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Original Article

Dental caries and oral health behaviour in the Malaysian Territorial Army Personnel

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Abstract A survey was conducted to assess dental caries experience and oral health related behaviour among Malaysian Territorial Army (TA) personnel. This cross-sectional study involved 284 personnel covering their socio-demography, oral hygiene habits and related behaviour and past utilization of dental services pattern. Dental caries were assessed using DMFT index. Caries prevalence was very high (97.2%; DMFT 8.15±5.36). Untreated decay (DT) was 3.67 (±3.15) and missing teeth (MT) 2.90 (±3.73). However, few were treated teeth (FT) at only 1.58 (±2.02). Almost everyone (98.2%) claimed they brushed their teeth at least once daily and 80% used fluoridated toothpaste. However, very few participants used dental floss (11.3%) while majority (60.2%) did not know about flossing. More than 70% were current smokers. Only 13.7% were regular attendees with the majority (86.3%) visiting the dentist only when they had dental problems. The most common reason (49.7%) for their last dental visit was related to presence of symptoms and few were (27.4%) for prevention. Symptomatic attendees are significantly more likely to have more severe caries experience than preventive oriented individuals (p=0.003). These findings support the importance of promoting preventive oral health utilization behaviour among army personnel.

Keywords: army, caries, oral health behaviour.

Introduction

Dental caries is highly prevalent in the Malaysian adult population including the army (Oral Health Division, 2004; Jasmin and Jaafar, 2011). A study conducted among a group of commandoes in Terendak Camp, Melaka, Malaysia reported a caries prevalence of 87.2% (Samsuri, 1999). A study on the progression of caries in the infantry battalion reported a caries increment of 3.8% within 5 years (Wahid, 2008).

The high levels of dental caries among these soldiers may have a negative impact on their combat readiness (Chaffin *et al.*, 2001; Skec *et al.*, 2002; Skec *et al.*, 2006 and Moss, 2002). The primary task of Malaysian Armed Forces Dental Services (MAFDS) is to ensure that the oral health of soldiers is always at an optimum level to maintain their combat readiness. Many programs such as Active Dental Support (ADS) were conducted to minimize dental problems and to ensure readiness in army personnel to be deployed in any mission. The effectiveness of ADS in the Malaysian Army was confirmed where the prevalence of active caries was lower among the ADS group of soldiers as compared to the non-ADS group (Haron, 1995; Taha, 2006).

Dental caries is known to be a lifestyle and behaviour-related disease. The objective of the study was to assess the relationship between dental caries experience and oral health

related behaviour viz. tooth brushing, flossing, smoking, use of fluoride toothpaste and dental attendance pattern among Malaysian TA personnel.

Materials and methods

The study population was the Infantry Regiment of the Malaysian TA. The sampling frame were 3 infantry battalions, randomly selected from 5 eligible units. The total eligible population were 2370 soldiers. The sample size needed for an estimated 5% error in prevalence and 95% confidence including about 10% compensation for dropouts was 300 soldiers. However, from the total of 300 samples, only those with complete socio- behavioural data were analyzed (n=284).

A cross-sectional questionnaire survey was conducted to collect socio-demographic data, oral hygiene habits and related behaviour and their past utilization of dental services. It was designed as a self-administered questionnaire in the Malay language. A pre-test was done involving 20 infantry personnel to check on clarity and ease of use. Some modifications to the questionnaire were done based on the feedback. Briefings to the sampled subjects were given prior to the exercise. The questionnaire was given to all subjects by the Dental Surgery Assistant (DSA) to be completed independently prior to the clinical oral examination. The questionnaire forms were collected immediately after they were completed, after which the subjects proceeded for the oral clinical examination area.

Analysis of data was carried out using Statistical Package for Social Science version 15.0 (SPSS Inc., Chicago, IL) for descriptive statistics. Correlation between caries status and independent variables were measured using Pearson's correlation coefficient. Odds ratio was used to estimate the risk of dental caries for each variable.

