

# “Assessment Of Oral Health Status And Treatment Needs Of Police Personnel Of Haryana, India”

R Sohi, V Bansal, K Veerasha, R Gambhir

## Citation

R Sohi, V Bansal, K Veerasha, R Gambhir. “Assessment Of Oral Health Status And Treatment Needs Of Police Personnel Of Haryana, India”. The Internet Journal of Epidemiology. 2009 Volume 9 Number 1.

## Abstract

Objectives: -

To assess the oral health status and treatment needs of police personnel in police stations of three districts (Ambala, Yamunanagar and Kurukshetra) within 35 km radius around M.M.C.D.S.R. Mullana. Materials and Methods:

- A cross sectional study was conducted on all the available police personnel (652) at 22 police stations, 2 S.P. offices and a 'Police Line'. The data were recorded on modified W.H.O format (1997). Blood pressure was recorded and varicose veins were checked. Results: -

The mean age of subjects was 41.02 years (SD= 12.29), 98.9 % (645) were males and 1.1 % (7) were females. Hypertension was the most common (9.97%) self reported systemic condition. 54.14% (353) subjects reported to be in need of some dental treatment and more than half of these subjects blamed 'lack of time' as the major reason for not being able to get that treatment done. The prevalence of dental caries was 54.3 % and the mean DMFT was 3.05. Mean number of teeth requiring filling and extraction were 0.44 and 0.67 respectively. 31.29 % subjects needed some prosthesis in maxillary while 40.03 % subjects needed some prosthesis in mandibular arch ( $p < 0.05$ ) whereas a very small number of subjects possessed some dental prosthesis. Regarding highest CPI score, 23.6 % subjects had a healthy periodontium while maximum subjects (61.3 %) had a score 2. Conclusion: -

Prevalence of dental caries was quite low. Despite a high prosthetic need, only a small number of subjects possessed dental prosthesis. Overall periodontal status was good with a high number of subjects having completely healthy periodontium. The high level of 'felt' dental needs of the subjects seemed to be due to lack of time to visit a dentist. Their nature of job is such that they are subjected to physical, mental and emotional stress.

## INTRODUCTION

Oral health is an integral part of general health and is one of the determinants of quality of life. Oral health and general health are determined by various factors such as life style, dietary habits, socioeconomic conditions, occupational environment etc. <sup>(1)</sup> Haryana State has just 1.4% of the total geographical area of India, but has nearly 2% of the country's population. Little published information is available about the oral health status of the population, especially adult population, of Haryana. The dental caries prevalence among the 35-44 year age group of Haryana is 77.2 % while prevalence of periodontal disease is 88.9 %. <sup>(2)</sup> Kumar A et al <sup>(3)</sup> reported the prosthetic needs of rural population of Ambala, Haryana to be 35.2 % in maxillary arch and 45.3 % in mandibular arch while reported the prevalence of periodontal disease to be 92.1 %.

The mission of police of a state is to help the common man,

to provide him security and to create a peaceful and law abiding community with his cooperation. <sup>(4)</sup> The place that is occupied by the police in a state is similar to the place occupied by the military in a nation. Police personnel are state government employees who have access for free medical care at government hospitals and privileges for leave on medical grounds. <sup>(5)</sup> This warrants good general as well as oral health. But on the other hand, police personnel are a group of professionals who have all together a different working environment with 24 hours duty and often being exposed to highest physical strain and mental stress. Because of their odd working pattern, they often miss timely food, sleep, rest, and recreation and family contacts. This complicates their life and pulls down their level of living. <sup>(6)</sup>

Oral health is an integral part of general health and is determined by various factors such as life style, dietary habits, socioeconomic conditions, occupational environment

etc. <sup>(1)</sup> To maintain effective control over crime, the health of police officials is of utmost importance.

