

## Prevalance of Dentin Hypersensitivity In Bihar And Jharkhand- A Multicentric Pilot Study

### ABSTRACT

**Aim:** Dentine hypersensitivity is a common oral problem. This pilot study investigated the prevalence of dentine hypersensitivity in the diverse population across four centres of Bihar and Jharkhand.

**Materials and Methods:** A multi-stage, random sampling method was used to investigate the study population. A total of 5622 subjects were examined at four centres in Bihar and Jharkhand. Subjects were divided into 8 age groups. Participants completed a dentine hypersensitivity questionnaire and underwent clinical examination. The diagnosis of dentine hypersensitivity was confirmed. Gingival recession of sensitive teeth was measured by a Williams periodontal probe.

**Results:** Among 5622 subjects, 1253 were found to be suffering from dentin hypersensitivity indicating a prevalence of 22.28%. Females were more prone to dentin hypersensitivity with male to female ratio of 1:1.31. While subjects in age group of 50-59 were predominantly affected, the molars and premolars were commonly affected with dentin hypersensitivity.

**Conclusion:** The prevalence of dentine hypersensitivity in East India was 22.28%, indicating that it is a common condition. For its effective management, public education about the condition and effective treatment of dentine hypersensitivity are required.

**Clinical Significance:** Assessment of prevalence of hypersensitivity in this demographical location would enable the dental care health workers to devise strategies to educate masses about the prevention and management of this disease

**KEYWORDS** Prevalance; Dentin; Dentin Hypersensitivity; Male; Female.

### Introduction:

Canadian advisory board on dentin hypersensitivity defines dentinal hypersensitivity, as a short, sharp pain that arises from exposed dentin in response to stimuli (typically thermal, evaporative, tactile, osmotic or chemical) and that cannot be ascribed to any other form of dental defect or pathology. [1] It is a significant clinical problem where the patients suffering from it have reported initiation of pain by intake of extremely cold or hot drinks, during tooth brushing and/or intake of sweet foods. [2] Dentine hypersensitivity occurs due to the reaction of a stimuli to the pulp-dentine complex. The stimuli can be either mechanical or immunological. Sometimes these stimuli induce a neurogenic inflammation of the pulp. [3]

Scientific literature reveals a variation in prevalence of dentin hypersensitivity ranging from 1.34% to 74% [4-18] which can be attributed to a plethora of factors which might include

demographic, socio economic status and awareness towards treatment. Moreover the type of methods used to diagnose the condition, variation in the consumption of erosive drinks and medical condition could also alter its prevalence. [2]

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Studies of dentine hypersensitivity in India are limited. Reviewing the dental literature, no study was found to address dentine hypersensitivity among east Indian population. Hence the aim of this study was to explore the prevalence of dentine hypersensitivity and the pattern of risk indicators among adults across four centres in Bihar Jharkhand.

### Materials and Methodology:

#### Subject population:

The present study was conducted across four centres in Bihar and Jharkhand namely Dental Institute, RIMS, Ranchi, Jharkhand, Community Health Center, Ormanjhi, Jharkhand, Buddha Institute of Dental Sciences and Hospital (BIDSH), Patna, Bihar and Sarjug Dental College and Hospital, Darbhanga, Bihar after obtaining permission from the Institutional Ethical Committee.

The study was conducted on 5622 subjects out of whom 2556 were males and 3066 females ranging between 11-89 years of age (Table 1). Subjects with less than 24 teeth or those who had undergone periodontal therapy or were on antibiotic or anti inflammatory therapy within the past six months were excluded from the study. The participants were in good general health as estimated by a health questionnaire.

The study population was divided into 8 groups of 11-19 years, 20-29 years, 30-39 years, 40-49 years, 50-59 years, 60-69 years, 70-79 years and 80-89 years. Prior to the clinical examination all subjects were provided with a questionnaire regarding their personal details.

Data such as gender, age, educational level (primary, secondary, college, and university), occupation status, teeth affected by hypersensitivity, any factor that initiated the sensitivity (cold/hot drinks, cold/hot food, sour stimuli, tooth brushing, sweet food) and the last visit to the dentist was charted.

