A cross sectional study of dentin hypersensitivity among dental students and interns

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Abstract

To evaluate the perceptions of dental students and interns about diagnosis and treatment of dentin hypersensitivity. In this cross-sectional study, participants were recruited from four dental colleges in Lahore, Pakistan. A self-administered validated questionnaire was used for data collection. Standard descriptive statistics were computed. Analytical statistical analysis was performed by using Pearson's chi-square test. Mean age of participants was 23.48 ± 5.61 years. Most respondents 76.1% stated that they had seen patients with DH in the last 2-4 weeks. Eighty percent claimed that DH had an impact on the quality of life of patients while 64.7% thought that impact was moderate. Self-reporting of sensitivity by patients (66.7%) and dental examinations (66.3%) were the most frequently employed diagnostic tools. Dental caries (82.7%) and periodontal disease (74.5%) were most common conditions considered while performing differential diagnosis of DH. Education on adequate tooth brushing technique was regarded as the most common (74.1%) management strategy. Higher percentage of interns (68.2%) than students (31.8%) considered restorative treatment to manage DH (p=0.01). Results showed that 39.6% of respondents were either confident or very confident in treating the condition. DH is a frequently encountered oral condition in dental clinics. Participants demonstrated understanding about DH. However, majority lacked confidence in its successful management.

Clinical article (J Int Dent Med Res 2018; 11(2) pp. 376-382)

Keywords: Dentin hypersensitivity, dental students, interns.

Received date: 04 December 2017 **Accept date:** 12 January 2018

Introduction

Dental student-patient interaction starts in clinical years of undergraduate dentistry program and students are expected to have adequate knowledge about diagnosis and management of dental diseases. Particularly, the understandings of the conditions which are commonly encountered in clinical settings are of critical importance to dental students and interns. Dentin hypersensitivity (DH) is one of the most prevalent oral conditions in dental practice as it was found that it affected 12.3% of patients who an average had 3.5 hypersensitive teeth.[1] Another study reported DH prevalence of 27% in general dental practice.[2] In addition, some epidemiological studies involving large community samples identified 25.5%-34.5% of populations with clinically diagnosed DH.[3-6] However, studies have documented prevalence rate of DH ranging from 1.34% [7] to 67.7%.[8]

Dentin hypersensitivity is manifested as transient sharp oral pain resulting from external stimuli.[9] Hot, cold and sweet are most common stimuli.[10] Many risk factors are associated with the occurrence of DH. Excessive tooth brushing, periodontal therapy, gingival recession, toothpaste abrasitivity, erosive tooth wear, intake of acidic food, bruxism, and smoking are associated with increased risk of DH.[3,6,11-13] In addition, females and adults (35-49 years) are more susceptible to DH than males and older individuals ≥ 60.[6] Most common teeth affected with DH include premolars and anterior teeth.[5,3,14] The condition significantly impairs oral health related quality of life of patients and females are

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more affected than male patients.[15] The treatment of DH depends upon proper diagnosis and identification of risk factors.[16,17] However, management strategies may require educating patients to improve oral health behaviours, using medication at-home, and providing chairside dental treatment.[16]

In questionnaire based studies, dentists reported their understanding of DH including its predisposing factors, diagnosis and treatment strategies.[18-22] In Nigeria, dentists correctly indicated hydrodynamic theory as the most common theory and cold as the commonest stimulus of DH.[18] The majority of practitioners identified combination of treatment options that included the use of medications in dental office (desensitizing agents, F varnishes, dentin bonding agents, glass ionomer cements) and at-home (F toothpastes and gels) in U.K [19] Dutch practicing dentists claimed that use of home care products was the most frequent therapeutic management of DH.[20] Gingival recession, erosion and abrasion were reported as the most common predisposing factors for DH by Australian dentists.[21,22]

Many studies have investigated knowledge of general practitioners about DH; however, there is scarcity of data pertaining to the understanding of this common oral condition among students and interns. It is, therefore, critical to know if these subjects have the knowledge of DH that is abreast with current scientific literature. In addition, the information obtained from the comparison of perceptions of students and interns and evaluation of perspectives of male and female participants can be used to make informed decisions by dental academics and clinicians. For these reasons, we conducted a study to evaluate perceptions of dental students and interns about diagnosis and treatment of DH. Students' perspectives were compared with interns and male versus female participants.