However, no studies have been conducted in the state of Haryana which assess the oral health status of police personnel. The state of Haryana is divided into four divisions and 19 districts. <sup>(7)</sup> M.M.C.D.S.R., Mullana comes under the Ambala district which lies in the north east region of Haryana. The area lying within 35 km radius of M.M.C.D.S.R., Mullana (which includes three districts, viz, Ambala, Yamunanager and Kurukshetra) was taken up for this study. Hence this study was taken up as a pilot study to assess the oral health status and treatment needs of police personnel within 35 km radius around M.M.C.D.S.R., Mullana (Ambala).

**METHODS**

Ethical clearance was taken from the Institution Review Board of M.M.C.D.S.R, Mullana. Prior permission was obtained from the Inspector General – Police (I.G.P.), Ambala division (Haryana) and from Superintendent of Police (S.P.) of respective districts.

The study population consisted of police personnel of three districts of Haryana (Ambala, Yamunanager and Kurukshetra) whose duties laid within 35 km radius of M.M.C.D.S.R., Mullana. The study was conducted from May 2008 to Feb 2009. The list of police stations was obtained from the respective SP offices. The police stations under this area were marked on a Haryana map. The visit was scheduled to various police stations at Ambala, Yamunanagar, Kurukshetra, S.P. Office and Police line (sports and training area of police personnel) after obtaining prior permission. All the available police personnel on the day of visit were examined and the data recorded.

Subjects, who gave their consent, were interviewed regarding demographic, general and oral health details. A clinical examination was conducted using a modified WHO format, (1997) <sup>(8)</sup> for oral health status and treatment needs (Table 1).

**Figure 1**

Table 1:- Variables used for collecting information from the subjects

• <i>Based on the interview of the subjects</i>		
Age	Gender	Educational qualification
Designation	Marital status	Income per capita
Oral hygiene practices	Diet ( veg/ non- veg)	Deleterious habits (Tobacco/ alcohol)
Do you feel that you need any dental treatment?	Chief dental complaint	Since when do you feel need for the dental treatment
Did you go for the treatment	Reasons for not seeking treatment	
• <i>Based on the examination of the subjects</i>		
Body mass index	Anemia	Varicosity of veins in legs
Blood pressure	Oral mucosal lesions	Dentition status and treatment needs
Prosthetic status	Prosthetic needs	Periodontal status (CPI) without loss of attachment
Dental fluorosis		

The diagnosis of oral mucosal lesions was carried out using WHO criteria (1980) <sup>(9)</sup> and Pindborg’s colour atlas <sup>(10)</sup>. Loss of attachment for periodontal status was dropped in view of time consumption during examination. Blood pressure <sup>(11)</sup> was recorded [hypertension was considered to be at Systolic BP (SBP) > 140mm Hg; Diastolic B.P (DBP) > 90 mm Hg] and varicose veins <sup>(12)</sup> were checked as they are occupational risks of the police personnel. A single trained examiner (R.S.) who was calibrated in the department conducted all the examinations. Intra examiner calibration was undertaken by examining 30 adults followed by their re-examination a week later which resulted in 87 % of diagnostic acceptability with a kappa value of 0.84. A well trained assistant was taken for recording the data. A total of 652 subjects were interviewed and examined.

B.G. Prasad classification modified using Aggarwal’s criteria <sup>(13)</sup> was used for assessment of Socio- economic status. Height and weight of subjects were measured to calculate the body mass index. <sup>(14)</sup> The subjects were made to sit on a stool/ chair available and type III examination <sup>(15)</sup> (using mouth mirrors & CPI probe under adequate illumination) was conducted.

Examination of the subjects was followed by provision of free dental treatment to the willing subjects at the police stations in the mobile dental van of M.M.C.D.S.R.. The data were analysed using SPSS (Version 13.0). The Student’s t-test and ANOVA were applied for the statistical evaluation of differences in means whereas proportions were compared by the use of Chi-square test. A p value of 0.05 was selected to denote statistical significance.

