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# **Evaluation of the effects of dental fluorosis (DF) on the oral health related life quality between 11–14 years school children in Peshawar, Khyber Pakhtoonkhwa**

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**Abstract**---Background: Teenagers' classroom absences were correlated with oral health issues including dental problems. In contrast to severe traumas, gingivitis and periodontal disease have been shown to have a negative effect on Oral Health-related Quality of Life (OHRQoL) in teenagers. Objective: The research's objective was to evaluate how Dental fluorosis

affected kids aged 11 to 14 in terms of their quality of life and condition-specific oral influence on daily performance. **Methods:** This cross-sectional study was conducted Between February 2021 and March 2022, to examine the effects of DF on OHRQoL among students aged 11 to 14 in Peshawar's fluoridated areas. 240 Peshawar-based school children between the ages of 11 and 14 took part in the research. **Results:** The mean CS OIDP score for high fluoridated areas was 38.84. Additionally, it demonstrates that students struggle most with socialising (7.87), which has the highest mean score, and eating (3.14), which has the lowest mean score. **Conclusion:** The findings of this research can serve as a warning to dental to conduct demographic research at the town and county level to identify risk variables and determine potential treatments and prevention methods.

**Keywords---**dental fluorosis, high fluoridated areas, low high fluoridated areas, dental care.

## Introduction

Diagnostic assessments are linked to data collected via the use of standardised and validated surveys in order to figure out how oral problems affect a person's oral health-related quality of life (OHRQoL) [1-2]. The authors found that Child performance on the CPQ<sub>11-14</sub> had a respectable consistency and that OHRQoL had a significant effect [3]. By using a questionnaire and a self-applied assessment, Goursand *et al.* (2008) and Barbosa *et al.* (2009) evaluated the Portuguese language version of the CPQ<sub>11-14</sub> for cross-cultural cohesiveness [4,5].

Teenagers' classroom absences were correlated with oral health issues including dental problems [6]. In contrast to severe traumas, gingivitis and periodontal disease have been shown to have a negative effect on OHRQoL in teenagers [7-9]. Almost same pattern was seen in research on misaligned teeth, which were linked to incidents of school-based bullying [10,11]. Several studies have investigated the relationship of dental caries and fluoride intake on teenagers' OHRQoL in locations with synthetic fluoridation. These findings suggest that dental caries greatly reduces OHRQoL compared to incredibly mild dental fluorosis (DF) [12-14].

Teenagers who lived in the area of Itapoa community in Brazil's Regional Government, in the nineties and had restricted access to dental care, were more than the average person to have experienced fillings and to have some extent of fluorosis. This condition is brought on by cumulative fluoride exposure beginning at a young age and includes using standard fluoride toothpaste, drinking fluoridated water, and eating meals cooked with fluoridated water [15-17]. The research's objective was to evaluate how DF affected kids aged 11 to 14 in terms of their quality of life (QOL) and condition-specific oral influence on daily performance (CS-OIDP).

## Material and Methods

This cross-sectional study was conducted Between February 2021 and March 2022 in Rehman College of Dentistry, Peshawar, to examine the effects of DF on OHRQoL among students aged 11 to 14 in Peshawar's fluoridated areas. After educating participants on the necessity for and purpose of the study, mom and dad of all enrolled kids ages 11 to 14 signed a written consent form. Adolescents lacking family consent form, stubborn kids, kids with chronic illnesses, kids with various developmental disorders were excluded.

240 Peshawar-based schoolchildren between the ages of 11 and 14 took part in the research. The school children were split into two categories based on their ages: Group 1 consisted of students between the ages of 11 and 12 who lived in low fluoridated areas (LFA), while Group 2 consisted of students between the ages of 13 and 14 who lived in high fluoridated areas (HFA). After identifying the impacted locations, drinking water from the sampling sites were taken from taps and wells and delivered to the laboratory for fluoride analysis. The research was then done based on the results of the fluoride content analysis. The findings were presented in mg/L.

