

Prevalence, Pattern, and Pathology of Impacted Third Molars among Rural Population above 21 Years in Ambala District: An Observational Field Study

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Abstract

Background: The purpose of the study was to assess the prevalence, pattern, and pathology of impacted third molars among rural population above 21 years. **Materials and Methods:** The study was conducted for a period of 7 months to assess the oral health status of impacted teeth among rural population in Ambala district. A total of 1039 subjects were assessed for prevalence, pattern, and pathology of impacted third molars using Winter's classification to record the patterns of impacted third molars. Type III Dental Examination was performed. The data collected were entered into the Microsoft Excel sheet Version 14.4.7 and analyzed using SPSS Software Version 20.0. The statistical significance was determined by Chi-square test and the level of significance was set at $P < 0.05$. **Results:** Out of 3442 clinically visible third molar teeth, 2.9% (101) were impacted. Among 101 impacted third molars, 76.2% (77) were mandibular third molars and 23.8% (24) were maxillary third molars. About 16.8% (17) of impacted third molars were associated with dental caries, 58.4% (59) had pericoronitis, and 39.6% (40) were associated with pain. **Conclusions:** The frequency of impacted third molars in mandible was more than maxilla. Furthermore, impacted third molars were distributed in women more than men. Mesioangular pattern was the most commonly distributed pattern of impacted third molar.

Keywords: Impacted third molar, Pain, Rural population

INTRODUCTION

Maintenance of oral health is one of the important strategic steps for good general health and to enjoy quality of life. However, oral health is ever in danger because of many conditions and diseases. Impaction of teeth is one such condition which causes threat to oral health in population. Impacted teeth are those teeth which fail to develop or erupt to proper functional location.^[1] Various factors may contribute to impacted teeth which include ectopic eruption, soft tissue or bony pathologies, supernumerary teeth or tooth size, and jaw discrepancy.^[2] The third molars are the most commonly impacted teeth in the oral cavity. They may usually remain asymptomatic due to which the patients do not approach the dentist. The untreated impacted tooth left in the oral cavity may become pathologic over the passage of time.

Due to various socioeconomic and psychological barriers, people with impaction may not be able to come to the dental

hospital. Hence, a field study, especially in rural areas, may give us the true reflection of the pattern, prevalence, and pathology of the third molar impactions.

There are limited studies in exploring the pathology of impacted third molars and there is a remote possibility of a study conducted in North India. Therefore, an attempt has been made to assess the prevalence, pattern, and pathology of impacted third molars among rural population above 21 years in the Ambala district, Haryana, India.

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MATERIALS AND METHODS

The cross-sectional study was conducted for a period of 7 months between April 2016 and October 2016 after obtaining due permission from the Institutional Review Board and Institutional Ethical Committee bearing protocol number MM/DC/15/196(42) dated March 28, 2016.

The examiner was calibrated by the department faculty before final study to ensure proper interpretation, understanding, and applicability of codes and criteria. The self-structured format was calibrated using Kappa statistics^[3] and it revealed almost perfect agreement with value of $k = 0.88$. The sample size estimation was done using Online OpenEpi,^[4] Version 3, open-source calculator – SS Propor. The formula used was $n = [DEFF * Np(1-p)] / [(d^2 / Z^2_{1-\alpha/2} * (N-1) + p * (1-p)]$. 1039 was the obtained sample size by considering hypothesized frequency of outcome of 60% at 99.9% confidence limit.

Ambala district consists of three tehsils: Ambala, Naraingarh, and Barara. Stratified random sampling was used and a proportionate number of subjects were taken from each tehsil. Each subject was explained beforehand the objective of study and written consent was taken from all subjects enrolled in the study. Dental screening camps were arranged in the villages with prior announcement by the village headmen/sarpanch for better attendance in the camps. In each camp, apart from the research work, the subjects were examined for other oral conditions and were referred to the dental institution for further treatment. The armamentarium used was set of plain mouth mirrors, dental explorer no. 5, straight probes, disposable ice cream sticks, set of tweezers, kidney tray, enamel bowl, sterile cotton, cotton holder, disposable mouth mask, disposable gloves. Korsolex® (a chemical solution for cold sterilization) and hand sanitizer/disinfectant were additionally used to maintain asepsis during oral examination. Digital weighing machine was used to record weight in kg and a wall mounted measuring tape recorded height in m². Type III Dental Examination was performed.^[5] All the instruments were autoclaved before each study camp. Demographic details, history of medical condition, and information regarding body mass index (BMI) were entered on a structured format.

Criteria for selection of subjects

Inclusion criteria

Subjects who were aged above 21 years and gave written consent for enrolment were included in the study.

Exclusion criteria

Subjects who were <21 years and those who were completely edentulous were excluded from the study.