**RESULTS**

The subjects’ mean age was 41.02 years (S.D. = 12. 29). A total of 98.9% (645) males and 1.1% (07) females were interviewed and examined. Majority of the subjects (61.5%) belonged to lower middle class of socioeconomic status. Maximum subjects, 58.7% (383), were educated till high school while only 2.1% (14) were post graduates.

Among the self reported systemic conditions, 9.97% subjects reported to be suffering from hypertension and 4.45% with diabetes mellitus. Most of the subjects, 55.7% (363), were vegetarian in diet. 35.7% (233) subjects were alcoholics and 34.2% (223) had a habit of using tobacco. All the subjects used to brush their teeth at least once a day.

A subjective assessment of the need for dental treatment depicted that 54.14 % (353) of the subjects were in need of one or the other dental treatment. Maximum subjects, 21.3% (139), had reported of decayed tooth/ teeth while 12.4 % (81) had reported of pain. Most of the subjects, 20.4% (133), had dental problem since more than 3 months. Out of the subjects having dental problem, 52.12% (184) reported that they could not seek treatment due to lack of time.

On examination, 43.4% (283) subjects were found to be in normal range of body mass index i.e. 18.5-24.99 and a same number of individuals, 43.4% (283) belonged to overweight category i.e. 25 to 29.99 B.M.I. Only 10.0% (65) of the subjects had normal systolic (SBP) as well as diastolic (DBP) blood pressure while 18.1% (118) had either and 71.9% (469) had both SBP & DBP higher. Varicose veins were present in 1.53% (10) subjects. Only 0.5 % (3) of the police personnel suffered from anaemia.

The prevalence of oral mucosal lesions was 6.4% out of which leukoplakia and smoker’s palate constituted 0.3% and 4.3 %, respectively. Maximum lesions (66.67%) were present on the palate followed by the buccal mucosa (26.19%). Majority of the oral mucosal lesions (33.33%) were in the age-group of 45-54 years. As the number of females covered was too low, no attempt was made to relate gender to any of the findings of the study.

Table 2 depicts the prevalence of dental caries and mean DMFT according to age. Mean number of teeth present per person was highest (30.16, SD = 3.14) in the age group of 25- 34 years and it showed a gradual decline with increase in age. Mean number of decayed and missing teeth were 1.07 (SD = 0.94) and 1.44 (SD = 1.01), respectively and their relation with age was found to be statistically significant (p

< 0.01, ANOVA).

**Figure 2**

Table 2 :- Distribution of dental caries prevalence and DMFT according to age

Age (in years)	N	DMFT		Dental Caries prevalence	
		Mean	S.D.	N	%
18-24	27	1.22	1.36	9	33.3
25-34	131	1.51	1.56	61	46.6
35-44	229	2.94	3.04	124	54.1
45-54	225	3.88	4.11	138	<b>61.3</b>
55-58	40	5.25	5.05	22	55.0
<b>Total</b>	<b>652</b>	<b>3.05</b>	<b>3.11</b>	<b>354</b>	<b>54.3</b>

**N = Number of subjects; S.D. = Standard Deviation**

Subjects with post graduation had lesser mean number of decayed (0.93, SD = 0.56) and missing teeth (1.43, SD = 1.17) as compared to subjects with only high school education (1.13, SD=0.96 & 1.97, SD=1.42, respectively). Subjects in upper high socio-economic class had a higher mean number of decayed (3.00, SD=2.45) as well as missing teeth (due to caries 2.00, SD=1.86 and due to other reasons 1.33, SD=1.24) as compared to the subjects in poor socio-economic class (0.9 SD=0.87, 0.88 SD=0.75 & 0.12 SD=0.18, respectively). Mean number of teeth requiring filling and extraction were 0.44 (SD=0.42) and 0.67 (SD=0.68) respectively. Proportionally more elderly than younger adults needed extraction, and caries was the major indication for extraction in all age groups.