Results

A total of 284 subjects aged between 20-50 years (mean=32.2) was examined in this study. The prevalence of dental caries was very high (97.2%) while the DMFT ranged from 0 to 32 (mean 8.15; SD ± 5.36). Untreated decayed teeth (DT) were 3.67 (SD ± 3.15) and missing teeth (MT) 2.90 (SD ± 3.73). However, the mean treated teeth (FT) were very low at only 1.58 (SD ± 2.02).

Oral health behaviour is presented in Table 1. Almost all (98.2%) participants claimed that they brushed their teeth at least once a day and more than 80% claimed to use fluoride toothpaste. However, very few participants used dental floss regularly (11.3%) while the majority (60.2%) did not even know about dental floss. More than 70% of the participants are current smokers whereby 56.7% smoked less than one pack (pack of 14s) a day and 14.1% smoked more than one pack a day. Only 13.7% (n= 29) of the participants were regular attendees to dental clinic. The majority (86.3%) were symptomatic attendees who only visited the dentist when they have dental problem. The most common reasons for their last dental visit were due to presence of symptoms i.e. to request for extraction (29.6%), followed by toothache (18.7%) and to request for fillings (15.1%). Preventive dental visits (preventive attendees) such as to get a dental check-up (19.7%) and scaling (7.7%) were not very frequent.

However, further statistical analysis showed no significant relationship between caries experience and personal behaviours (Table 2) such as tooth brushing, use of fluoride toothpaste, flossing, smoking, attendance pattern to dental clinic. However, there was a statistically significant relationship between the reasons for last dental visit and caries experience (p=0.003) whereby symptomatic attendees are 2.2 (1.31, 3.83) times more likely to have a higher caries experience (DMFT>4) than asymptomatic attendees.

Table 1 Oral health behaviour in the Infantry Regiment of the Malaysian Territorial Army

Oral health behaviour	Frequency	Percent
Brushing habits		
Never brush	1	0.4
Few time a week	4	1.4
Once a day	16	5.6
Twice a day	141	49.6
More than two time a day	122	43.0
Use of fluoride toothpaste		
Yes (all the time)	233	82.0
Sometimes	14	4.9
No	6	2.1
Not sure	31	10.9
Flossing habits		
Never heard about dental floss	171	60.2
Do not floss	81	28.5
At least once a week	13	4.6
At least once a day	19	6.7
Smoking habits		
Currently smoking	201	70.8
Non-smoking	83	29.2
Amount of cigarette		
Less than one pack a day	161	56.7
1-2 packs a day (pack of 14s)	35	12.3
More than two packs a day (pack of 14s)	5	1.8
Attendance pattern		
Only when have dental problem	245	86.3
Every six month	16	5.6
Once a year	23	8.1
Reason for last dental visit		
Preventive		
Request dental check-up	56	19.7
Scaling	22	7.7
Rehabilitative		
Filling	43	15.1
Denture	9	3.2
Symptomatic		
Extraction	84	29.6
Toothache	53	18.7
Gum problem	4	1.4
Others	13	4.6

Table 2 Relation between oral health behaviour and caries experience

Oral health behaviour	DMFT ≤ 4 n (%)	DMFT ≥ 5 n (%)	OR	95% CI	*p*-value
Brushing habits					0.936
Twice a day or more	73 (27.8)	190 (72.2)	1.04		
Once a day or less	6 (28.6)	15 (71.4)		0.39 – 2.78	
Use of fluoride toothpaste					0.949
Yes (all the time)	65 (27.9)	168 (72.1)	1.02		
Sometimes or no	14 (27.5)	37 (72.5)		0.52 – 2.02	
Flossing habits					0.086
At least once a week	13 (40.6)	19 (59.4)	1.93		
Do not floss	66 (26.2)	186 (73.8)		0.90 – 4.12	
Smoking habits					0.369
Currently smoking	59 (29.3)	142 (70.7)	1.31	0.73 – 2.36	
Non smoking	20 (24.1)	63 (75.9)			
Attendance pattern					0.954
At least once a year	11 (28.2)	28 (71.8)	1.02	0.48 – 2.17	
Only when having dental problem	68 (27.8)	177 (72.2)			
Reason for last dental visit					0.003
Preventive, rehabilitative reasons and others	51 (35.7)	92 (64.3)	2.24	1.31 – 3.83	
Symptomatic reasons	28 (19.9)	113 (80.1)			