The WHO guidelines were followed for calculating BMI.^[6] BMI = Weight of individual (kg)/Height² (m).

For classification of impacted teeth, *Winter's classification* was adopted (Figure 1).^[7] *Winter's classification* is based on the inclination of the impacted third molar tooth to the long axis of the second molar.

Impaction type	The angle of M3's Long axis in relation to second molar	
Vertical	10° to -10°	
Mesioangular	11° to 79°	
Horizontal	80° to 100°	
Distoangular	-11° to -79°	

Figure 1: Impaction type and its long axis in relation to the second molar

1. Mesioangular: Long axis of 3rd molar bisects the long axis of 2nd molar at or above occlusal plane
2. Distoangular: Long axis of 3rd molar away from long axis of 2nd molar at the level of occlusal plane
3. Horizontal: Long axis of 3rd molar bisects long axis of 2nd molar at the right angle
4. Vertical: The long axis of the impacted tooth runs parallel to the long axis of the 2nd molar
5. Other Impactions.

Statistical analysis

The data so collected were entered into the Microsoft Excel sheet Version 14.4.7 and analyzed using SPSS Software Version 20.0 (Chicago, USA).^[8] The statistical significance was determined by Chi-square test and the level of significance was set at $P < 0.05$.

RESULTS

A total of 4156 third molar teeth were examined in the study. About 82.8% (3442) were clinically visible third molar teeth and 17.2% (714) were clinically missing. From 3442 clinically visible third molar teeth, 2.9% (101) were impacted and 97.1% (3341) had no impaction. In 101 clinically visible impacted third molars, 73.2% (74) were seen in 21–30 age group, while 21.8% (22) were in 31–40 age group and meager 5% (5) were distributed in 41–50 age group (Table 1). A non-significant correlation was found between age and impacted third molar ($P = 0.954$).

Out of total subjects with impacted molars, 40.6% (41) impactions were present in males and 59.4% (60) impactions were seen in females (Table 2) with a non-significant comparison ($P = 0.377$). Significant correlation was found

between BMI and impacted third molar ($P=0.018$) and among subjects with impacted teeth, 56.4% (57) had normal BMI, 36.6% (37) were pre-obese, 5% (5) were underweight, and 2% (2) fell in obese class (Table 3).

Comparison was drawn with intake of diet amongst subjects and it was seen that the prevalence of impacted third molar was more in those who 78.2% (79) consumed vegetarian diet and 21.8% (22) was the prevalence of impaction among mixed diet subjects. However, the association of the type of diet with impaction was non-significant ($P=0.719$).

Impaction was clinically detectable most commonly in 45.7% (46) mandibular left third molars, followed by 30.6% (31) in mandibular right third molars, 12.8% (13) in maxillary left third molars, and 10.9% (11) was the least distributed site in maxillary right third molars (Table 2).

Mesioangular impaction was the most frequently distributed pattern of impaction 56.4% (57), accompanied with 38.6% (39) vertical impaction and 5% (5) with distoangular impaction. None of the subjects reported horizontal and inverted impaction (Table 4).

Pathologies clinically detectable in impacted third molars comprised predominantly 58.4% (59) pericoronitis, with 39.6% (40) encountering pain, 20.8% (21) had ulceration, and 16.8% (17) complained of dental caries coupled with swelling 16.8% (17). Only 6.9% (7) complained of partial trismus with impacted teeth.

DISCUSSION

The most common impacted teeth in the oral cavity are the third molar which normally erupts at the age of 18–21 years.

Early detection, referral, and intervention are part of the primary level of prevention.^[9] The patients who come for extraction of impacted teeth form only the tip of iceberg of community problems. Therefore, this study was done to assess the prevalence of impacted third molars in the rural areas of Ambala district.

A total of 1039 subjects having a total of 4156 molars were examined in a span of 7 months of which 82.8% (3442) are clinically visible third molar teeth. The overall prevalence of impaction was drastically less in comparison with clinical evidence^[10-12] which may be due to geographical and cultural differences. The prevalence of impacted third molars in the present study decreased with the increasing age groups and the maximum impaction (73.2%) was observed in the 21–30 years age group. The results are similar to the results reported obtained from different geographical areas.^[2,12,13] About 40.6% of the impacted third molars were present in males and 59.4% in females which were less than those reported by Pokhare^[13] and Syed *et al.*^[2] but an exception was drawn by Goyal *et al.*,^[12] Singh and Dhungel,^[14] and Selvan *et al.*^[15] where males had slightly more impacted teeth compared to females. Thus, females had increased affinity of third molar impaction which was contrary to earlier evidence.