The percentage of subjects having one or more missing teeth was 29.29 % (191) but only 2.92 % (19) subjects possessed prosthesis in mandibular arch and a same number of individuals possessed prosthesis in maxillary arch. Table 3 depict prosthetic status and needs of subjects.

**Figure 3**

Table 3:- Distribution of subjects according to Prosthetic status and needs

	Maxilla		Mandible	
	Number	%	Number	%
Prosthetic status	19	2.92	19	2.92
Prosthetic need	204	31.29	261	40.03

Prosthetic needs for mandibular arch were higher in all the age groups as compared to maxillary arch ( $p < 0.05$ , chi square). There was no edentulous subject found up to the age of 44 years. In the age groups 45-54 and 55-58 years the percentages of edentates were 0.15 and 0.31 respectively.

Of the 652 subjects, 3 (0.46 %) subjects were excluded from the CPI computations either because of edentulousness or because extractions indicated for remaining teeth would have rendered the subjects edentulous. The percentage distribution of survey subjects according to the highest CPI score is shown in (Table 4).

**Figure 4**

Table 4:-Distribution of subjects according to highest CPI score

CPI score	Number	Percentage
0 (Healthy)	153	23.6
1 (Bleeding)	1	0.2
2 (Calculus)	398	61.3
3 (Pocket $\leq 4$ -5mm)	86	13.3
4 (Pocket $\geq 6$ mm)	11	1.7
X (Excluded)	3	0.46
Total	649	100

Highest CPI score was non- significant in relation to socio-economic status. When education was compared with health of the supporting structures, it was found that 35.7% of the post graduates had healthy periodontium as compared to 18% among the high school ones ( $p < 0.01$ ). Subjects with diabetes had higher maximum CPI score than subjects with any other self reported systemic disease ( $p < 0.01$ ).

Most of the subjects (95.38%) had dental fluorosis with maximum subjects having questionable (73.60%) and very mild (18.55%) dental fluorosis.

**DISCUSSION**

Occupational environment plays a major role on the health

of the exposed. The severity of the health hazards increase when the duration of exposure increases.<sup>(16)</sup> This fact is more important in situations as that of police personnel who are engaged in their 24 hour duty quite often. These personnel have to undergo lot of physical as well as mental strain and commonly have to stand during their long working hours.

Despite a thorough search of literature, very few studies could be found concerning oral health of police personnel. Since the military services form the nearest equivalent, majority of discussion is based on military personnel. Females occupied a very small number of police personnel. With 933 females against 1000 men in the country,<sup>(17)</sup> a greater number of females should be recruited in the police force, to make it people friendly.

Most of the police personnel were undergraduates similar to that reported by Chisick MC<sup>(18)</sup> and Dilip CL.<sup>(6)</sup> This may be due to recruitments at an early stage. However, it is suggested to recruit personnel with minimum graduation as their educational qualification, so that the management of the public will be effective.

Hypertension was the most common self reported systemic condition similar to the results of Tharkar S.<sup>(19)</sup> This finding seems to be obvious based on the lifestyle in this occupation and mandates annual health screening of police personnel. The prevalence of tobacco use was higher than that of general population of Haryana.<sup>(2)</sup> This may be because contrary to the DCI survey<sup>(2)</sup>, majority of the study subjects in the present study were males and according to the cultural practices would have higher tendency to use tobacco.

More than half of the police personnel had ‘felt need’ for dental treatment and the major reason reported for not taking dental treatment was lack of time due to job restrictions. This was similar to that reported by Kawamura M<sup>(20)</sup>. Many times, the need persisted for more than 3 months. This reveals the hectic schedule of the police personnel which bars them even from taking treatment for their health.