#### Clinical Examination:

Clinical examination consisted of drying the teeth and gingiva with compressed air gently and the patients were asked if they had any sensitivity. In case of a positive response, the diagnosis of DH was confirmed using a blast of air from a syringe of dental unit. If the response was doubtful, cold test was used to confirm DH where a piece of cotton impregnated in cold water was used to confirm the definitive diagnosis of DH.

A William's probe (PCP 10-SE, Hu-Friedy Mfg. Co. Inc., Chicago, IL, USA) was used to access levels of recession in the teeth affected with DH.

### Results:

Under the limitations of the study, it was observed that 22.28% of the total subjects (n=5622) were suffering from dentin hypersensitivity. Samples divided into 8 groups based on their age as mentioned in Table 1. SPSS version 21.0 was used for data analysing.  $P < 0.05$  considered with 95% CI (confidence interval) in the study. Student's T- test was used to analyze the difference in mean values, and chi-square test was utilized for categorical data. Significant difference was accepted at  $P < 0.05$ . There is statistically non significant difference between all the four groups ( $p = 0.993$ ) as represented in table 4. It implies that the selected population is homogeneous which shows the population selected is not biased. Hence the sample selection is accurate.

Graph 1 represents the distribution amongst genders at the four centres. It was seen that Females are in majority in all the four groups with female study population highest in BIDS Patna.

Out of the total 5622 patients, 1253 subjects (711 females and 542 males) were found to be suffering from DH as represented in Table 2 and Table 3. Results from our study imply that females are more affected by dentin hypersensitivity than males. There is statistically highly significant difference in dentin hypersensitivity in females ( $p = 0.001$ ) in Dental institute RIMS, BIDSH Patna and Sarjug Darbhanga. Also there is statistically significant difference in dentin hypersensitivity in males in all the four groups. This suggests there is association between dentin hypersensitivity and gender as mentioned in Table 5 and Graph 2. Females are suffering more from DH especially age group 50-59 years (Group 5) as compared to males.

Table 6 and 7 elaborates the type and the average number of teeth affected from dentinal hypersensitivity. It can be concluded that in females group 2, group 4 and group 8 had maximum number of teeth affected with DH and posterior teeth were commonly involved. In males group 2,3,4 and 8 were majorly affected with DH with molars and premolar teeth more frequently involved.

There is statistically highly significant difference ( $p=0.001$ ) on comparison of type and teeth affected in three of the groups in females and statistically significant difference in all the four groups and males. This suggests that type and teeth affected are associated equally among males and females. (Table 8).

Etiology of DH was also ascertained from the subjects table 9 and graph 3. Abrasive tooth paste use and improper tooth brushing were the most common reasons for the etiology of Dentin Hypersensitivity. Food related habits and myth were observed as least causing etiology for Dentin hypersensitivity. Lack of visit to dental setups and less orientation towards oral hygiene maintenance also contributed towards DH.

### Discussion:

Holland GR et al [19] stated that dentinal hypersensitivity is diagnosed by means of a patient's self report of pain, the results of the evaluation of patient's response to stimulation and the exclusion of other dental and periodontal conditions thereby making it a diagnosis by exclusion.

The present study was aimed to assess the incidence of hypersensitivity in east India. We conducted the study on 5622 subjects divided into 8 groups aged between 11 years and 89 years using a combination of questionnaire and clinical examination. We used a multi-stage, stratified, random sampling method that balanced the number of participants and to reduce bias in the results. The result of our study indicated that 1253 of the 5622 participants were suffering from hypersensitivity making the prevalence of DH to about 22.28%. Results from other studies showed that the incidence of DH is between 2.8% to 57.2% [2,4,6,9-11,16-18] making our findings near the low end of previous studies.

This can be attributed to the fact that no specific approach was followed to identify participants who had pain or sensitivity. The authors relied on the participant's perception towards pain for identifying a positive result. Their perception was then correlated with the results of clinical examination to eliminate other potential causes of pain. This advantage of this strategy was that it presented with a more conservative approach but had a pitfall of eliminating those subjects who had greater pain threshold. Moreover, this approach helped to identify those subjects for whom dentin hypersensitivity was a self-perceived problem making our methodology consistent

with Holland GR [19] who stated dentin hypersensitivity as a spontaneously reported problem and is a diagnosis of exclusion.

