Dental pain and its impact on quality of life among indigenous adolescents of Himalayas (Ladakh), India

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ABSTRACT

Background: Ladakh has less than optimal oral health care services and a poor transport and connectivity with other areas of the country during most part of the year. Therefore, immediate address to any dental pain is not possible. This study aims to determine the prevalence of dental pain among 12–15-year-old schoolchildren of Leh, Ladakh after the commutation impairing time of the year.

Materials and Methods: A cross-sectional study was conducted in May 2014 to determine the prevalence and impact of dental pain among adolescents residing in Leh, Ladakh. A total of 264 students in the age group of 12–15 years participated in the study. The data were obtained using a pretested questionnaire that elicited information on past experience (6 months) of dental pain and the resultant impact on their daily lives.

Statistical Analysis Used: Descriptive statistics was used for distribution of frequencies.

Results: The response rate was 75.7%. Seventy-seven percent of the students reported dental pain in the past 6 months. About 89% of the students reported, at least, one impact due to dental pain. Females reported more than their male counterpart. Difficulty in eating was found to be commonly reported impact followed by difficulty in sleeping.

Conclusions: The prevalence of dental pain and its impact was found to be high. There is a need for a paradigm shift in focus of oral health services from urban areas to remote and rural areas. Knowledge about the magnitude of dental pain can be used to evaluate and plan preventive and curative services in remote and rural areas.

Key words: Adolescents, dental pain, impact, indigenous, prevalence, quality of life, questionnaire

“The interest of the indigenous people must be a part of the new development agenda in order for it to succeed (…). Let us work even harder to empower them and support their aspirations,” declared UN Secretary-General Ban Ki-Moon. The focus of the international day is of the world’s indigenous population’ 2014 (9 August) is “Bridging the gap: Implementing the rights of Indigenous peoples.”[1]

In line with the United Nations Global focus, we reached out to the Himalayan indigenous population residing in Ladakh region to provide oral health care and understand various oral health challenges faced by them. Ladakh has less than optimal oral health care services and a poor transport and connectivity with other areas of the country during most part of the year. Remoteness is a significant factor determining the level of basic health, education, and infrastructure services to which indigenous people have access.[2] Therefore, immediate address to any dental pain is not possible.

There are studies in literature which report the significant impact of dental pain on the daily life of children such as in Sri Lanka and Harrow, England.[3,4] The prevalence of dental pain and its impact on quality of life among indigenous adolescents of Himalayas (Ladakh), India. Indian J Dent Res 2016;27:22-6.

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pain varies among different age groups and at various recall intervals. Nalweyiso et al., Kiwanuka and Astrum reported dental pain among 36.5% and 47.6% of school students in 2004 and 2005. Goes et al. reported 33.6% of pain among 14–15-year-old students of Brazil. In the Indian subcontinent, Dandi et al. in 2011 reported that 71.4% of 12-year-old students reported dental pain. However, in this study, we focus on a population with little or no access to professional dental treatment.

The schools remain an important setting, offering an efficient and effective way to reach children worldwide and through them, families and community members. The aim of this study was to determine the prevalence of dental pain among 12–15-year-old schoolchildren of Ladakh after the commutation impairing time of the year. This study also explores how dental pain has its social impacts on their daily life. This study stresses the importance of “bridging the gap” and shifting the focus of community dental health from neighboring communities to the remote ones.

MATERIALS AND METHODS

Area profile
Leh is a district in Ladakh situated roughly between 32 and 36° North latitude and 75 and 80° East longitude and at an altitude ranging from 2300 m to 5000 m above sea level. Topographically, the whole of the district is mountainous with wide diurnal and seasonal fluctuation in temperature with −40°C in winter and +35°C in summer. During winters, the road to Leh remains closed for more than 7 months. The bus services and other means of communication are very poor; hence, the availability and accessibility for oral health services are almost difficult. The study was conducted just after winter in May 2014. Leh has a total population of 133,487 of which 34.21% of them are living in urban areas; the rest 65.79% are living in rural areas. There are about five dentists in Leh, the capital of Ladakh, three of the dentists are at the hospital, and two have private practices. This is for the total population in Leh and an area of 45,110 km². The whole district is divided into nine blocks. Leh is the only township and district headquarters. The whole district has been declared as a tribal district.

Study setting
A cross-sectional questionnaire study was conducted in May 2014 among 12–15-year-old students of two schools in Leh, (Ladakh, India). The data were obtained using a pretested; closed-ended questionnaire that elicited information on past experience of dental pain and the degree of dental pain assessed using a 3-point scale: Mild, moderate, and severe; trigger factors and possible reasons for the pain; and the impact of pain on the child.