Anaemia was present only in 0.5% of study population much less as compared to study reported by Satapathy DM.<sup>(16)</sup> This may be because Haryana being one of the rich agricultural states of India, there is good per capita availability of food and milk products. Additionally, police personnel are permanent government employees with an ensured income and a lot of their expenses are borne by the government. This depicts that they can have a good diet and hence low prevalence of anaemia. Varicosities of veins were present in

1.53% of study subjects. This may be due to prolonged standing hours of police personnel.

The prevalence of oral mucosal lesions was higher than that of general population of Haryana.<sup>(2)</sup> This is in accordance to the use of tobacco in the present study. The prevalence of leukoplakia was less than that reported by Ikeda N<sup>(21)</sup>, Ikeda N<sup>(22)</sup> and Saraswathi TR<sup>(23)</sup>. This may be related to the duration of tobacco use which was not recorded in the present study and hence no definite comments can be made in this regard.

Prevalence of dental caries was found to be quite low as compared to studies by Hopcraft M,<sup>(24)</sup> Hopcraft M<sup>(25)</sup>, Dale JW<sup>(26)</sup> and Athanassouli T<sup>(27)</sup>. Andrews NH<sup>(28)</sup> obtained a prevalence of nearing 100% with a mean DMFT of 19.13, Vrbic V et al<sup>(29)</sup> obtained dental caries prevalence of 98% with a mean DMFT of 18, Normark S<sup>(30)</sup> reported a caries prevalence of 85% and Arvidson UB<sup>(31)</sup> obtained mean DMFT of 4.7. The low prevalence of dental caries may be because police personnel stay for long time in their working environment and hence shall have very low sugar exposure.

Despite a high prosthetic need, only a small number of subjects possessed some form of dental prosthesis. This was contrary to the study reports of Lo ECM<sup>(32)</sup> and Ahuja A<sup>(33)</sup> where prosthetic need was low and a large number of subjects possessed some prosthesis. When more than half of the subjects in the present study had felt need for some form of dental treatment but had not received the same, a low presence of prosthesis seems to be obvious.

Contrary to various studies, Holmgren CJ,<sup>(34)</sup> Smith AC,<sup>(35)</sup> Dilip CL<sup>(6)</sup> quite a high number of subjects had completely healthy periodontium. Presence of calculus was the most common periodontal condition similar to studies reported by Skaleric U,<sup>(36)</sup> Anil S.,<sup>(37)</sup> Mosha HJ,<sup>(38)</sup> Dong Y-J et al<sup>(39)</sup> and Holmgren CJ.<sup>(34)</sup> Although presence of calculus was the most common finding, yet the proportion of these subjects was low compared to various studies. Holmgren CJ,<sup>(34)</sup> Smith AC,<sup>(35)</sup> Lo ECM<sup>(32)</sup>.

Subjects with higher education had better periodontal health as compared to subjects with lower education similar to that reported by Katz J et al.<sup>(40)</sup> Subjects in present study had better periodontal status as compared to study by Dilip CL.<sup>(6)</sup> This may be because all the subjects in the present study reported to be in a habit of regularly using oral hygiene maintenance aids. Poorer periodontal health was found in subjects reporting to be suffering with diabetes as compared

to non- diabetics. This is in accordance with the fact that diabetics have poorer periodontal health.<sup>(40)</sup> The state of Haryana being a high fluoride belt area, dental fluorosis was almost omnipresent.<sup>(2)</sup>

The sample of police personnel provides a unique opportunity to study a large population from diverse socio-economic and geographic backgrounds. Police personnel form the backbone for safety and security of a community hence their health is of utmost importance, not only for them and their families but also for the entire nation. The adverse outlook of this occupation makes it necessary for the government to either build health care, general and oral, clinics equipped with efficient manpower, especially for the police personnel or to regularly organize treatment camps at various police stations. Prevention oriented health education lectures should be delivered and possibly, should also form part of their training curriculum. Regular recruitments of police personnel with good educational background (graduation) and proper gender ratio could be helpful in managing deficiencies at work place and vocational effectiveness.