To evaluate OHRQoL, the CS-OIDP assessment would be included. There were two primary components on the survey questions: The observed changes would be investigated in the fluorosis portion of the CS-OIDP assessment if the respondent indicated yes to the inquiry concerning tooth colour change in the oral complication part. Eight functions are described in this classification, which is broken into three different classifications: psychological, physical, and social. In person interviews, the interviewer filled out the forms. The CS-OIDP indicator is determined by dividing the total of functional scores by the highest rating that can be earned. Ultimately, the completed surveys were layered, input into an Excel worksheet, and the findings were retrieved using SPSS software 20 edition and Pearson's test was performed.

## Results

There were 34 (28.33%) men and 86 (71.67%) women in the present research who had HFA, compared to 46 (38.34%) men and 74 (61.66%) women who had LFA [figure 1]. In HFA, more research participants with the age group of 13 years (n=22; 36.67%) had mild DF than the research participants with the age group of 14 years (n=27; 45%), who all had mild fluorosis [Table 1]. According to Table 2, the mean CS OIDP score for HFA was 38.84. Additionally, it demonstrates that students struggle most with socialising (7.87), which has the highest mean score, and eating (3.14), which has the lowest mean score.

According to Table 3, study participants under the age of 13 had the most trouble engaging in school-related pursuits, which were accompanied by socialising, smiling, and speaking clearly. By contrast, students over the age of 14 had more trouble engaging in everyday routines, with the most trouble being in school-related tasks, which were followed by socialising, smiling, exercising emotional

maturity, and calming. The findings for each of the CS OIDP subdomains indicated were meaningful (P value less than 0.05). Table 4 demonstrates that 29 and 15 research participants aged 13 and 14 who participated in HFA expressed significant shame over the state of their teeth. The majority of research participants (n=40 and n=37), 11- and 12-year-old schoolchildren who resided in LFA, did not feel self-conscious about the state of their teeth. Similar to this, the majority of study participants (n=28 and n=26) from the HFA age group of 13 and 14 years—were significantly concerned about the look of their teeth, but nearly 49 and 46 study subjects from the LFA age group of 11 and 12 years were not at all concerned. Due to this, the majority of study participants (59 and 54) who lived in the LFA age group of 11 and 12 years weren't at all embarrassed or constrained their laughing because of the looks of teeth, in contrast to more over half of the study subjects (29 and 30) from the HFA age group of 13 and 14 years. Several of the research participants, 13 and 14-year-olds living in HFA thought that their teeth were noticeably discoloured, whereas none of the participants in LFA expressed the same worry. DF and OHRQoL have a negative connection, as seen in Table 5. The efficiency of patients living in HFA in their everyday routines declines as DF severity rises. Dental fluorosis, CS OIDP, and OHRQoL are all observed to be significantly correlated with one another. The connection here between CS OIDP score and OHRQoL is positive, as seen in Table 6. The QOL improves when performance in daily tasks improves. The relationship between dental fluorosis, CS OIDP, and OHRQoL was deemed to be statistically significant.