Materials and methods

This cross-sectional survey study was carried out at four dental colleges in Lahore, Pakistan. The administrators provided approval for data collection in their respective dental institutions. They exempted the study from ethical approval due to the anonymity of participants' responses. The study sample consisted of dental students in clinical years (third and fourth year) and interns.

The study participants were informed about the purpose and objectives of the study. They were also provided information about their voluntary participation, right to refusal, and anonymity of responses. Those willing to participate in the study provided their consents. The dental students were provided with self-administered questionnaire at the end of their classes. The interns received the questionnaires in their respective clinical departments. Any query or ambiguity about the questionnaire items was addressed by the researchers. The questionnaire validity was already confirmed in previous studies.[19,20,23] However, further content validation was performed by the experts and specialists and minor modifications were made in the instrument to achieve the objectives of the study.

The survey instrument recorded respondents' demographic information and their responses about percentage and number of patients seen with DH including its impact on the quality of life of patients. The respondents were questioned about the methods used to diagnose DH, and the choices included sensitivity reported by patient (self-reported), medical history, dental examination, periodontal assessment (probing pocket depths), periodontal assessment (measurement of recession), thermal test, percussion test, pulpal testing, dental radiographs and diet analysis. There were 10 options pertaining to differential diagnosis of DH (other oral conditions considered while diagnosing DH), and respondents were asked to choose as many options as possible according to their understanding. These options included cracked tooth syndrome, fractured restoration, chipped teeth, dental caries, periodontal disease, post-restorative sensitivity, marginal leakage, pulpitis, palato-gingival groove and bleaching sensitivity.[17] Finally, there were questions about the management of DH and respondents' confidence in providing the treatment and use of educational pamphlet. At home use of a desensitizing dentifrice, education on proper, non-destructive tooth brushing technique, in-surgery application of an anti-sensitivity agent, and provision of restorative treatment were four management therapies choices provided to the participants.

The data were analyzed using Statistical Package for Social Sciences (SPSS) (IBM SPSS Statistics for Windows, Version 22. Armonk, NY: IBM Corp). Participants' responses were displayed as frequencies, percentages and charts. For continuous variables, mean and standard deviation were computed. Dental interns are qualified to provide treatment to patients. Hence, comparisons were made evaluate the perspectives of students and those who were trained and competent in providing dental care to patients. Pearson's chi-square tests and cross tabulation were performed to compare participants' responses about the diagnosis and management of DH between students and interns and males and females. A p-value < 0.05 was considered statistically significant.

Results

Variables	N	%
Demographic information		
Gender		
Male	79	31.0
Female	176	69.0
Participants		
interns	157	61.6
Students	98	38.4
Dentin hypersensitivity		
Patients with DH seen in last 2-4 weeks		
Yes	194	76.1
No	61	23.9
Percentage of patients with DH		
1%	19	7.5
3%	11	4.3
5%	16	6.3
10%	15	5.9
15%	26	10.2
25%	50	19.6
≥50%	99	38.8
Not known	19	7.5
Duration of complain of DH		
≤1 week	33	12.9
2 weeks	52	20.4
3 weeks	35	13.7
4 weeks	43	16.9
8 weeks	22	8.6
≥12 weeks	25	9.8
Not known	45	17.6
Impact of DH on quality of life		
Yes	205	80.4
No	34	13.3
Don't know	16	6.3
Severity of impact of DH on quality life		
Mild	51	20.0
Moderate	165	64.7
Severe	35	13.7
Extremely severe	4	1.6

Table 1. Distribution of participants' responses about demographic data and DH.

Variables	N	%
Diagnosis of DH		
Sensitivity reported by patient (self-reported)	170	66.7
Medical history	93	36.5
Dental examination	169	66.3
Periodontal assessment (Probing depths)	90	35.3
Periodontal assessment (Measurement of Recession)	79	31.0
Thermal tests	128	50.2
Percussion tests	76	29.8
Pulpal Testing	70	27.5
Dental radiographs	55	21.6
Diet analysis	74	29.0
Conditions in differential diagnosis of DH		
Cracked tooth syndrome	133	52.2
Fractured restoration	163	63.9
Chipped Teeth	145	56.9
Dental caries	211	82.7
Periodontal disease	190	74.5
Post-restorative sensitivity	152	59.6
Marginal Leakage	141	55.3
Pulpitis	133	52.2
Palato-gingival groove	58	22.7
Bleaching sensitivity	140	54.9
Not known	9	3.5
Treatment of DH		
At home use of a desensitizing dentifrice	167	65.5
Education on proper, non-destructive tooth brushing technique	189	74.1
In-surgery application of an anti-sensitivity agent	92	36.1
Restorative treatment	151	59.2
Not sure	4	1.6

Table 2. Distribution of participants' responses about the diagnosis of DH.