Significant at *p*-value < 0.05

Discussion

The prevalence of dental caries among the TA soldiers was extremely high (97.2%; DMFT=8.15). Another study conducted among soldiers from an infantry battalion found that the prevalence of dental caries was only 79.8% (DMFT=4.1) (Wahid, 2008), while a study among commandoes in Terendak Camp, Melaka, Malaysia showed the prevalence of 87.2% (DMFT=5.6) (Samsuri, 1999).

In comparison, caries experience in other army populations is also relatively high. A study among Australian Army personnel reported that a prevalence of dental caries of 84.8%, while DMFT ranged between 3.6 and 9.0 (Hopcraft and Morgan, 2003). Another study among Austalian Army recruits found that the prevalence of caries was 73.8% (DMFT range 2.43 to 10.77) (Hopcraft and Morgan, 2005). A more recent study involving 1084 Australian Army recruits, revealed that DMFT score for the age-group between 17 to 35 years was 3.16 to 7.11 (Hopcraft *et al.*, 2009).

A study of oral health of Croatian Army recruits found that the DMFT score was 7.32 (Badel *et al.*, 2009). Another study found that the prevalence was 97.4% (DMFT=7.76) (Badel *et al.*, 2003). A survey of recruits and professionals in the Croatian Army found poor oral health whereby the prevalence of dental caries was 98.5% (Skec *et al.*, 2002).

Among Israeli permanent force army personnel the DMFT score was 11.66 (Sgan-Cohen *et al.*, 1999). However the main difference in the present study was that the highest component contributing to the DMFT component of the Israeli Army was treated teeth (FT 7.9) and very few were untreated decay (DT 1.37), whereas in the Malaysian TA untreated decay and missing teeth were the highest components of DMFT.

In theory, plaque is the established cause of caries and a tooth which is completely free of plaque will not decay (Kidd, 2005). However in practice, total plaque removal are almost impossible especially in less than ideal situations such as army exercises or in war. Regular tooth brushing and other mechanical cleaning procedures are considered the most reliable means of controlling plaque (Löe, 2000). In the present study, tooth brushing was found to be a common oral hygiene behaviour whereby almost all (98.2%) claimed they brushed their teeth at least once a day. Similar results were reported in other study where 100% of the infantry personnel claimed to brush their teeth daily (Wahid, 2008). However in extreme working condition (where soldiers need to be at working place for long period), for example the crews of two Royal Malaysian Navy ships, only about one third brushed their teeth twice or more a day (Taha, 2006).

Another unhealthy behaviour common among the army personnel was smoking. The present study confirmed that the majority (70.8%) are current smokers and 14.1% smoked more than one pack a day. This is comparable to the 85% smoking prevalence among infantry soldiers (Wahid, 2008). In comparison, smoking behaviour among army personnel was not much different from other countries. A survey of health related behaviour among US army personnel found out that one-third of the personnel were smoking (Bray *et al.*, 2003). Another survey conducted on the crew of two Trident nuclear submarines in the UK found that 32% declared themselves to be smokers (Norris and Brims, 2002). Others studies on smoking habit reported the prevalence of 70% smoking habit among Lithuanian Army recruits (Kelbauskas *et al.*, 2005) and tobacco use among Croatian Army personnel was 62.7% (Zajc *et al.*, 2011).