The present study concluded that 50-59 year old age group had the highest prevalence of dentine hypersensitivity, followed by the 60-69 and 40-49 year age groups. Other studies have also reported the relationship between the prevalence of dentine hypersensitivity and age. Fischer et al [20] and Rees et al [6] in their studies found a high prevalence in the 41-50 year old age group whereas Graf and Galasse et al [21] found that dentine hypersensitivity occurred mostly in the 25-29 age group.

In the present study the male to female ratio of DH was 1:1.31, which was in line with the study conducted by Orchardson et al [22]. Rees and Addy [2] reported a ratio of 1:2.5. Other studies [2,4,10,16] also concluded that women are more susceptible to dentine hypersensitivity than men.

The results of our study were in accordance with the works of Rees JS et al [4], Liu HS et al [10], Fisher C et al [20], Orchardson R et al [22], Flynn J et al [23] and Addy M et al [24] who observed that premolars and molars were the most susceptible for DH.

Haneet RH [25] conducted a similar study on 404 patients in Karnataka and observed that 20% of the subjects suffered from DH. They also concluded that DH was significantly correlated with gingival recession, labioversion and abrasion/erosion with a higher predilection for DH in the age cohort 36-45 years and in female subjects.

However, Rane P et al [26] conducted a study in Maharashtra and found a varied result. They examined 960 patients including 528 males and 432 females and observed a prevalence of dentine hypersensitivity at 42.5% and more common among the male population (60.8%) and the peak age was between 30 to 39 years (39.2%). Lower anteriors were commonly involved (35.8%) and cold drinks (25.8%) are the main aggravating factor in their study while 6.5% of subjects experienced it all the time but still some do not take preventive measures. Mahajan G et al [27] in a similar study in Punjab, India reported a prevalence of DH at 64.2% with lower premolar being most at risk.

Conflicting results from other different studies could be due to differences in demography, education, habits and customs of sample subjects.

**Conclusion:**

Within the limitation of the present study, it could be concluded that the prevalence of dentin hypersensitivity in Jharkhand and Bihar was approximately 22.28% with females being more prone to it. While subjects in age group of 50-59 were predominantly affected, the molars and premolars were commonly affected with dentin hypersensitivity. Improper Brushing technique and use of abrasive toothpastes were the predominant reason for increased incidence of DH. For its effective management, public education about the condition and effective treatment of dentine hypersensitivity are required.

Table 1: Total Participants

CENTRE	FEMALE	MALE	TOTAL
DENTAL INSTITUTE, RANCHI	885	778	1663
CHC, ORMANJHI	315	222	537
BIDSH, PATNA	1069	906	1975
SARJUG, DARBHANGA	797	650	1447
TOTAL	3066	2556	5622

Table 2: Subjects With Dentin Hypersensitivity

Gp	Age (Yrs)	DENTAL INSTITUTE, RANCHI			CHC, ORMANJHI			BIDSH, PATNA			SARJUG, DARBHANGA		
		Total Patients	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male
I	11-19	34	18	16	07	05	02	29	15	14	18	11	07
II	20-29	42	23	19	15	07	08	58	37	21	39	23	16
III	30-39	48	33	15	16	09	07	67	43	24	50	27	23
IV	40-49	62	32	30	18	11	07	85	49	36	66	39	27
V	50-59	81	46	35	26	16	10	111	64	47	90	52	38
VI	60-69	59	33	26	09	05	04	53	29	24	43	22	21
VII	70-79	12	05	07	06	03	03	37	17	20	22	12	10
VIII	80-89	05	01	04	05	02	03	25	13	12	14	09	05
		344	191	153	102	58	44	465	267	198	342	195	147

Table 3: Subjects With Dentin Hypersensitivity

	DENTAL INSTITUTE, RANCHI	CHC, ORMANJHI	BIDSH, PATNA	SARJUG, DARBHANGA	TOTAL
FEMALE	191	58	267	195	711
MALE	153	44	198	147	542
TOTAL	344	102	465	342	1253