The questionnaire was pretested on a group of 20 students from the same age group from a school which was not undertaken in the study to prevent contamination of the study sample. The questions were written in English and were understood by the students. If any student had difficulty in understanding the questions, a translator was provided with sufficient proficiency in English and Ladakhi (local language) and who was not related to the study. Following the pilot study, only one option in parent’s response, “did not report to parents” and one option in impacts, “had pain but still went to school” was added. Rest it was found acceptable by all the participants of pilot study.

Sample population
The sample size was determined based on the prevalence, of impact due to dental pain, from the literature (78%) and with an allowable error of 5%. The sample size of 264 was calculated using the formula \( Z^2 \cdot Pq/\Delta^2 \). For this study, a list of schools was obtained from the Department of Health in Leh (main town) and schools were short-listed which had students in the age group of 12–15 years. A total of 10 schools fulfilled the above criteria. Of the 10 schools, only four schools gave the permission to conduct the study. Schools were selected until the desired sample was obtained. If the predetermined sample was not reached in one school, it was decided to select another school randomly from the four schools. The institutional permission to conduct the study was obtained on a prior basis from the respective headmaster of the schools before involving their students. Only those participants present on the day of the study were included for the study. No attempt was made to trace the students who remained absent, and no incentives was provided for the participants. Participants were informed that their responses will be kept confidential and were encouraged to answer all questions which were in a tick box format. The questionnaires were personally distributed to participants in every class, requested to fill and return the questionnaire in the presence of the investigator. The time allotted for the completion of the questionnaire was 15 min. If any student had difficulty in understanding the questions, a translator was provided with sufficient proficiency in English and Ladakhi (local language), who was not related to the study. The calculated sample size of 264 study participants was reached from two schools, so the remaining two schools were not involved in the present study. Completed questionnaires were personally collected from all the participants. Incomplete questionnaires were rejected. Questionnaires were distributed until the desired sample was reached. Incomplete questionnaires and questionnaires with questions having two responses from participants were rejected. Finally, 200 questionnaires were selected for statistical analysis.

The data obtained was entered in Microsoft Excel sheet and subjected to statistical analysis using statistical package.
of social sciences (SPSS version 17.0, SPSS Inc., Chicago, IL, USA) mainly for frequency distributions with respect to
gender, severity of pain, parents response, and impact due
to pain. Cross tabulation for gender, age, and reporting of
impacts due to dental pain was tested using Chi-square test.

RESULTS

A total of 264 participants were part of this study. Of
264 questionnaires distributed only 200 questionnaires were
finally considered for the study.

Table 1 shows that overall 64% (128) of the participants
consisted of females. Majority of the participants belonged
to 15 years of age. Dental pain was reported by 77% (154) of
participants. Among those reporting dental pain, about 67%
were females. Severe pain was reported by 22.07% of the
participants whereas majority of them reported moderate
pain. Mild pain was more reported by males than females
and on the contrary, severe pain was reported more often by
females [Table 2]. About 89% reported at least one impact
due to dental pain. Seventy-four percent cited consuming
foods and beverages as trigger factors and about 10% did not
remember what triggered dental pain [Table 3].

Among those who reported dental pain (n = 154) the
distribution of respondents according to age and gender is
shown in Table 4 (in percentages). The highest distribution
was shown among 15-year-old and more among females.

In response to dental pain, 15.6% of the participants did not
even report to their parents about them experiencing dental
pain and 20.8% of the parents did not do anything in spite
of reporting to their parents. Only 36.4% of the respondents
were taken to the dentist by their parents [Table 5]. The
reported impacts according to severity revealed majority
of impacts’ for moderate pain except, “absent from school”
which was more affected by severe pain [Table 6].

Of the 154 participants reporting dental pain in the past
6 months, about 16 (10.4%) of the participants experienced
one or more impact. Difficulty in eating was the most
common reported impact in 78 (50.5%) participants, and
34 (22.07%) of them were unable to sleep due to pain. About
6% of them reported that pain prevented them from going
to school, and another 6.7% were unable to smile and attend
school with pain [Table 7]. It was found that reporting of
impacts due to dental pain was more by females except for,
could not go to play and smiling due to dental pain, which
was not statistically significant.

