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Prevalence of Mandibular Fractures in a Government Medical College at Ranchi

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Abstract

Context: The unique position, shape and structure of the lower jaw lead to its high incidence of fracture. The mandible is a membranous long bone bent to a horse shoe shape. Even though it is very strong, its prominent position on the face makes it vulnerable to fracture. The fracture can occur in different parts of the bone, sometimes at multiple sites too, depending upon the nature of the impact. **Aim and Setting and Design:** The purpose of this study is to determine the etiology, pattern and distribution of mandibular fractures in a Government Medical College at Ranchi, Jharkhand. **Methods and Materials:** The study was carried out in the dental OPD of a Government Medical College at Ranchi, Jharkhand from June 2013 to November 2014. All patients who were clinically and radio graphically confirmed fracture mandible were examined and all demographic variables (age, gender, place, education, occupation, tobacco habit and duration of habit) were recorded. The pattern and cause of mandibular fracture were included and sites were classified accordingly as ramus, condyle, symphysis, body, parasymphysis and angle. **Statistical Analysis:** Simple descriptive statistics were employed for the analysis. **Results and Conclusion:** The present study concluded Road Traffic Accidents as the most common cause for mandibular fractures. Also, parasymphyseal fracture was the commonest unilateral and parasymphysis and condyle as commonest combined fracture of the mandible.

Keywords: Behaviour, Children, Dental Caries, Prevalence, Socioeconomic Status

1. Introduction

The prominent position of the maxillofacial skeleton is the most common cause of its fracture. The location, type and pattern of fractures are determined by the injury mechanism and direction of impact. In addition, patient's age and the presence and position of teeth have a direct effect on the characteristic pattern of such injuries. The mandible is the only movable bone of the facial skeleton and its anatomical features makes this bone important in speech, biting, chewing and respiration. Skeletal and soft tissues of the face region are prone to injuries as it is the most pronounced and exposed part of the body[1,2]. Many authors report mandibular fractures as the most common site of maxillofacial fractures, followed by zygomatic complex[3–5].

The mandible is a blunt or rounded V or U horseshoe shaped tubular long bone. It is a very strong bone, but its prominent position on the face makes it particularly vulnerable to fracture. The fracture might occur in different parts of the bone; depending upon t he s ite or position of impact. Also, because of the mandible's rounded shape, a traumatic impact may cause the fracture at more than one site[1]. It has been reported that mandibular fracture accounts for 36% - 59% of all maxillofacial fractures[6,7].

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The purpose of this study is to determine the etiology, pattern and distribution of mandibular fractures in Rajendra Institute of Medical Sciences at Ranchi, Jharkhand.

2. Materials and Methods

The study was carried out in the dental OPD of RIMS (Rajendra Institute of Medical Sciences), Ranchi from June 2013 to November 2014. All patients who were clinically and radio graphically confirmed fracture mandible was examined and all demographic variables (age, gender, place, education, occupation, tobacco habit and duration of habit) were recorded. The pattern and cause of mandibular fracture was included and sites were classified accordingly as ramus, condyle, symphysis, body, parasymphysis and angle. Also, the referral department was noted to examine whether the patient reported independently or was referred from some department. Simple descriptive statistics were employed for the analysis.

3. Results

There were a total of 118 patients who were included in the study. Their age ranged from five to sixty years and presented to the dental OPD with maxillofacial trauma. 92.4 percent of the patients were male. The maximum number of injuries (34.7%) was reported in 11-20 years age group followed by 21-30 years (29.7%) and 31-40 years (18.6%). The elderly age group of 51-60 years had the least mandibular fracture (3.4%). The figure shows very few number of female patients who have reported in the study (Figure 1).

