.0
	Sertu	8	20.0
	Serda	12	30.0

Table 1 shows the number of subjects of members of the Strata *Bintara*, namely age, gender, and rank. Age was divided into 6 groups and the majority of members were aged above 50 years old with as many as 16 members (40.0%). The largest number based on gender. 33 (82.5%) were male. There were 6 ranks and the largest number of members were in rank Serda as many as 12 (30.0%). The frequency distribution of members of Strata *Bintara* of the *Pangkalan* Indonesian National Military-Naval Force based on the DMF-T index category is shown in Table 2

Table 2. Frequency distribution of members of Strata *Bintara* of the Indonesian National Military Naval Force based on the DMF-T index category.

Score	Category	Decay (D)	Missing (M)	Filling (F)	DMF-T Total	Number of samples (n)	Percentage (%)
0,8 - 1,1	Very Low	2	2	1	5	10	25.0
1.2 - 2.6	Low	7	6	1	14	7	17.5
2.7 - 4.4	Moderate	18	16	6	40	11	27.5
4.5 - 6.5	High	25	12	1	38	7	17.5
> 6.5	Very High	24	21	6	51	5	12.5
Total		76	57	15	146	40	100

Table 2 shows the frequency distribution of members of the Strata *Bintara* of the *Pangkalan* Indonesian National Military-Naval Force Bandung. There were 5 categories of DMF-T index, namely very low, low, moderate, high, and very high. The largest number of subjects were in the moderate category, namely 11 subjects (27.5%). The results of the average DMF-T index assessment for members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung are shown in Table 3.

Table 3. The average value of the DMF-T index for members of The Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung.

Σ Decay (D)	Σ Missing (M)	Σ Filling (F)	DMF-T Total	Number of samples (n)	DMF-T Index Value	DMF-T Category
76	57	15	148	40	3,7	Moderate

The average DMF-T index value in Table 3 was generated from the calculation of the number of components D, M, F divided by the number of samples studied. The average DMF-T index value for members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung was 3,7 which belongs to the moderate DMF-T category.

The DMF-T index value based on age, gender, and rank of the members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung is shown in Table 4.

Table 4. The DMF-T index value based on age, gender, and rank of the members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung.

	Variable	Number of samples (n)	Percentage (%)	DMF-T Total	Average Value of DMF-T Index	DMF-T Category
Age (years)	25 - 29	5	12.5	4	0.8	Very Low
	30 - 34	1	2.5	2	2.0	Low
	35 - 39	2	5.0	5	2.5	Low
	40 - 44	7	17.5	22	3.1	Low
	45 - 49	9	22.5	39	4.3	Moderate
	>50	16	40.0	76	4.7	High
Gender	Male	33	82.5	133	4.0	Moderate
	Female	7	17.5	15	2.1	Low
Rank	Peltu	10	25.0	36	3.6	Moderate
	Pelda	3	7.5	5	1.6	Low
	Serma	3	7.5	15	5.0	High
	Serka	4	10.0	32	8.0	Very High
	Sertu	8	20.0	16	2.0	Low
	Serda	12	30.0	44	3.6	Moderate

Table 4 shows the DMF-T index value based on age. gender, and rank. Out of six 6 age groups, the largest number of members had an average DMF-T index score of 4,7 (high category), namely 16 members (40.0%) in the age group above 50 years old. Based on gender, the results showed that 33 male members (82.5%) had DMF-T index average value of 4,0 (moderate category). Out of 6 ranks, the largest number of members had an average DMF-T index value of 3.6 (moderate category), namely the rank of Serda of 12 members (30.0%).

The results of the assessment of the dental health status of the Indonesian National Military-Naval Force based on Stakes (dental health status) by *Perkasal* on members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung are shown in Table 5.

Table 5. Assessment of the Dental Health Status of the Indonesian National Military-Naval Force for members of the Strata *Bintara* at Indonesian National Military-Naval Force Bandung.

Score	Category	Decay (D)	Missing (M)	Filling (F)	Number of samples (n)	Percentage (%)
DMF maximum of 10 teeth	Stakes I	62	49	11	38	90.0
DMF maximum of 12 teeth	Stakes II	9	1	1	1	2.5
DMF maximum of 16 teeth	Stakes III	5	7	3	1	2.5
DMF more than 16 teeth	Stakes IV	0	0	0	0	0
Total		**76**	**57**	**15**	**40**	**100.0**

Table 5 shows the results of the dental health status of the Indonesian National Military-Naval Force based on Stakes (dental health status) by *Perkasal* on members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung which were divided into 4 categories, namely Stakes I, Stakes II, Stakes III, and Stakes IV. The majority of members were identified as Stakes I category, namely 38 subjects (95.0 %).

DISCUSSION

Table 1 shows the characteristics of 40 subjects of members of the Strata *Bintara*, namely age, gender, and rank in *Pangkalan* Indonesian National Military-Naval Force Bandung. Age was divided into 6 groups and the majority of members were aged above 50 years old with as many as 16 members (40.0%). The largest number based on gender. 33 (82.5%) were male. There were 6 ranks and the largest number of members were in rank Serda as many as 12 (30.0%).