## References

1. WHO (2003). The world oral health report 2003. Geneva: World health organization.
2. Bali RK, Mathur VB, Talwar PP, Chanana HB. National oral health survey and fluoride mapping, India. 2002- 2003, Dental Council of India; 2003.
3. Kumar A, Viridi M, Veerasha KL, Bansal V. Oral health status & treatment needs of rural population of Ambala, Haryana, India. *Internet J Epidemiol* 2010; 8(2).
4. Haryana police. Internet resource: <http://haryanapolice.gov.in/> Accessed on 21/ August/ 2010.
5. Haryana police department. Monthly remuneration of officers/employees. Internet resource: <http://haryanapolice.nic.in/rtipart10.asp>. Accessed on 2 April 2010.
6. Dilip C.L. Health status, treatment requirements and knowledge and attitudes towards oral health of police recruits in Karnataka. *J Indian Assoc Pub Health Dent* 2005; 5: 20–34.
7. Districts of Haryana. Available on <http://www.haryana-online.com/Government/districts.htm>. Accessed on 18/Aug/2010.
8. Oral health surveys, basic methods. 4th ed. Geneva: WHO; 1997.
9. Kramer IRH, Pindborg JJ, Bezroukov V, Sardo Infirri J: Guide to epidemiology and diagnosis of oral mucosal diseases and conditions, World Health Organization. *Community Dent Oral Epidemiol* 1980; 8: 1-26
10. Pindborg JJ. Atlas of diseases of the oral mucosa. WB Saunders company. 4th Ed
11. Gupta R. Hypertension in India-definition, prevalence and evaluation. *J Indian Med Assoc.* 1999 Mar; 97(3): 74-80.
12. Campbell B: Varicose veins and their management. *Brit Med J* 2006; 287–292.
13. Aggarwal AK. Social classification: the need to update