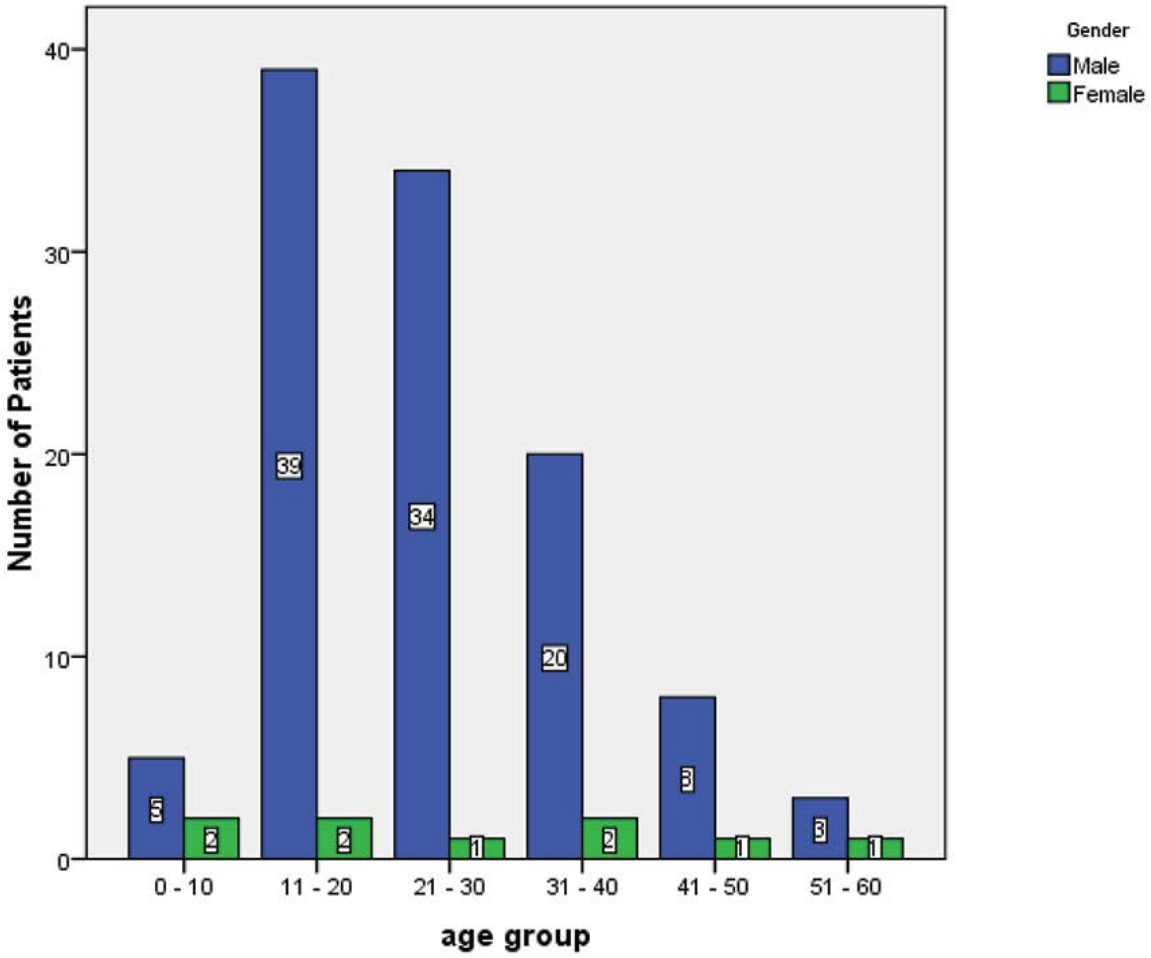


Figure 1. Age and gender distribution of patients.

The education (Figure 2) and occupation distribution (Figure 3) of the study population have also been included to give a detailed overview of the socioeconomic status of the population who reported to the hospital for their treatment. 45.76 percent of the patients had not finished their class tenth education and only 10.17 percent were intermediates and graduates each.

The occupational distribution was also presented in detail to elaborate on the socioeconomic status. Since the age group involved maximum was 11-20 years hence the maximum number of the reported patients were students (26.3%). The next in line were farmers (16.9%). Others who reported were drivers (8.5%); laborers (8.5%); small scale businessmen (6.8%) etc. Also 7.6 percent of the patients were unemployed.

The causes of fractures were predominantly four wheeler (36.44%) and two wheeler accidents (32.2%). Other etiologies for mandibular fracture were fall from a height (17.8%); physical assault (6.78%); sports injury (5.08%); animal bite (0.85%) and accident at work (0.85%) respectively (Figure 4).