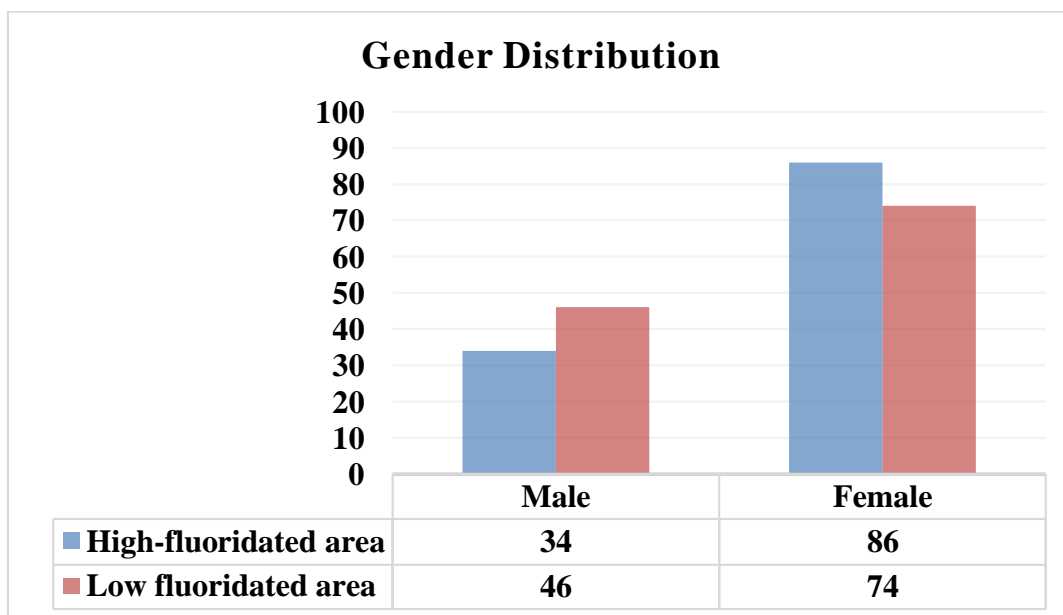


Figure 1: Details on the research subjects' characteristics (n=240)

Table 1: Dental fluoride intake prevalence among research participants in HFA (n=120)

DF grade	HFA	
	13 years, <i>n</i> (%)	14 years, <i>n</i> (%)
Normal	1 (1.66)	1 (1.66)
Questionable	7 (11.67)	6 (10)
Very mild	9 (15)	7 (11.67)
Mild	22 (36.67)	27 (45)
Moderate	18 (30)	14 (23.33)
Severe	3 (5)	5 (8.34)

Table 2: The research subjects' mean condition-specific oral influence values on daily operations and domains (HFA)

CS-OIDP index	Mean ± SD
CS-OIDP index (total score)	38.84±16.76
Eating	3.14±0.23
Talking obviously	5.11±0.34
Teeth cleaning	6.49±0.41
Relaxing	6.10±0.43
Emotional control	6.27±0.41
Laughing without being embarrassing	7.31±0.31
School doings	7.53±0.31
Socializing	7.87±0.39

Table 3: DF and condition-specific oral effects on ongoing performance domains: A Spearman relationship

CS-OIDP and domains	DF concentration at HFA			
	13 years age group		14 years age group	
	<i>r</i>	<i>P value</i>	<i>r</i>	<i>P value</i>
CS-OIDP index (total score)	0.27	0.03	0.32	0.02
Eating	0.9	0.43	0.8	0.41
Talking clearly	0.30	0.01	0.24	0.04
Teeth cleaning	0.16	0.18	0.17	0.16
Relaxing	0.23	0.04	0.28	0.02
Emotional control	0.24	0.04	0.25	0.03
Smiling without being embarrassing	0.28	0.01	0.32	0.02
School actions	0.32	0.02	0.35	0.004
Socializing	0.27	0.04	0.31	0.02

Table 4: factors influencing research participants' lifestyle quality who live in HFA and LFA

Questions	Group 1		Group 2	
	11 years age group	12 years age group	13 years age group	14 years age group
How have your teeth's look affected you?				
I feel quite embarrassed.	0	0	9	5
Significant embarrassment	9	6	15	29
Nearly embarrassment	3	8	11	9
Just a little embarrassment	8	9	12	11
Absolutely no embarrassment	40	37	13	6
Have your teeth's condition prevented you from grinning?				
A lot	0	4	12	14
Considerably	1	2	29	30
Somewhat	0	0	2	2
Absolutely not	59	54	17	14
Have you ever been concerned about the way your teeth looked?				
Appropriate worried	3	4	24	23
Extremely concerned	5	6	26	28
a little concerned	3	4	10	9
Almost not worried	49	46	0	0
Are my teeth?				
Very pleasant	49	51	0	0
Slightly nice	5	2	0	0
Both unpleasant and nice	5	4	31	29
Slightly-very unpleasant	0	0	0	0
Fairly straight	0	0	15	17
Equally very stained	0	0	13	14
Very strong	1	3	0	0
Neither healthy nor pathetic	0	0	0	0