The present study found that regular dental check-up is not a norm among infantry personnel. Only 13.7% came for regular checkups although it is encouraged and free of charge. Most would only come when they have a dental problem. It appears that free dental check-up in the service does not necessarily lead to preventive dental utilization behaviour. Many studies have shown the benefit of regular dental check-ups. For example subjects with more frequent dental visit were found to have lower rates of tooth loss and fewer numbers of teeth with active caries (Sheiham *et al.*, 1985). Regular attendees also tend to have a significant positive impact on dental health (Richards and Ameen, 2002).

Some studies investigated why soldiers refused to come for dental visit**.** Dental anxiety was found to be related to low dental attendance (Wisløff *et al.*, 1995). Another study found that individuals with high dental fear had significantly high number of decayed and missing teeth and lower number of filled teeth (Schuller *et al.*, 2003). The dental attendance levels of the present army population were not optimal compared to similar populations in some countries. A study on the Croatian Army reported that 81% of recruits and 78% of professional army personnel had visited a dentist within one year (Skec *et al.*, 2002). A study on Israeli Army personnel found that about 60% of the respondents had their last dental visit within the previous one year (Zadik *et al.,* 2009). A survey of health related behaviours among the US Army personnel estimated that 90.0% of them had received a dental check-up in the past one year (Bray *et al.*, 2003).

In the present study, almost one half (48.3%) of reasons for last dental visit were to request for emergency treatment ie. extraction (29.6%) and treatment for toothache (18.7%). This confirms that there has not been much change in health behaviour since earlier studies in 1996 which reported 25.5% of army personnel who attended dental clinic were due to toothache (Jasmin *et al.*, 1996).

This study showed that there was no relationship between caries

experience with tooth brushing, use of fluoride toothpaste, flossing, and smoking habits. A systematic review on the incidence and prevalence of dental caries revealed only weak evidence that tooth brushing prevents dental caries (Reisine and Psoter, 2001). However, study among Italian adults attending an Army Academy showed that caries severity was significantly associated with smoking habit (Campus *et al.*, 2011).

Conclusion

There was a significant relationship between caries experience and the reasons for last dental visit. Preventive visits (e.g. dental check-up, filling or scaling) were significantly associated with less severe dental caries experience as compared to symptomatic attendees (i.e. those who visited due to toothache and extraction).

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References

Badel T, Azinović Z, Keros J, Dulčić N, Mehulić K (2003). Caries of Croatian Army recruits. *Acta Stomat Croat*, **37**(4): 443-452.

Badel T, Keros J, Jerolimov V, Dulčić N, Despotušić SR (2009). Oral health of the Croatian Army recruits in 2001. *Med Glas*, **6**(2): 256-260.

Bray RM, Hourani LL, Rae KL, Dever JA, Brown JM, Vincus AA *et al.* (2003). *2002 Department of Defense Survey of Health Related Behaviors Among Military Personnel. RTI/7841/006-FR*. Research Triangle Park, NC: RTI International.

Campus G, Cagetti MG, Senna A, Blasi G, Mascolo A, Demarchi P, Strohmenger L (2011). Does smoking increase risk for caries? A cross-sectional study in an Italian military academy. *Caries Res*, **45**(1): 40-46.

Chaffin J, King JE, Fretwell LD (2001). U.S Army dental emergency rates in Bosnia. *Mil Med*, **166**(12): 1074-1078.

Haron H (1995). *The effectiveness of the ADS programme in the Malaysia Armed Forces*. MCD Thesis, Faculty of Dentistry, University of Malaya.

Hopcraft M, Morgan M (2003). Dental caries experience in a young adult military population. *Aust Dent J*, **48**(2): 125-129.

Hopcraft M, Morgan MV (2005). Dental caries experience in Australian Army recruits 2002-2003. *Aust Dent J*, **50**(1): 16-20.

Hopcraft MS, Yapp KE, Mahoney G, Morgan MV (2009). Dental caries experience in young Australian Army recruits 2008. *Aust Dent J*, **54**(4): 316-322.