Among cases having multiple injuries (n=36) fracture parasymphysis and subcondyle was commonest (n=12: 10.2%). It was closely followed by fracture parasymphysis and angle (n=11: 9.3%). Others in line were symphysis and condyle (n=5: 4.2%); angle and condyle (n=3: 2.5%); parasymphysis and body (n=2; 1.7%); angle and body (n=2; 1.7%); condyle and body (n=1; 0.8%) respectively (Figure 5).

There were a total of 167 fractures in 118 patients. The most common site of mandibular fracture was parasymphysis (n=73; 43.7%), followed by condyle (n= 39; 23.4%), angle (n=30; 18%), body (n=13; 7.8%), symphysis (n=11; 6.6%) and coronoid (n=1; 0.6%) (Figure 6).

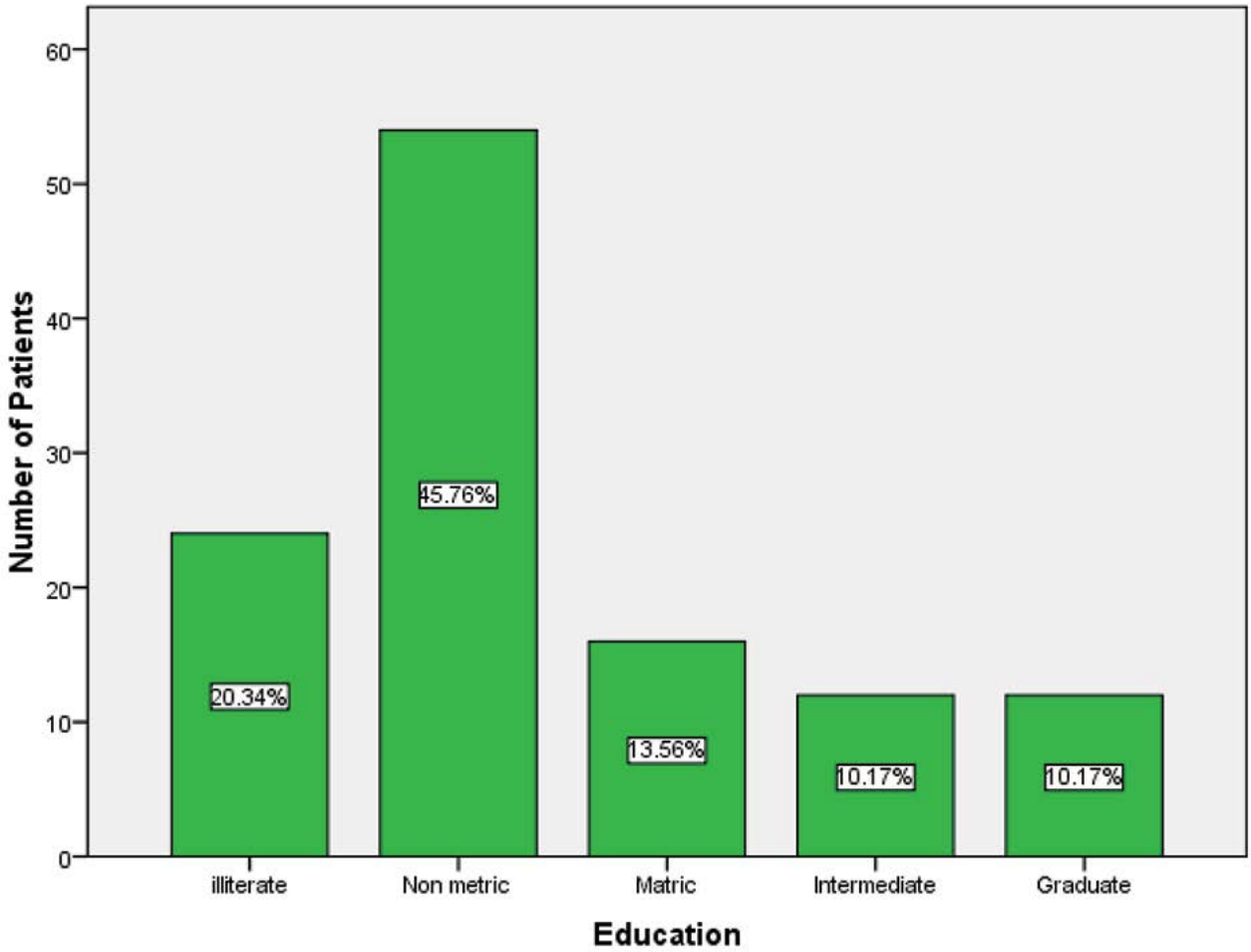


Figure 2. Education distribution of patients.