DISCUSSION

This study was aimed to determine the prevalence of dental
pain and associated impacts on the daily lives of 12–15-year-
old school students of two randomly chosen schools from

| Table 1: Distribution of participants according to age, gender and with dental pain |
|------------------|------------------|------------------|
| Variables        | n (%)            | n (%)            |
| Age (years)      | 12               | 10 (5)           |
|                  | 13               | 32 (16)          |
|                  | 14               | 66 (33)          |
|                  | 15               | 92 (46)          |
| Gender           | Male             | Female           |
|                  | 72 (36)          | 128 (64)         |
| Respondents not reporting dental pain in the past 6 months | 154 (77) |
| Respondents reporting dental pain in the past 6 months | 46 (23) |
| Those reporting pain (n) | 154            |
| Gender           | Male | 50 (32.4) | Females | 104 (67.5) |
| Triggering factors | Consuming food/beverages | 114 (74) |
|                  | On simply biting | 16 (10.4) |
|                  | Spontaneous      | 8 (5.2)          |
|                  | Don’t remember   | 16 (10.4)        |
| Table 2: Distribution of participants reporting dental pain according to severity of pain and gender |
| Intensity of pain | Males | Females | n (%) |
| Mild pain        | 10     | 2       | 12 (7.79) |
| Moderate pain    | 32     | 76      | 108 (70.1) |
| Severe pain      | 8      | 26      | 34 (22.07) |
| Total number of respondents, n=154 (%) |
| Table 3: Distribution of participants reporting dental pain according to impacts and triggering factors |
| Reporting impact | n (%) |
| More than one impact | 16 (10.4) |
| One impact        | 138 (89.6) |
| Gender            | Male | 46 (33.3) | Females | 92 (66.7) |
| Triggering factors | Consuming food/beverages | 114 (74) |
|                  | On simply biting | 16 (10.4) |
|                  | Spontaneous      | 8 (5.2)          |
|                  | Don’t remember   | 16 (10.4)        |
| Total number of respondents, n=154 (%) |

Leh, Ladakh. The response rate in the study was 75.7%.
This high percentage of drop outs could be attributed to
the participant’s inability to comprehend and respond to
an appropriate option. The dropouts in the study were
close to 25%, but due to nature of study design, the missing
data may not have any major impact on the results unlike
other study design such as cohort study or case–control
study. Of the total, about 77% of the students reported
dental pain in the past 6 months with female students 104
(67.5%) reporting dental pain and its impact more than their males counterparts 50 (32.4%). The prevalence of dental pain reported in the past 6 months was 77% which is much higher than those reported in studies conducted by Goes et al. in 2007, Nomura et al. in 2002, Jiang et al. in 2009, Mashoto et al. in 2007, and Jiang et al. in 2002, Jiang et al. in 2009, and Jiang et al. in 2007. Slade also reported the prevalence of toothache to range from 5% to 33% across various countries.2-8 Comparing the present prevalence rates across populations of children worldwide needs to be done with caution since various time frames and age groups are focused in different studies. We also need to understand that long recall period of 6 months in the present study might have led to a slight underestimation of the prevalence rates reported in this study. Among those reporting dental pain, 34% of them had severe pain. Consumption of foods and beverages triggered the pain in most of the students followed by biting accidently without their knowledge. There was, however, another 10%, who did not remember what triggered the pain. The reporting of dental pain was more among 14–15 years students than 12–13 years which surpasses the reported pain from the same age group in Brazil which was only 33.3%.7 This could imply that 14–15 years are at more risk for reasons which could cause dental pain. In the present, we found that females reported more than males, which could be due to more number of female students participating in the present study.

The response from the parents in the present study surprisingly includes, about 20% of parents who did not do anything to relieve their children from dental pain. The reason could be either accessibility and/or availability of oral health services since the study was conducted in the month of May 2014 and owing to its altitude; the climatic conditions are very extreme due to which it becomes very difficult to commute and visit a dentist. Other reason could be their lack of awareness and knowledge regarding oral health services. However, a good number of parents reacted by utilizing oral health care services, if not treatment, at least made an attempt to approach the local pharmacy for a pain killer. A proportion of students in the present study also persisted who did not even tell their parents that they have dental pain. The reason could be due to diminished awareness of oral health or due to fear of visiting a dentist or previously neglected response from their parents.