- in present scenario. *Indian J Community Medicine* 2008; 33(1): 50-55.
14. World Health Organization. Global database on body mass index. BMI classification. Internet resource: [www.who.int/bmi/index.jsp](http://www.who.int/bmi/index.jsp). Accessed on 20 March 2010.
15. Dunning JM. *Principles of Dental Public Health*. Fourth ed. Cambridge. Page 339. Harvard University Press.
16. Satapathy DM, Behera TR, Tripathy RM. Health status of traffic police personnel in Brahmapur City. *Indian J Community Med* 2009; 34(1): 71- 72
17. Directorate General of Health Services. Ministry of health and Family welfare. National health profile 2006. Government of India. Available at [www.cbhidghs.nic.in](http://www.cbhidghs.nic.in)
18. Chisick MC. Comparing dental utilization of U.S. Army soldiers with their employed civilian cohorts. *Community Dent Oral Epidemiol* 1995; 23: 222-5.
19. Tharkar S., Kumpatla S, Muthukumaran P, Viswanathan V. High prevalence of metabolic syndrome and cardiovascular risk among police personnel compared to general population in India. *Journal of Association of Physicians of India* 2008; 56: 845-9.
20. Kawamura M and Iwamoto Y. Present state of dental health knowledge, attitudes/behaviour and perceived oral health of Japanese employees. *Int Dent J* 1999; 49: 173- 181.
21. Ikeda N, Ishii T, Iida S, Kawai T. Epidemiological study of oral Leukoplakia based on mass screening for oral mucosal diseases in a selected Japanese population. *Community Dent Oral Epidemiol* 1991; 19: 160-3.
22. Ikeda N, Hand Y, Khim SP, Durward C, Axell T, Mizuno T, Fukano H, Kawai T. Prevalence study of oral mucosal lesions in a selected Cambodian population. *Community Dent Oral Epidemiol* 1995; 23: 49-54.
23. Saraswathi TR, Ranganathan K, Shanmugam S, Sowmya R, Narasimhan PD, Gunaseelan R. Prevalence of oral lesions in relation to habits: Cross sectional study in South India. *Ind J Dent Res* 2006; 17 (3): 121-125.
24. Hopcraft M, Morgan M. Dental Caries experience in a young adult military population. *Aust Dent J* 2003; 48(2): 125-129.
25. Hopcraft M, Morgan MV. Dental Caries experience in Australian army recruits 2002-2003. *Aust Dent J* 2005; 50(1): 16- 20.
26. Dale JW. Prevalence of dental caries and periodontal disease in military personnel. *Aust Dent J* 1969; 30 -36
27. Athanassouli T, Koletsi-Kounari H, Mamai-Homata H, Panagopoulos H. Oral health status of adult population in Athens, Greece. *Community Dent Oral Epidemiol* 1990; 17: 82-4.
28. Andrew NH. Study of the dental status of male and female personnel who enlisted in the Royale Australian Air Force during the 1939-45 War. *Aust J Dent* 1948; 52: 12-24
29. Vrbic V, Vulovic M, Rajic Z, Topić B, Tatić E, Malić M, Milić D, Aurer-Kozelj J, Neceva L, Redzepagić S, et al. Oral health in SFR Yugoslavia in 1986. *Community Dent Oral Epidemiol* 1987; 16(5): 286-8
30. Normark S: Oral health among 15 and 35-44 year olds in Sierra Leone. *Tandlaegebladet* 1991; 95(4): 132-8.
31. Arvidson-Bufano UB, Holm A. Dental health in urban and rural areas of central and western Bangladesh. *Odontostomatol Trop* 1990; 13(3): 81-6.
32. Lo ECM, Corbet EF, Holmgren CJ. Oral health care needs among the middle aged and the elderly in Hong Kong. *Community Dent Oral Epidemiol* 1994; 22: 403-7.
33. Ahuja A, Darekar HS. Community dentistry in armed forces. *MJAFI* 2003; 59: 18-20.
34. Holmgren CJ, Corbet EF, Lim LP. Periodontal conditions among the middle-aged and the elderly in Hong Kong. *Community Dent Oral Epidemiol* 1994; 22: 396-402.
35. Smith AC, Lang WP. CPITN, DMFT, and treatment requirements in a Nicaraguan population. *Community Dent Oral Epidemiol* 1993; 21: 190-3.
36. Skaleric U, Kovac-Kavacic M. Periodontal treatment needs in a population of Ljubljana, Yugoslavia. *Community Dent Oral Epidemiol* 1989; 17: 304-6.
37. Anil S, Hari S, Vijayakumar T. Periodontal conditions of a selected population in Trivandrum district, Kerala, India. *Community Dent Oral Epidemiol* 1990; 18: 325.
38. Mosha HJ, Ngilisho LAF, NKwera H, Scheutz F, Poulsen S. Oral Health status and treatment needs in different age groups in two regions of Tanzania. *Community Dent Oral Epidemiol* 1994; 22: 307- 10.
39. Dong Y-J, Lee MM-S, Pai L, Peng T-K. Relationship of gingival calculus and bleeding on probing in CPITN Code 2 sextants. *Community Dent Oral Epidemiol* 1994; 22: 294-7.
40. Katz J, Chaushu G, Sgan-Cohen HD. Relationship of blood glucose level to community periodontal Index of treatment needs and body mass index in permanent Israeli military population. *J Periodontol* 2000; 71: 1521- 1527.

**Author Information**

**Ramandeep Kaur Sohi, B.D.S., M.D.S.**

Sr. Lecturer, M.M.C.D.S.& R.

**Vikram Bansal, B.D.S., M.D.S.**

Sr. Lecturer, M.M.C.D.S.& R.

**K.L. Veerasha, B.D.S., M.D.S.**

Professor & HOD, M.M.C.D.S.& R.

**Ramandeep Singh Gambhir, B.D.S., M.D.S.**

Sr. Lecturer, Gian Sagar Dental College, Banur