Graph 1: Distribution of Male and Female in the Study Population

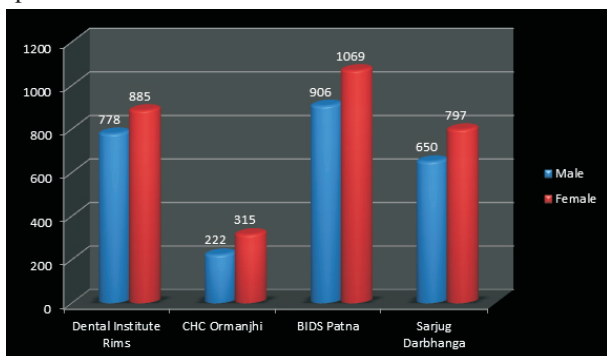


Table 4: Distribution of Study Population According to age Group and Gender

Age Groups	Dental institute RIMS		CHC Ormanjhi		BIDSH, Patna		Sarjug Darbhanga	
	Male	Female	Male	Female	Male	Female	Male	Female
11-19 yrs	126 (16.4%)	107 (12.09%)	27 (12.16%)	41 (13.01%)	73 (8.05%)	83 (7.76%)	72 (11.07%)	97 (12.1%)
20-29 yrs	122 (15.6%)	133 (15.02%)	35 (15.7%)	46 (14.6%)	120 (13.24%)	143 (13.3%)	86 (13.2%)	109 (13.6%)
30-39 yrs	131 (16.8%)	117 (13.2%)	33 (14.8%)	39 (12.3%)	125 (13.7%)	168 (15.7%)	106 (16.3%)	106 (13.2%)
40-49 yrs	136 (17.4%)	157 (17.7%)	35 (15.7%)	48 (15.23%)	173 (19.08%)	188 (17.5%)	109 (16.7%)	114 (14.3%)
50-59 yrs	117 (15.3%)	168 (18.4%)	44 (19.8%)	65 (20.63%)	116 (18.3%)	193 (18.05%)	112 (17.2%)	149 (18.6%)
60-69 yrs	108 (13.8%)	159 (17.9%)	36 (16.3%)	52 (16.5%)	195 (21.5%)	243 (23.7%)	136 (20.9%)	174 (21.8%)
70-79 yrs	15 (1.9%)	32 (3.2%)	8 (3.6%)	17 (5.39%)	41 (4.5%)	33 (3.08%)	27 (3.2%)	29 (3.6%)
80-89 yrs	13 (1.6%)	12 (1.3%)	4 (1.8%)	7 (2.22%)	13 (1.43%)	18 (1.68%)	8 (1.2%)	19 (2.8%)

(Where:  $\chi^2 = 0.750$ ;  $p = 0.993$ ;  $df = 6$ )

Table 5: Study Population With Dentin Hypersensitivity

Group	Mean±SD	SEM	t test	df	pvalue
Dental Institute RIMS				7	0.003(S) 0.001(HS)
Male	19±10.82	3.82	4.96		
Female	23.8±15.29	5.40	4.41		
CHC Ormanjhi				7	0.012(S) 0.003(S)
Male	5.50± 2.87	1.017	5.404		
Female	7.25±4.62	1.63	4.43		
BIDSH				7	0.015(S) 0.001(HS)
Male	24.75±11.57	4.09	6.04		
Female	33.37±18.23	6.44	5.17		
Sarjug				7	0.021(S) 0.001(HS)
Male	18.37± 11.16	3.94	4.65		
Female	24.37±14.92	5.27	4.61		