Not only was the prevalence of dental pain high, but also the severity and impact of the pain was substantial. We found that a small percentage of children had to bear the pain and still go to school (3.8%) and some of them could not smile (1.29%), however a substantial percentage of children had difficulty in eating (50.6%) while some of them had their sleep affected (22%). Absent from school (6.4%) was the next common reported impact followed by their inability to play (5.19%). The impact in the present study was in the order of difficulty in eating, inability to sleep, absent from school and inability to play. The findings are somewhat in accordance with a study conducted among 8-year-olds by Shepard MA et al. in 1999 and Mittal M et al. in 2012 where inability to eat was the common reported impact.5,12 In a similar study conducted by Mashoto et al. in 2009, difficulty in eating was the most reported impacts among 10-19-year-old study subjects.15 Another study conducted among 12–15-year-old orphans by Sudeep et al. in 2014 concluded that more number of participants (181) reported difficulty in eating followed by inability to perform oral hygiene measures due to dental pain.18 We found that females reported more impacts than males except in, could not play, where the values were equal, but the difference was statistically not significant (P > 0.05), it was also obvious that dental pain was found to have more consequences on functional than social performances. We also found a small proportion of students 16 (10.4%) who reported more than one impacts, which was very less compared to a study done by Mittal et al. in 2012 among 8-year-olds where 50.4% of them had more than one impacts.17

Dental pain estimates are recognized indicators of oral health status as well as a measure of the quality of life.15 The present finding indicates that dental pain in schoolchildren could be avoided and thus their quality of life improved by strengthening preventive and therapeutic dental services in sparsely populated and remote areas of Leh, Ladakh. The causes of dental pain reported in this study

### Table 5: Distribution of participants with dental pain according to their parent’s response for mild-moderate and severe pain

| Pain | Mild | Moderate | Severe | n (%) |
|------|------|----------|--------|-------|
| Did not do anything | 2 | 24 | 6 | 32 (20.80) |
| Gave pain killers | 6 | 32 | 4 | 42 (27.30) |
| Took them to dentist | 0 | 34 | 22 | 56 (36.4) |
| Respondents did not report to their parents | 4 | 18 | 2 | 24 (15.60) |
| Total | 12 (7.80) | 108 (70.10) | 34 (22.10) | 154 (100) |

### Table 6: Distribution of respondents with dental pain reporting impacts in mild, moderate, and severe pain

| Impacts | Mild | Moderate | Severe | n (%) |
|---------|------|----------|--------|-------|
| Difficulty in eating | 6 (3.9) | 56 (36.3) | 16 (10.3) |
| Difficulty in sleeping | 4 (2.6) | 22 (14.2) | 8 (5.2) |
| Absent from school | 0 | 4 (2.6) | 6 (3.9) |
| Could not not | 0 | 8 (5.2) | 0 |
| Still went to school | 0 | 4 (2.6) | 2 (1.3) |
| Could not smile due to pain | 0 | 2 (1.3) | 0 |

### Table 7: Reporting of impacts experienced due to dental pain according to gender

| Impacts | Males | Females | P |
|---------|-------|---------|---|
| More than one impact | 4 (2.6) | 12 (7.8) | 0.134 (NS) |
| One impact | | | |
| Difficulty in eating | 26 (16.6) | 52 (33.7) | |
| Difficulty in sleeping | 10 (6.5) | 24 (15.5) | |
| Absent from school | 4 (2.6) | 6 (3.9) | |
| Could not not | 4 (2.6) | 4 (2.6) | |
| Still went to school | 0 | 6 (3.9) | |
| Could not smile due to pain | 2 (1.3) | 0 | |

Chi-square test P=0.05; proportion of impacts between males and females irrespective of individual impacts. NS=Not significant
should be investigated further, although sequelae of caries are the most likely reason for dental pain.

We used questionnaires in our study to obtain the data. However, it is obvious that structured self-administered questionnaires as applied in this study have certain limitations. Bias due to social desirability, acquiescence and lack of recall are frequently encountered with children. Self-reported dental pain is subject to misclassification because children fail to identify the pain as dental in origin and might include other conditions in their reports. Furthermore, other variables such as dentition status, parents' education, their socioeconomic status, and geographical areas were not measured and/or considered in this study.

In the present study, a major proportion of the students had problems in eating and sleeping, and it can be assumed that these are more likely to perceive the need for oral health care than the rest. Few studies in the literature state that factors like exfoliating teeth and spaces due to unerupted permanent tooth contribute to the high incidence of impacts. The findings of the present study can be taken more seriously since the study subjects have more or less crossed the exfoliation periods and with maturity and increase in age, there is a better understanding and perception about health and illness. Measuring impacts on daily functioning are more objective and reliable than measuring reported health problems or symptoms which are more influenced by individuals' perception and interpretation. The recall periods considered in the study and discussion do vary, but the objective of the study was to assess the prevalence of dental pain and its impacts. Even dental pain in shorter recall period has some impacts in students' daily life. However, the psychosocial impacts of oral disorders tend to vary from individual to individual, even though the severity of their clinical conditions remains the same.