Of 324 questionnaires were distributed, 255 were completed and returned (response rate= 78.7%). Age of the participants ranged from 20 to 29 years with mean age 23.48 years (SD 5.61 years). Most participants were females (69%). The results showed that 76.1% of study participants stated that they had seen patients with DH in the last 2-4 weeks and 38.8% confirmed that they had seen ≥ 50% DH patients. The majority (73.8%) mentioned that their patients had complaints of DH that lasted for less than one week to four weeks. DH had negative impact on the quality of life of patients was reported by 80.4% of the respondents and 64.7% of them believed that impact was moderate (Table 1).

Table 2 shows participants' responses about the diagnosis and treatment of DH. Most respondents indicated that they diagnosed DH by patients' self-report of sensitivity (66.7%) and by performing dental examination (66.3%). Thermal test was used by half of respondents and almost one quarter used radiographs for the diagnosis of DH. Dental caries (82.7%), periodontal disease (74.5%) and fractured restoration (63.9%) were common oral conditions that were considered in differential diagnosis. Education on proper tooth brushing technique was regarded the commonest (74.1%) management strategy. Other frequently reported treatment options included use of a desensitizing dentifrice at home (65.5%) and provision of restorative treatment (59.2%).

The comparisons of subjects' responses between males and females revealed no statistically significant differences, however, female demonstrated better understanding of DH than male participants. Periodontal assessment (measurement of recession) for diagnosis of DH was considered significantly more important by interns than students (p-value 0.04). Similarly, significantly higher percentage of interns (68.2%) than students (31.8%) indicated restorative treatment for the management of DH (p-value 0.01) (Table 3).

Figure 1 shows that 39.6% of respondents were either confident or very confident, 32.5% were somewhat confident, and 27.8% were not very confident or not at all confident in prescribing treatment for DH. In response to a question about the compliance of patients, 49.8% confirmed that their patients complied with professional advice. The need for preventive educational leaflet was recognized by 60.5% of the participants.

Variables	Gender			Participants		
	Male N (%)	Female N (%)	p-value	interns N (%)	Students N (%)	p-value
Diagnosis of DH						
Sensitivity reported by patient	50 (29.4)	120 (70.6)	0.44	111 (65.3)	59 (34.7)	0.08
Medical history	27 (29.0)	66 (71.0)	0.61	51 (54.8)	42 (45.2)	0.09
Dental examination	52 (30.8)	117 (69.2)	0.92	110 (65.1)	59 (34.9)	0.10
Periodontal assessment (Probing depths)	29 (32.2)	61 (67.8)	0.75	61 (67.8)	29 (32.2)	0.13
Periodontal assessment (Measurement of Recession)	27 (34.2)	52 (65.8)	0.46	56 (70.9)	23 (29.1)	0.04*
Thermal tests	40 (31.3)	88 (68.8)	0.92	78 (60.9)	50 (39.1)	0.83
Percussion tests	23 (30.3)	53 (69.7)	0.92	40 (52.6)	36 (47.4)	0.06
Pulpal Testing	20 (28.6)	50 (71.4)	0.61	38 (54.3)	32 (45.7)	0.14
Dental radiographs	21 (38.2)	34 (61.8)	0.19	37(67.3)	18 (32.7)	0.32
Diet analysis	19 (25.7)	55 (74.3)	0.24	45 (60.8)	29 (39.2)	0.87
Treatment of DH						
At home use of a desensitizing dentifrice	49 (29.3)	118 (70.7)	0.43	102 (61.1)	65 (38.9)	0.82
Education on proper, non-destructive tooth brushing technique	56 (29.6)	133 (70.4)	0.43	123 (65.1)	66 (34.9)	0.05
In-surgery application of an anti-sensitivity agent	29 (31.5)	63 (68.5)	0.88	58 (63.0)	34 (37.0)	0.71
Restorative treatment	45 (29.8)	106 (70.2)	0.62	103 (68.2)	48 (31.8)	0.01*

Table 3. Comparison of diagnosis and management of DH between males and females participants and students and interns.