The results showed that the DMF-T index in the moderate category was the category with the highest frequency, which was 11 members (27.5%) as shown in Table 2. This is in accordance with the DMF-T index category according to WHO, which is 2.7 - 4.4.[17] From this research data, it was also found that the average DMF-T index for members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung was 3.7 which belongs to the medium DMF-T category as shown in Table 3. The results of this research illustrate that the spread of caries (DMF-T index) is lower than the results of the research on the Serbian army (10.5), Iranian army (9.67), and Jordanian army (8.69).[15,19-20] This can be explained due to the fact that Serbia, Iran, and Croatia are developing countries. Wartini et al.,[21] stated that Indonesia is a developing country. Based on research, people in developing countries still lack attention and awareness of dental and oral health.[19]

The results shown in Table 3 demonstrate that the number of F components (Filling) or teeth that had been filled, as many as 15 teeth, was smaller than the number of M components (Missing) or teeth that had been extracted, which was 57 teeth from the total number of subjects. This can explain that the subject more often decided to extract teeth rather than obtaining treatment, due to the subject's strict schedule that prevents multi visit dental treatments. The higher value of the M component (Missing) compared to the F component (Filling) also occurred in a study conducted on the Malaysian army.[8]

Table 4 shows that the highest DMF-T index average value based on age was in the age group above 50 years, namely 4.7 which was included in the high category and the lowest DMF-T index average value was in the 25-29 year age group namely 0,8 which was included in the very low category. These results indicate that the dental condition of the young age group is better than the old age group. This shows that the older a person is, the greater the risk of developing caries. This result is in accordance with Tarigan's opinion which stated that as a person's age increases, the number of caries increases.[22] This can be explained due to the fact that the age factor affects the motivation in maintaining dental and oral health. As you get older, the motivation to improve dental and oral hygiene decreases.[9]

The results showed that male members had a higher DMF-T index average value than female members, namely 33 male members with an average value of 4.0 and 7 female members with the average value of 2.1, as shown in Table 4. This can happen because the possibility of awareness in women about dental and oral health is better than men.[23] Higher average value of the DMF-T index in male members also occurred in a study conducted on the Serbian army.[19]

The members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung are divided into several ranks consisting of *Peltu, Pelda, Serma, Serka, Sertu*, and *Serda*. The division of ranks among members of the Strata *Bintara* reflects the level of welfare and socioeconomic status. The socioeconomic status of the community can contribute to knowledge, lifestyle, and access to information about health. It can be said that someone who has a low socioeconomic status will have a lower level of oral hygiene, so that he is more likely to experience dental caries.[24] The results showed that the highest rank in the Strata *Bintara* had the same DMF-T index average value as the lowest rank, namely the rank of *Peltu* consisting of 10 members with an average score of 3.6 and the rank of *Serda* consisting of 12 members with the same average score of 3.6. The results also found that the highest average value of the DMF-T index based on rank was *Serka* rank, which was 4 members (10.0%) with an average value of 8.0, as shown in Table 4. These results indicate that there is no influence of socioeconomic level on the spread of caries which is in accordance with what was said by Ngantung *et al*.[24] In fact, the factor that can influence the spread of caries is the level of a person's ability to obtain information about how to maintain oral hygiene.[24]

The results of the Stakes assessment on members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung showed that the majority of the subjects belonged to the Stakes I category, as many as 38 members (95%), as shown in Table 5. This is in accordance with *Perkasal* in 2018 in that Stakes I has a maximum DMF component of 10 teeth.[18] The difference between the DMF-T index category according to World Health Organization (WHO) and the stakes category based on *Perkasal* is in terms of determining the DMF-T index category. According to WHO, the very high category has a DMF-T index greater than 6.5 (with a DMF component of 6 - 7), while according to *Perkasal* the Stakes 1 category is having a maximum number of DMF components of 10 teeth.[17-18] This causes a fairly high difference in the frequency distribution of the *Bintara* Officers based on Stakes according to *Perkasal*. This difference affects the very low standard of dental health for the TNI, the WHO categories should be used as they are the current international standard of dental health status.

The results showed that there was 1 subject belonging to the Stakes II category (maximum DMF component 12 teeth) and there was 1 subject belonging to the Stakes III category (maximum DMF component 16 teeth), as shown in Table 5. This is due to the limited facilities and services for dental and oral health due to their assignment locations and their strict schedule. The results of the same study were also found in the Serbian army that the high prevalence of caries was caused by the lack of attention paid to dental care and other factors such as fear of dental intervention, toothache, and the low level of awareness of the importance of oral health.[19]

Based on this research, it is necessary to increase the knowledge of members of the Strata *Bintara* at *Pangkalan* Indonesian National Military-Naval Force Bandung on the spread of caries including the etiology, prevention, and management of caries. In addition, it is necessary to inform all members of the *Pangkalan* Indonesian National Military-Naval Force Bandung about the importance of maintaining dental and oral health which can support general health to improve the preparedness of each member. Lekić et al.,[19] stated that dental and oral care is best achieved through preventive measures, especially with motivation and training on proper oral hygiene maintenance, regular dental check-ups, and constant monitoring and re-motivation.

The limitation of this study is that there were no interviews conducted with the subjects, which could have helped obtain deeper information about the dental and oral care habits of the subjects. This research is expected to be the basis for conducting further research on the description of the spread of caries in military personnel in a wider scope. From this research, it showed the need to improve the monitoring system of dental health and dental health knowledge among army members. Other than that, dental treatments that are faster, easier, and provide predictable results are needed.

CONCLUSION

The spread of caries in members of the *Bintara* officers based on the average DMF-T index value was in the moderate category, which was 3.7 based on WHO and based on *Perkasal* the majority was included in the Stakes I category, which had a maximum number of DMF of 10 teeth.

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