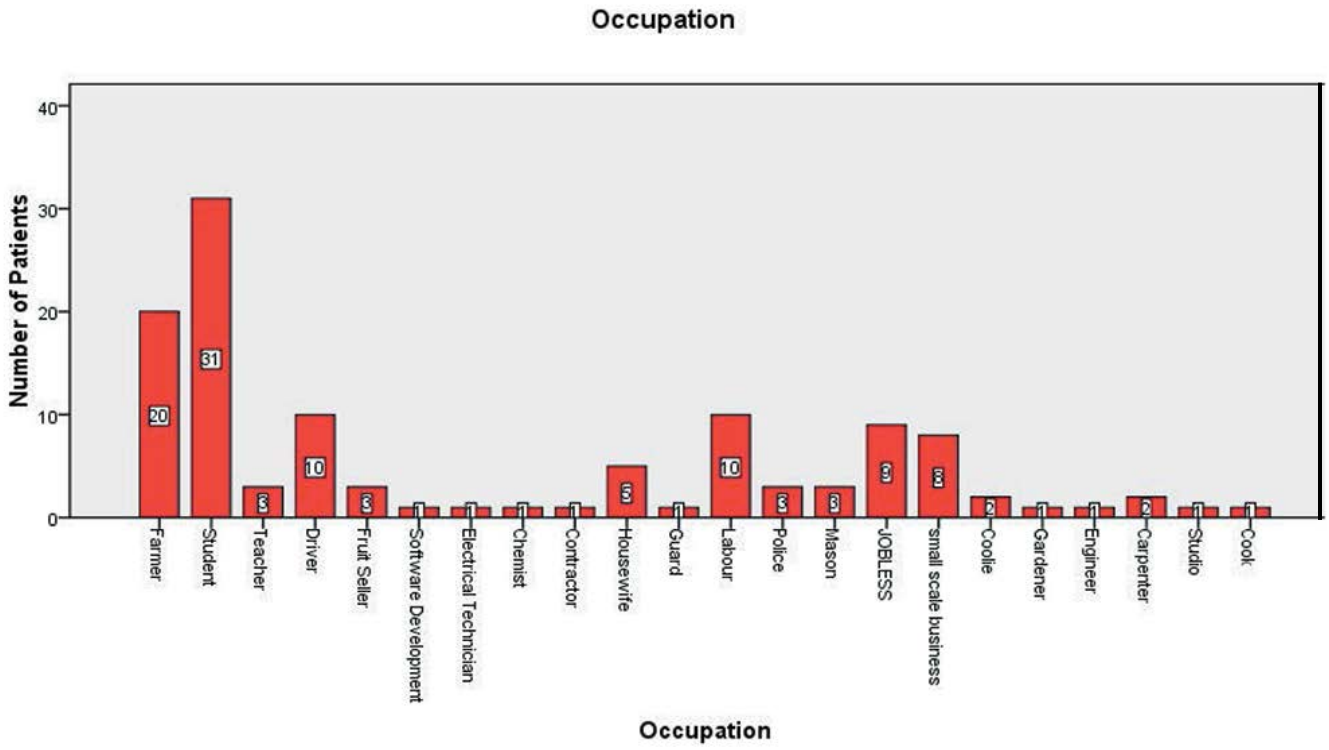


Figure 3. Detailed occupation distribution of patients.