Jasmin B, Jaafar N (2011). Dental health status and treatment needs in the Infantry Regiment of the Malaysian Territorial Army. *Asia Pac J Public Health*, **23**(2): 203-208.

Jasmin B, Razak IA, Esa R (1996). Periodontal status and treatment needs among a selected group of Malaysian army personnel. *Malays Dent J*, **17**: 6-10.

Kelbauskas E, Kelbauskiené S, Paipaliené P (2005). Smoking and other factors influencing the oral health of Lithuanian Army recruits. *Mil Med*, **170**(9): 791-796.

Kidd EAM (2005). *Essentials of Dental Caries*, 3rd edn. New York: Oxford University Press Inc., pp. 68.

Löe H (2000). Oral hygiene in the prevention of caries and periodontal disease. *Int Dent J*, **50**(3): 129-139.

Moss DL (2002). Dental emergencies during SFOR 8 in Bosnia. *Mil Med*, **167**(11): 904-906.

Norris WD, Brims FJ (2002). Attitudes to smoking on submarines: results of a questionnaire study. *Mil Med*, **167**(7): 589-592.

Oral Health Division (2004). *National Oral Health Survey of Adults 2000 (NOHSA, 2000)*. Putrajaya: Oral Health Division, Ministry of Health, Malaysia.

Reisine ST, Psoter W (2001). Socioeconomic status and selected behavioral determinants as risk factors for dental caries. *J Dent Educ*, **65**(10): 1009-1016.

Richards W, Ameen J (2002). The impact of attendance patterns on oral health in a general dental practice. *Br Dent J*, **193**(12): 697-702.

Samsuri N (1999). *Oral health and related impacts among commandos in Malaysia Armed Forces*. MCD Thesis, Faculty of Dentistry, University of Malaya.

Schuller AA, Willumsen T, Holst D (2003). Are there differences in oral health and oral health behavior between individuals with high and low dental fear? *Community Dent Oral Epidemiol*, **31**(2): 116-121.

Sgan-Cohen HD, Horev T, Zusman SP, Katz J, Eldad A (1999). The prevalence and treatment of dental caries among Israeli permanent force military personnel. *Mil Med*, **164**(8): 562-565.

Sheiham A, Maizels J, Cushing A, Holmes J (1985). Dental attendance and dental status. *Community Dent Oral Epidemiol*, **13**(6): 304-309.

Skec V, Macan D, Spicek J, Susac M, Luksić I (2002). Influence of oral health on combat readiness in the Croatian Army. *Mil Med*, **167**(12): 1016-1019.

Skec V, Macan JS, Susac M, Jokić D, Brajdić D, Macan D (2006). Influence of oral hygiene on oral health of recruits and professionals in the Croatian Army. *Mil Med*, **171**(10): 1006-1009.

Taha ZM (2006). *The effectiveness of a dental support programme in the military for the front line duty*. MPH (OH) Thesis, Faculty of Dentistry, University of Malaya.

Wahid AA (2008). *Dental status and combat readiness assessment of Malaysia Armed Forces Infantry soldiers*. MPH (OH) Thesis, Faculty of Dentistry, University of Malaya.

Wisløff TF, Vassend O, Asmyhr O (1995). Dental anxiety, utilisation of dental services, and DMFS status in Norwegian military recruits. *Community Dent Health*, **12**(2): 100-103.

Zadik Y, Zusman SP, Galor S, Dinte AF (2009). Dental attendance and self-assessment of dental status by Israeli military personnel according to gender, education and smoking status 1998-2006. *Mil Med*, **174**(2): 197-200.

Zajc I, Brajdić D, Biočić J, Bošan-Kilibarda I, Kopić V, Siber S, Macan D (2011). The effect of tobacco use on oral health and dental readiness in the Croatian Army. *J Addict Dis*, **30**(2): 159-168.