The reason for more impactions in females could be due to consumption of soft diet or nutritional deficiency which is more common in females. It has been found that impaction on the right side is less than impactions on the left side. This could be due to sufficient unilateral growth of mandible and maxilla on the right side because people chew more food and give exercise more on the right side of mouth as most of the population are right-handed eaters.^[15]

Most of the subjects with impacted third molars were vegetarians (78.2%) and an interesting observation was that those sustaining on mixed diet had less impacted teeth which was in stark contrast to the findings drawn from earlier research.^[12]

About 76.2% of the impacted third molars were more prevalent in mandibular arch which is similar to the study reported in the literature by Syed *et al.*^[2] but a strikingly different observation was drawn from a study where impacted teeth predominance was confined in maxillary arch.^[12] In the present study, out of

Table 1: Distribution of clinically visible impacted teeth according to age groups

Age groups	Total impacted teeth		Sig. (P-value)
	n (Frequency)	Percentage	
21–30	74	73.2	0.954
31–40	22	21.8	
41–50	5	5	
51–60	0	0	
61–70	0	0	

Table 2: Distribution of clinically visible impacted teeth according to arch, site, and gender

Gender	Arch				Total impacted teeth n% age		Sig. (<i>P</i> -value)
	Maxillary		Mandibular				
	Right third molar	Left third molar	Right third molar	Left third molar			
Gender							
Male	5	3	11	22	41	40.6	0.377
Female	6	10	20	24	60	59.4	
Total							
<i>n</i>	11	13	31	46	101	100	
% age	10.9	12.8	30.6	45.7			

Table 3: Distribution of clinically visible impacted teeth according to BMI

Body mass index (BMI)	Total impacted teeth		P-value
	n (Frequency)	Percentage	
Underweight<18.5	5	5	P<0.01
Normal range (18.5–24.9)	57	56.4	
Pre-obese (25–29.9)	37	36.6	
Obese≥30	2	2	
Total	101	100	

Table 4: Distribution of clinically visible impacted teeth according to the type of impaction

Type of impaction	n (Frequency)	Percentage
Vertical	39	38.6
Mesioangular	57	56.4
Distoangular	5	5
Horizontal	0	0
Inverted	0	0
Total	101	100.0

101 clinically impacted third molars, 56.4% had mesioangular impaction that was substantially high when compared with the study of Hashemipour *et al.*^[9] and Selvan *et al.*^[15] Nonetheless, the prevalence of mesioangular impaction was analogous to findings by Singh and Dhungel^[14] and Jaron and Trybek.^[16] One-third of the subjects (38.6%) had vertical impactions which was similar to observation obtained by Goyal *et al.*^[12] but higher when compared with a study of Hashemipour *et al.*^[9] Therefore, most of the impacted teeth were mesioangularly or vertically impacted.

Impacted molars are usually asymptomatic. Undiagnosed and untreated impactions can lead to conditions such as pain, swelling, cheek bite, periodontal pocketing, cellulitis, trismus, and dental caries on distal surface of the second molar or third molar itself or pericoronitis, sometimes causing chronic ulcerations on buccal mucosa, leading to potential malignant conditions.^[17,18] Pericoronitis was visibly most significant pathology associated with impaction and similar distribution trend was reported previously.^[19]

Dental caries was present in 16.8% of the impacted third molars in the present study which was less than findings reported by Selvan *et al.*^[15] and Yilmaz *et al.*^[20] About 58.4% of impacted third molars had pericoronitis which was slightly <62.5% quoted by Sabra and Soliman.^[17] The higher rate of pericoronitis in the study confirmed the previous study of Jamileh and Pedlar.^[21] Pain was present in 39.6% of the impacted third molars which was almost similar to findings by Yilmaz *et al.*^[20] Partial trismus was present in 6.9% of the impacted third molars similar to that quoted by Yilmaz *et al.*^[20] but was strikingly <51.8% quoted by Sabra and Soliman.^[17]

Therefore, the present study showed significant number of pathologies associated with impacted molars.

Removal of impacted teeth needs careful history, clinical and radiological examination, and expertise in oral surgery because of the nature and position of the impacted third molars since complications such as dry socket, infection, swelling, trismus, and paresthesia of inferior alveolar nerve can occur.^[22]

CONCLUSIONS

1. Out of total third molars examined during the study, 3% were found to be impacted. It is a considerable prevalence to accept it as a public health problem which needs population screening in the 21–30 years age group, so as to detect impactions at an early age to prevent complications such as pain, pericoronitis, pericoronal abscess, ulcer, and loss of working hours among the population
2. The basic health workers and grass root health workers can be educated in this regard to screen and refer the subjects for early management.

The limitation of the study was absence of IOPA X-ray facility on the field setup. Hence, the study results obtained could be slightly underscored.

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