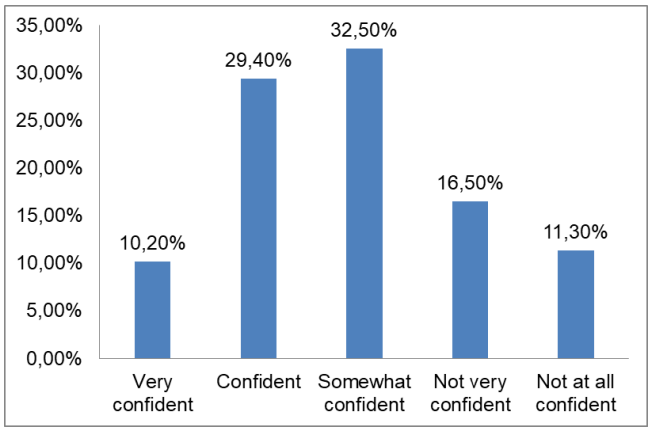

Figure 1. Confidence level participants in providing treatment of DH.

Discussion

The study provided insight into participants' understanding of DH which is critical to assessing the adequacy of their knowledge and its consistency with current needs of dental curriculum. The burden of disease is huge as clear majority of participants reported screening patients with the DH that had negative impact on the quality of life.

In the present study, most participants (76.1%) claimed that they had seen patients with dentin hypersensitivity during the last 2-4 weeks. This self-reported prevalence figure is similar to the results shown by Afolabi et al.[18] who found 73% of study respondents seeing patients with DH. In contrast, other previous survey based studies of practicing dentists pointed out lower estimates of DH in UK (25%),[19] Australia (<20%),[20] and Netherland (10%)[20]. In our study, 38.8% of respondents reported that ≥ 50% of their patients had DH in our study. This high burden of DH reported by our sample could be because of high prevalence of dental caries (78%) and periodontal disease (90%) in adults in the country.[24]

The patients with DH have been shown to indicate significant negative impact on oral health related quality of life (OHRQoL).[15,25,26] This corroborates with the results of our study where 80% of respondents said that DH impacted quality of life of patients, and 64% regarded the impact as moderate. In the present study, most respondents (73.8%) stated that duration of DH ranged from one week to four weeks. Similar to our findings, a previous study reported that DH lasted for about one month in 50% of patients.[27] This may point out to poor oral health behaviours of patients regarding access to oral care services. A previous study from Pakistan found that 42.5% of patients visited dentist during last six months and only 19% performed dental attendance for routine dental check-up.[28]

It is difficult to clinically measure the pain of DH; therefore, dental practitioners frequently obtain patients' history about the condition to reach to proper diagnosis, although this may not give objective assessment of the pain. In order to overcome this deficiency, thermal stimulation and air blast testing are commonly used to evaluate DH in clinical trials.[17] Our study found that most participants relied on the patients' description of the sensitivity while thermal testing was the third most common method of DH diagnosis. A recent review showed that clinicians generally depend on self-reporting of patients about DH complaint and they do not routinely perform differential diagnosis.[29] According to Canadian Advisory Board on Dentin Hypersensitivity, fractured restoration, marginal leakage, pulpitis, dental caries, periodontal disease, chipped teeth, bleaching sensitivity and cracked tooth syndrome should be ruled out when diagnosing dentin sensitivity.[17] The present study reported dental caries and periodontal disease as the commonest conditions in differential diagnosis of DH.