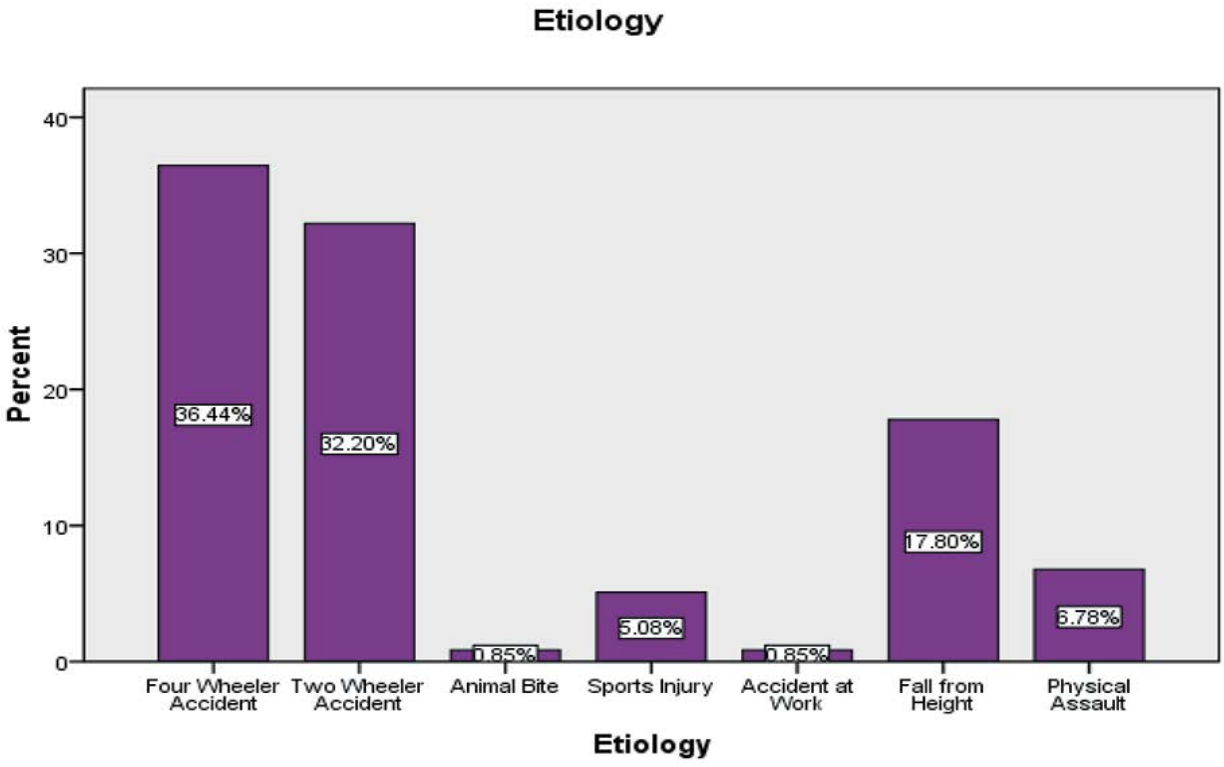


Figure 4. Etiology of mandibular fracture

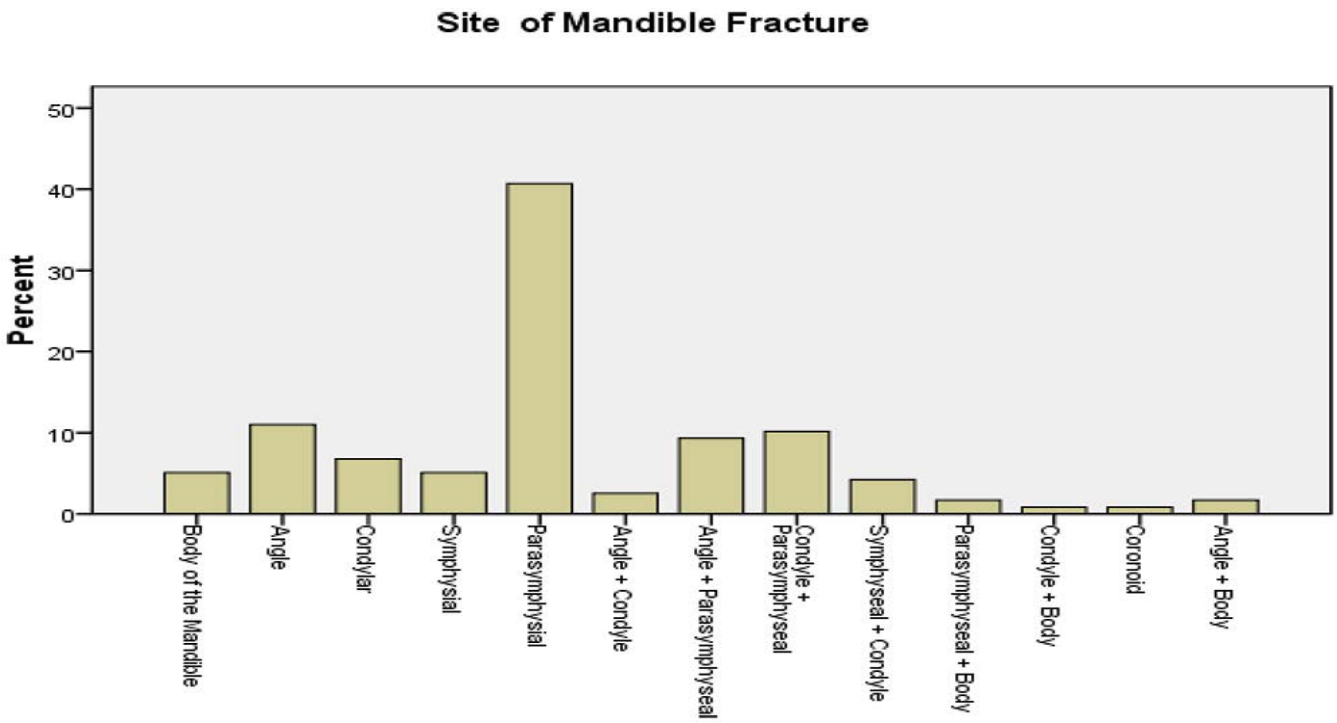


Figure 5. Percentage distribution of site of mandibular fracture.