Table 5: DF and condition-specific oral impacts on daily evaluation and OHRQoL in HFA were correlated by Pearson's test

OHRQoL		
	r	P value
Dental fluorosis	-0.279	0.003*
CS-OIDP	-0.227	0.019*

Table 6: Pearson's association between the oral influence of a disease's symptoms on daily functioning and the LFA's OHRQoL

OHRQoL		
	r	P value
CS-OIDP	0.629	0.001

## Discussion

Physiological, economic, and psychiatric aspects are all seriously impacted by oral health issues [18]. Only primary health can represent or be used to evaluate oral health. Nevertheless, issues with oral hygiene can also lead to physical, psychological, and social aspects. These modifications may have an impact on peoples' OHRQoL [19,20].

In the present research, 34 males and 86 females from HFA, while 46 males and 74 females from LFA participated in the study. While research in Thailand, Muradnagar, and AQ5 found 46.5% women, 54.5% men, and 53.2% women, correspondingly, and a research in Karnataka found 49.3% of women and 51.7% of men [21-23]. This could be explained by the fact that there are roughly equal numbers of girls and boys applying for school entrance in several regions.

The findings of this study showed that DF decreases children's everyday activities and OHRQoL. The majority of the participants had mild to moderate dental fluorosis, which adversely effected their normal tasks. According to this survey, the actual average CS OIDP rating was 38.84 out of 100. Communicating effectively and interacting with others were the two areas where issues were most and fewest prevalent. It was discovered that even among study participants living in HFA, everyday performances fall as DF intensity rises, reducing the tooth-related QOL. While there were no participants in the severe grade of DF in the research by Nilchian et al. conducted in 2018 in Iran, DF intensity was equitably spread across all categories in the current investigation. This could happen because there is more fluorosis than in a previous research in the drinking water or other additives [24]. The mean CS OIDP score was 22.9 out of 100, according to the results of a 2018 report by Nilchian et al. The school activities and dental hygiene domains had the most and least complaints, however, In our research, the mean CS OIDP score was 39.85 out of 100. Speaking properly and interacting with others presented the most and smallest problems, accordingly.

In the latest research, the majority of respondents reported having trouble largely with socialising, with a maximum mean score (7.87) and a least mean score (3.14), respectively. In our study, the majority of study participants between the ages of 12 and 15 in HFA expressed significant embarrassment about the state of their teeth, while study participants in LFA showed no signs of discomfort. These findings are consistent with the current investigation. Additionally, it was noted that most study participants had dental fluorosis, which had either somewhat or not at all irritated them or restricted their ability to grin. A few participants in the study were self-conscious about how they looked, and most of them thought their teeth were rather white. Since more than 50 % of students who lived in HFA were self-conscious about their appearance and avoided smiling, the results of this study are entirely different from those of the current study. In HFA, 13 and 14-year-old study participants reported that their teeth are moderately to severely discoloured. The likely cause of the inconsistent results between the two research could be because the trials were performed at different times or in different years [25].

DF and OHRQoL are negatively correlated in the current study. The efficiency of patients living in HFA in their normal tasks declines as DF severity rises. Dental fluorosis, CS OIDP, and OHRQoL are all observed to be significantly correlated with one another. DF had no discernible negative effects on looks or psychological response, according to Nilchian et al. These findings don't match up with each other, which may be a consequence of the original study very mild cases of DF [24]. The OHRQoL of research participants who live in LFA has a favourable link with their CS OIDP level in the proposed investigation. The QOL improves when efficiency in normal activities improves. Dental fluorosis, CS OIDP, and OHRQoL are all observed to be significantly correlated with one another.

### Conclusion

DF affects daily routines and lowers OHRQoL, which has an impact on one's overall health. In this research, gender had no bearing on the QOL conditions or condition-specific effects. With the exception of a small number of participants who experienced difficulty doing everyday tasks because of malocclusion, practically all participants in the study in LFA did not experience poor QOL.

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