The popular treatment options in our study included education about non-destructive tooth brushing method, use of desensitizing agent at home and in office application of anti-sensitivity medication. These findings are close to the results provided by Gillam et al.[19] In addition, these management preferences are in accordance with the recommended guidelines that suggest removing or modifying predisposing factors and prescribing desensitizing agent.[16,17]

In current survey, the most common management strategy was advice on atraumatic tooth brushing technique. It is possible that most respondents recommended non-invasive treatment to modify the underlying cause of the problem which could be improper tooth brushing habits. However, it has been shown that prescription of desensitizing agent was the treatment of choice for DH.[21,22] Similarly, in a recent randomized controlled trial, patients treated with desensitizing agent reported significantly reduced score of Oral Health Impact Profile (OHIP) than the patients on placebo.[25] These variations in treatment options in different studies could be explained by the presence of variety of predisposing agents operating in different populations. Moreover, there is no agreement in the literature about a standard therapeutic agent for the treatment of DH.[30]

The association between gender and academic performance has been documented with female dental students significantly performing better in theoretical courses than male students.[31] It was also found that female students had significantly higher oral health knowledge than male counterparts.[32] Likewise, inferential statistical analysis of data in our study found more female than male participants understand the diagnosis and treatment of DH,

though no significant gender differences were observed. Our study revealed some significant differences between students and interns. More interns compared with students claimed restorative treatment as management strategy for DH. Similarly, greater percentage of interns demonstrated better understanding of diagnosis and management of DH. These findings were expected because interns were practicing dentistry as competent professionals whereas students still have to acquire knowledge and master the skills in last two years of their undergraduate dental program.

Given the importance of better understanding of the condition and provision of quality treatment to patients, the participants are expected to be confident or very confident in advising or providing treatment for DH. In our study, 40% of participants reported that they were confident/very confident in treating the condition. This finding is in accordance with the results of a previous study where 50% of participants lacked the confidence to successfully manage the condition.[17] This underscores the need for improving dental curriculum for students and also providing continuing education activities for practicing dentists. The role of educational tools to enhance patients' awareness about DH was recognized by the majority of participants which highlights respondents' approaches in the prevention of DH. However, patient compliance could be a challenge in successfully providing comprehensive treatment as half of respondents pointed out to the lack of compliance to treatment in the present study.

Conclusions

This study found that DH is a common oral health problem that is frequently encountered in clinical settings. The majority of respondents believed that the condition impact quality of life of patients negatively, though mostly its impact is mild or moderate in severity. Most participants diagnosed DH on patients' self-reporting of the problem while periodontal assessments and other diagnosis methods were infrequently employed. The interns and female participants demonstrated improved understanding of DH. A considerable percentage of respondents lacked the confidence to successfully treating DH. There is need to provide better didactic and clinical teaching to students and continuing education programs to interns so that they can accurately diagnose the problem and confidently manages the condition. Moreover, educational tools should be provided to patients to enhance their awareness of DH paying particular attention to increase compliance to treatment regimen.

References

1. Cunha-Cruz J, Wataha JC, Heaton LJ, et al. The prevalence of dentin hypersensitivity in general dental practices in the northwest United States. J Am Dent Assoc 2013;144(3):288-96.
2. Al-Khafaji H. Observations on dentine hypersensitivity in general dental practices in the United Arab Emirates. Eur J Dent 2013;7(4):389-94.
3. Wang Y, Que K, Lin L, Hu D, Li X. The prevalence of dentine hypersensitivity in the general population in China. J Oral Rehabil 2012;39(11):812-20.
4. Que K, Ruan J, Fan X, Liang X, Hu D. A multi-centre and cross-sectional study of dentine hypersensitivity in China. J Clin Periodontol 2010;37(7):631-7.
5. Ye W, Feng XP, Li R. The prevalence of dentine hypersensitivity in Chinese adults. J Oral Rehabil 2012;39(3):182-7.
6. Costa RS, Rios FS, Moura MS, et al. Prevalence and risk indicators of dentin hypersensitivity in adult and elderly populations from Porto Alegre, Brazil. J Periodontol 2014;85(9):1247-58.
7. Bamise CT, Olusile AO, Oginni AO, Dosumu OO. The prevalence of dentine hypersensitivity among adult patients attending a Nigerian teaching hospital. Oral Health Prev Dent 2007;5(1):49-53.
8. Rees JS, Jin LJ, Lam S, Kudanowska I, Vowles R. The prevalence of dentine hypersensitivity in a hospital clinic population in Hong Kong. J Dent 2003;31(7):453-61.
9. Dababneh RH, Khouri AT, Addy M. Dentine hypersensitivity - an enigma? A review of terminology, mechanisms, aetiology and management. Br Dent J 1999;187(11):606-11; discussion 03.
10. Juber MB SJ, Yuliati. Sweet Taste Sensitivity and Its association with Serum Zinc Levels in Women with Premenstrual Syndrome. J Int Dent Med Res 2017;10(2):354-57.
11. Mafla AC, Lopez-Moncayo LF. Dentine sensitivity risk factors: A case-control study. Eur J Dent 2016;10(1):1-6.
12. West NX, Sanz M, Lussi A, et al. Prevalence of dentine hypersensitivity and study of associated factors: a European population-based cross-sectional study. J Dent 2013;41(10):841-51.
13. Scaramucci T, de Almeida Anfe TE, da Silva Ferreira S, Frias AC, Sobral MA. Investigation of the prevalence, clinical features, and risk factors of dentin hypersensitivity in a selected Brazilian population. Clin Oral Investig 2014;18(2):651-7.
14. Kehua Q, Yingying F, Hong S, et al. A cross-sectional study of dentine hypersensitivity in China. Int Dent J 2009;59(6):376-80.
15. Bekes K, John MT, Schaller HG, Hirsch C. Oral health-related quality of life in patients seeking care for dentin hypersensitivity. J Oral Rehabil 2009;36(1):45-51.
16. Chu CH, Lam A, Lo EC. Dentin hypersensitivity and its management. Gen Dent 2011;59(2):115-22.
17. Consensus-based recommendations for the diagnosis and management of dentin hypersensitivity. J Can Dent Assoc 2003;69(4):221-6.
18. Afolabi AO, Ogundipe OK, Adegbulugbe IC, Shaba OP. Perception of dentine hypersensitivity and its management by a group of Nigerian dentists. Nig Q J Hosp Med 2012;22(3):216-20.