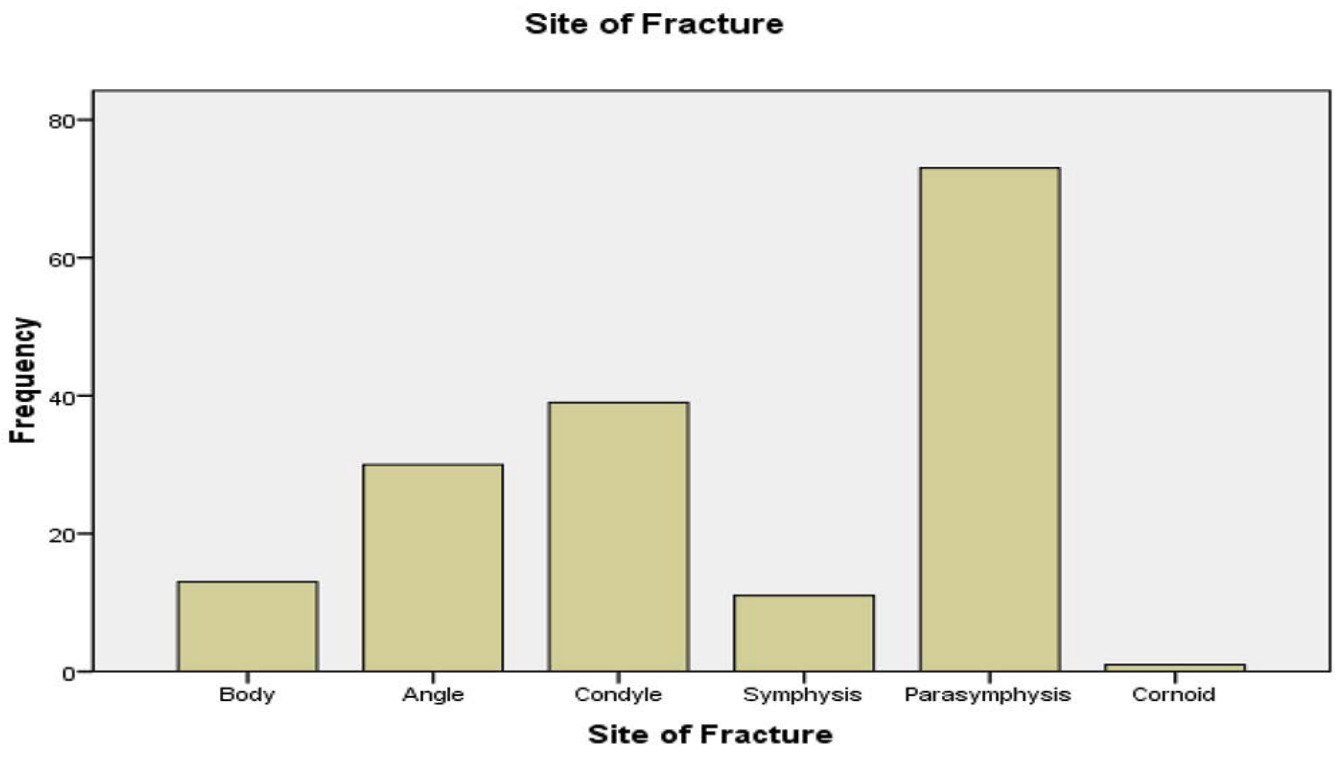


Figure 6. Frequency distribution of site of mandibular fracture.

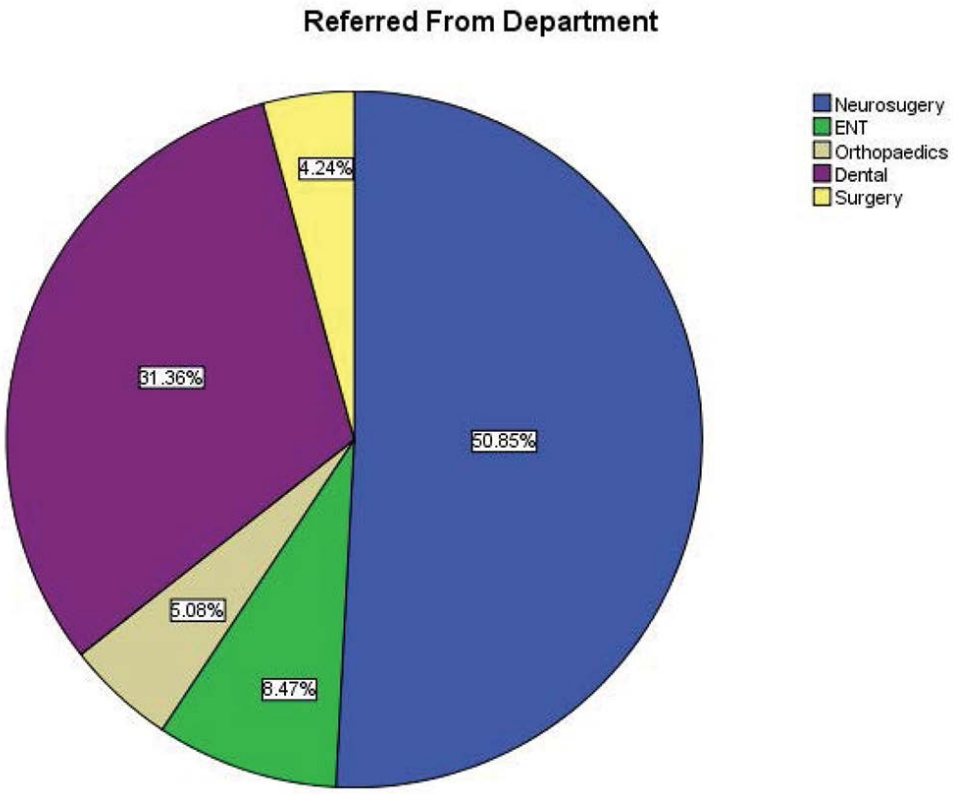


Figure 7. Percentage distribution of referral departments of patients.

The patients reported either directly to dental OPD in the hospital or were referred from other departments. Half of the patients were referred from Neurosurgery (50.85%), followed by ENT (8.47%), Orthopedics (5.08%), and Surgery Department (4.24%). However remaining 31.36 % reported directly to the dental OPD (Figure 7).

4. Discussion

Although being the heaviest and strongest facial bone, the mandible is prone to fractures because of its unique form and location. In our study the age group ranging from five to sixty years presented with fracture mandible. The most commonly involved age group was 11-20 years. However, another study carried out in Armed Forces Medical College, Pune reported predominance in the age group of 20–29 years[8]. Also, another study in Yavatmal at SUN;GMC presented the peak occurrence of mandible fracture in adults of 21-30 years of age[9].