CONCLUSIONS

The prevalence of dental pain among 12–15-year-old school students was found to be high. However, the severity of pain experienced was not. This means that quality of life was affected at milder and moderate levels of dental pain when assessed after 6 months interval. Difficulty in eating and sleeping were the most common impacts observed. Leh, being a remote area where the availability and accessibility for oral health is compromised, the focus should be more on prevention of oral diseases. Knowledge about the magnitude of dental pain can be used to evaluate and plan preventive and curative services. Efforts should be directed to create awareness among the school children to enable them to lead a life of good quality.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. United Nations. Main Page, International Day of the World's Indigenous Peoples 9 August. Available from: http://www.un.org/en/events/indigenousday. [Last accessed on 2014 Nov 20].
2. Smith K, Kruger E, Dyson K, Tennant M. Oral health in rural and remote Western Australian indigenous communities: A two-year retrospective analysis of 999 people. Int Dent J 2007;57:93-9.
3. Shepherd MA, Nadanovsky P, Sheiham A. The prevalence and impact of dental pain in 8-year-old school children in Harrow, England. Br Dent J 1999;187:38-41.
4. Ratnayake N, Ekanayake L. Prevalence and impact of oral pain in 8-year-old children in Sri Lanka. Int J Paediatr Dent 2005;15:105-12.
5. Nahweyiso N, Busingye J, Whitworth J, Robinson PG. Dental treatment needs of children in a rural subcounty of Uganda. Int J Paediatr Dent 2004;14:27-33.
6. Kiwanuka SN, Aström AN. Self-reported dental pain and associated factors in Ugandan schoolchildren. Nor Epidemiol 2005;15:175-82.
7. Goes PS, Watt R, Hardy KG, Sheiham A. The prevalence and severity of dental pain in 14-15 year old Brazilian schoolchildren. Community Dent Health 2007;24:217-24.
8. Dandi KK, Rao EV, Margabandhu S. Dental pain as a determinant of expressed need for dental care among 12-year-old school children in India. Indian J Dent Res 2011;22:611.
9. Shailee F, Girish MS, Kapil RS, Nidhi P. Oral health status and treatment needs among 12- and 15-year-old government and private school children in Shimla city, Himachal Pradesh, India. J Int Soc Prev Community Dent 2013;3:44-50.
10. LADHC-Leh. Leh, District Profile. Available from: http://www.leh.nic.in/pages.leh.pdf. [Last accessed on 2015 Jan 15].
11. Population Census; 2011. Available from: http://www.census2011.co.in/census/district/621-leh.html. [Last accessed on 2015 Jan 15].
12. Malmo University. Oral Health Database. Training-oral-health-workers-to-provide-basic-dental-care-in-Ladakh-India. Available from: http://www.mah.se/CAPP/Country-Oral-HealthProfiles/SEARO/India/Information-Relevant-to-Oral-Health-and-Care/Special-project-of-interest. [Last accessed on 2015 Jan 18].
13. Nomura LH, Bastos JL, Peres MA. Dental pain prevalence and association with dental caries and socioeconomic status in schoolchildren, Southern Brazil, 2002. Braz Oral Res 2004;18:134-40.
14. Jiang H, Petersen PE, Peng B, Tai B, Bian Z. Self-assessed dental health, oral health practices, and general health behaviors in Chinese urban adolescents. Acta Odontol Scand 2005;63:343-52.
15. Mashoto KO, Aström AN, David J, Masalu JR. Dental pain, oral impacts and perceived need for dental treatment in Tanzanian school students: A cross-sectional study. Health Qual Life Outcomes 2009;7:73.
16. Slade GD. Epidemiology of dental pain and dental caries among children and adolescents. Community Dent Health 2001;18:219-27.
17. Mittal M, Dwivedi S, Vashisth P, Jaiswal D. Prevalence and impact of oral pain in 8-year-old children in India. J Dent Sci Oral Rehabil 2012;3:37-40.
18. Sudeep CB, Sequeira PS, Jain J. Oral health related quality of life among 12-15 year old children residing at orphanages in South India – A descriptive study. Br J Res 2014;1:053-62.
19. Fink R. Issues and problems in measuring children’s health status in community health research. Soc Sci Med 1989;29:715-9.