19. Gillam DG, Bulman JS, Eijkman MA, Newman HN. Dentists' perceptions of dentine hypersensitivity and knowledge of its treatment. J Oral Rehabil 2002;29(3):219-25.
20. Schuurs AH, Wesselink PR, Eijkman MA, Duivenvoorden HJ. Dentists' views on cervical hypersensitivity and their knowledge of its treatment. Endod Dent Traumatol 1995;11(5):240-4.
21. Amarasena N, Spencer J, Ou Y, Brennan D. Dentine hypersensitivity - Australian dentists' perspective. Aust Dent J 2010;55(2):181-7.
22. Amarasena N, Spencer J, Ou Y, Brennan D. Dentine hypersensitivity in a private practice patient population in Australia. J Oral Rehabil 2011;38(1):52-60.
23. Gillam DG, Seo HS, Bulman JS, Newman HN. Perceptions of dentine hypersensitivity in a general practice population. J Oral Rehabil 1999;26(9):710-4.
24. Maher R. Dental disorders in Pakistan--a national pathfinder study. J Pak Med Assoc 1991;41(10):250-2.
25. Idon PI, Esan TA, Bamise CT. Oral health-related quality of life in patients presenting with dentine hypersensitivity: A randomized controlled study of treatment effect. European Journal of General Dentistry 2017;6(2):99.
26. Masud M, Al-Bayaty BF, Muhamed AH, Alwi AS, Takiyudin Z, Hidayat FH. Gingival Recession and dentine hypersensitivity in periodontal patients:is it affecting their oral health related quality of life? J Int Dent Med Res 2017;10(3):909-14.
27. Taani DQ, Awartani F. Prevalence and distribution of dentin hypersensitivity and plaque in a dental hospital population. Quintessence Int 2001;32(5):372-6.
28. Parveen N, Ahmed B, Bari A, Butt AM. Oro-dental health: awareness and practices. JUMDC 2011;2(2):5-10.
29. Gillam DG. Current diagnosis of dentin hypersensitivity in the dental office: an overview. Clin Oral Investig 2013;17 Suppl 1:S21-9.
30. Porto IC, Andrade AK, Montes MA. Diagnosis and treatment of dentinal hypersensitivity. J Oral Sci 2009;51(3):323-32.
31. Sawair FA, Baqain ZH, Al-Omari I, Wahab FK, Rajab LD. Effect of gender on performance of undergraduate dental students at the University of Jordan, Amman. J Dent Educ 2009;73(11):1313-9.
32. Al-Ansari JM, Honkala S. Gender differences in oral health knowledge and behavior of the health science college students in Kuwait. J Allied Health 2007;36(1):41-6.