The occupation and education demographics presented a clear picture of the lower socioeconomic strata who visited the Government Medical College. Numerous studies[10,11,12] have shown that health of individuals on the lower end of the socioeconomic scale is markedly worse than that of individuals of the upper end. Another study[2] done at SCB dental college, Cuttack, Odisha presented occupation distribution as 101 labourers, 59 businessmen, 57 students, 34 drivers, 46 unemployed etc. However, present study reported 31 students, 20 farmers, 10 drivers and labourers each and 9 patients were unemployed.

In the present study, RTA (Road Traffic Accident) was the leading cause of mandibular fracture including four and two wheeler accidents. This finding is in concurrence with other studies (Table 1).

Our study presented with parasymphyseal fracture of the mandible as the commonest site of fracture (43.7%) followed by condyle (23.4%); angle (18%); body (7.8%); symphysis (6.6%) and coronoid (0.6%). The comparison table presents

Table 1. Comparison of Road Traffic Accident in Present Study and others

Studies	Percentages of RTA
Present Study	68.64%
Thapiyal GK et al; 2008 (Pune)[13]	92%
Tamgadge PB, Kalbande A; 2013 (Yavatmal)[9]	61.6%
Subodh S et al; 2012 (Lucknow)[14]	68.2%
Kar IB,Mahavoi BR; 2012 (Odisha)[2]	80.31%
Mittal G, Mittal S; 2013 (Uttarakhand)[1]	37.2%
Kamath RA et al; 2012 (Davangere, Karnataka)[15]	74.7%

a similar picture in other studies. Parasymphyseal and was commonest involved site probably due to long rooted canine. However, symphyseal fracture came later in the incidence chart. This u niqueness c an b e c haracterized b y t hickened and buttressed front of the arch forming the chin. This development is unique to humans and some of his recent ancestors unlike other animals who lack chins.

Higher incidence of mandibular condyle fracture is attributable to the binding of the mandibular ramus with high stiffness a nd m andibular c ondyle h ead w ith l ow stiffness. This is generally caused by indirect force that is delivered to the mandibular condyle head[16]. Un-erupted third molars probably are the cause of angle fracture (third most common site) in the current study.

Also among combined fracture, parasymphyseal and condyle fracture was commonest. This fi nding was in agreement with other studies (Table 2).

Current study shows strong association of head injuries (50.8%) with mandibular fractures. This is probably trauma to maxillo-facial complex may impact indirect force to its nearby cranial structures.

Open reduction and internal fixation (n=18; 15.3%) and closed reduction (n=100; 84.37%) were treatment options done in patients.

The current study has several drawbacks. Firstly, the duration of the study could have been extended to five or ten years to record the trend. Secondly, the possibility of social desirability bias while answering questions cannot be ruled out. However, the strengths are the study is the first of its kind that is providing baseline data in the concerned institution. Few data that we recorded have not been included in other studies and direct comparison with other studies regarding fracture percentage is also provided.

5. Conclusion

The present study concluded Road Traffic Accidents as the most common cause for mandibular fractures. Also, parasymphyseal fracture was the commonest unilateral and parasymphysis and condyle as commonest combined fracture of the mandible.

This is the first study providing baseline data regarding the mandibular fracture in the concerned institution. It is hoped that this data would be valuable in planning and providing effective and efficient preventive health care programmes.

Table 2. Comparison of Different Sites of Mandibular Fracture with other studies

	Parasymphysis	Condyle	Angle	Body	Symphysis	Coronoid
Present Study	43.7%	23.4%	18%	7.8%	6.6%	0.6%
Thapiyal GK et al; 2008 (Pune)[13]	45%	15%	30%	7.9%	NIL	NIL
Tamgadge PB, Kalbande A; 2013 (Yavatmal)[9]	18.6%	34%	10%	20.6%	13.3%	3.3%
Subodh S et al; 2012 (Lucknow)[14]	31.4%	21.6%	13.7%	24.5%	3.9%	1%
Kar IB,Mahavoi BR; 2012 (Odisha)[2]	33%	20.87%	14.11%	13.12%	11.33%	0.39%
Mittal G, Mittal S; 2013 (Uttarakhand)[1]	25.1%	15.1%	23.0%	21.5%	12.3%	NIL
Kamath RA et al; 2012 (Davangere, Karnataka)[15]	49.3%	18.07%	16.8%	6%	9.6%	NIL

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