Graph 2: Distribution of Study Population with Dentin Hypersensitivity

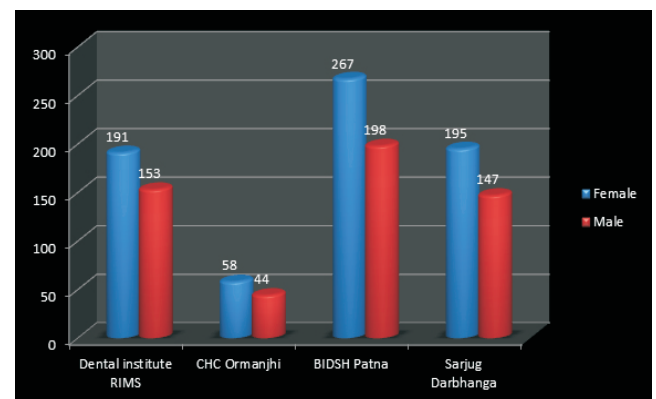


Table 6: Average Number of Teeth Affected In Female

Group	Age (Yrs)	DENTAL INSTITUTE	CHC, ORMANJHI	BIDSH PATNA	SARJUG DARBHANGA
I	11-19	2.53	1.53	1.09	2.53
II	20-29	4.53	1.89	1.34	4.34
III	30-39	4.04	3.33	3.12	4.14
IV	40-49	4.34	4.12	5.67	4.67
V	50-59	3.96	3.56	4.45	4.03
VI	60-69	3.48	3.23	3.96	3.57
VII	70-79	2.48	2.66	3.12	2.48
VIII	80-89	4.45	3.35	2.33	3.89

Table 7: Average Number and Type of Teeth Affected In Maless

Group	Age (Yrs)	DENTAL INSTITUTE	CHC, ORMANJHI	BIDSH PATNA	SARJUG DARBHANGA
I	11-19	2.13	2.98	3.12	2.89
II	20-29	3.96	3.57	3.44	3.34
III	30-39	3.48	3.36	3.87	3.67
IV	40-49	4.41	4.34	4.45	4.78
V	50-59	5.12	4.46	4.23	4.12
VI	60-69	3.44	3.67	3.87	3.99
VII	70-79	3.38	3.90	3.85	3.45
VIII	80-89	2.57	2.67	3.02	2.12

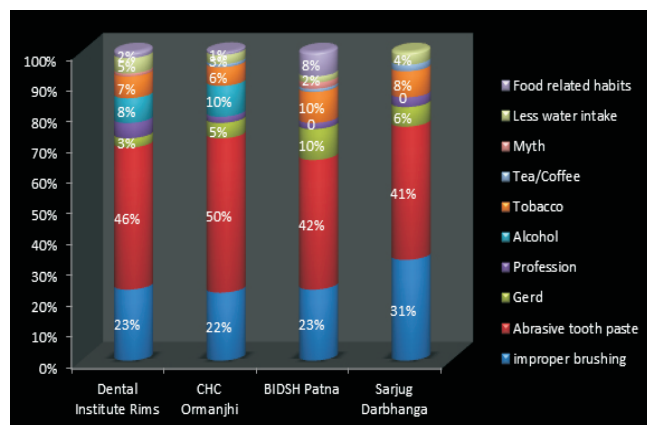
Table 8: Comparison of Type and Teeth Affected

Groups	Mean±SD	SEM	df	T test	p value
Dental Institute RIMS Male	3.56±0.95 3.72±0.82	0.291 0.337	7	10.53 12.8	0.032(S) 0.001(HS)
Female					
CHC Ormanjhi Male	3.61±0.62 2.95±0.87	0.219 0.309		16.52 9.57	0.023(S) 0.011(S)
Female					
BIDSH Male	3.73±0.504 3.13±1.55	0.178 0.549		2.915 5.709	0.033(S) 0.001(HS)
Female					
Sarjug Male	3.54±0.808 3.7±0.807	0.28 0.29		12.34 12.98	0.003(S) 0.001(HS)
Female					

Table 9: Etiology of Dh As Interviewed From Subjects

	DENTAL INSTITUTE	CHC, ORMANJHI	BIDSH PATNA	SARJUG DARBHANGA
IMPROPER BRUSHING	23%	22%	23%	31%
ABRASIVE TOOTH PASTE	46%	50%	42%	41%
GERD	3%	5%	10%	6%
PROFESSION	5%	2%	2%	3%
ALCOHOL	8%	10%	0%	0%
TOBACCO	7%	6%	10%	8%
TEA/COFFEE	0%	1%	1%	2%
MYTH	1%	0%	2%	0%
LESS WATER INTAKE	5%	3%	2%	4%
FOOD RELATED HABITS	2%	1%	8%	5%

Graph 3 Etiology of Dentin Hypersensitivity As Interviewed From Subjects



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