

# The characteristics of mandibular fractures among patients attending Plastic Surgery Unit in Sanglah General Hospital, Bali, Indonesia: A preliminary study



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## ABSTRACT

**Background:** Trauma is the fourth leading cause of death in the world and occurs at all ages. The high incidence of traffic accidents is equivalent to the increasing incidence of maxillofacial trauma, especially mandibular fracture. This study aims to determine the characteristics by age, gender, mechanism of injury and anatomical site of mandibular fractures among patients attending the Plastic Surgery Unit of Sanglah General Hospital as a preliminary study.

**Methods:** A descriptive cross-sectional study was enrolled among 45 patients attending plastic surgery who recorded in medical records from January 2014 until December 2016 as well as met the inclusion criteria. Data were analyzed using SPSS version 17 and presented in

percentage regarding Age, mechanism of injury, gender, and fracture site.

**Results:** There were 45 patients with 61 mandibular fracture sites. Most of the patients were male (84.4%). Based on age, the mandibular fracture is most common in the productive age (20-30 years old) at 22 cases (36.1%). Majority cause of fractures was road traffic accident (82.2%). Parasymphysis region was the most common site of fracture (39.3%).

**Conclusion:** The characteristics of mandibular fracture patients describe trauma patterns in the community. This finding is similar with some readily available literature with RTAs was the most common etiology and parasymphysis was the most common fracture site.

**Keywords:** Mandibular Fractures, Patient Characteristics, Road Traffic Accidents, Parasymphysis

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## INTRODUCTION

Trauma is the fourth leading cause of death in the world. More than 90% of deaths due to injury occur in developing countries.<sup>1</sup> Every year around 1.25 million people died due to road traffic accidents (RTAs).<sup>2</sup> The high incidence of RTAs is equivalent to increasing the incidence of maxillofacial traumas.<sup>3</sup> Because the location of the mandible is prominent and unprotected, mandibular fractures are the most common fracture of maxillofacial fractures.<sup>4</sup> It has been reported that the incidence of mandibular fractures account for 70.5% of all maxillofacial fractures.<sup>5</sup>

A road traffic accident is the leading cause of mandibular fractures in developing countries, while assault and interpersonal violence are a leading cause in developed countries.<sup>6,7</sup> Mandibular fracture may occur alone or in combination with other facial fracture.<sup>8</sup> Based on the site of a fracture, the mandibular fracture can occur in the region parasymphysis, symphysis, corpus, angle, ramus, alveolar, condyle and coronoid. The mechanism of injury and pattern of mandible fracture vary considerably among different study population.<sup>9</sup>

Research in one of the hospitals in Indonesia states that mandibular fractures were common in male and the incidence was often in productive age.<sup>10</sup> Especially in Bali, recording and reporting mandibular fractures data are rarely conducted. Thus, this study is conducted to obtain the characteristics of the mandibular fracture patient who underwent surgery in the Plastic Surgery Unit of Sanglah General Hospital, Bali. Therefore, the data can uncover the situation in Bali.

## MATERIAL AND METHODS

This research is a descriptive retrospective study using secondary data from medical records. Data of mandibular fracture patients between January 2014 until December 2016 was obtained from the patient medical record in Sanglah General Hospital, Bali traced from the list of mandibular fracture surgery patients recorded by Sanglah Plastic Surgery Unit. A total of 52 patients who meet the inclusion criteria were undergone mandibular fracture repair in Sanglah Plastic Surgery Unit. However, the medical record of 7 patients lost; thus they

were excluded from the characteristics tabulation. From the 45 medical records, the data of the age, gender, mechanism of injury and site of fracture are analyzed using SPSS version 17 software for windows. Data were presented in number and percentage for several variables such as age, mechanism of injury, gender, fracture site, as well as cross tabulation between age and mechanism of injury.

## RESULTS

The frequency of the patients and the proportion based on age, gender, mechanism of injury and anatomical site of mandibular fractures are shown in Table 1. From the Table, it was shown that the majority of patients were in 21-30 years-age group

(37.8%), followed by RTAs (82.2%), males (84.4%), and fracture of parasymphysis (39.3%).

Based on age, there were several distinct pattern of injury mechanism among respondents. Road Traffic Accidents (RTAs) were predominant in 31-40 years-age group (87.5%). However, sport accident was found in 11-20 years age group (26.7%), followed by work accident in 31-40 years age group (12.5%), and 5.9% for assault in 21-30 years age group (Table 2).

## DISCUSSION

The incidence and characteristics of mandibular fracture vary with geographic region, era, cultural and socioeconomic condition.<sup>11</sup> The number of mandibular fracture cases in Sanglah Plastic Surgery Unit cannot be used to comparing with other countries. This data is only obtained from patients underwent surgery in Sanglah Plastic Surgery Unit while the patients may undergo surgery in another unit in Sanglah Hospital or another hospital in Bali. Complete recording and national research are needed to get a better insight.

The results of this study are similar to previous reports, particularly regarding age and gender.<sup>9,12,13</sup> This study found the highest incidence of mandibular fracture in the age group of 21-30 years old (37.8%). Age incidence was similar to a study by Barde et al.<sup>9</sup> This age group are productive age where most of them have many outdoor physical activities. Trauma is considered a problem of this group age, which may be because of activities related injury and careless driving on the road.<sup>14</sup> This study also found mandibular fracture is most occur in male (84.4%). It is far greater than female (15.6%). This finding was similar to a study reported by Ghodke et al.<sup>15</sup> The high incidence of mandibular fracture in males is believed more aggressive nature and outgoing person. May also be attributed to the fact that females are confined to housework and them carefully and less frequent to drive.<sup>6</sup>

The leading cause of mandibular fractures in this study were RTAs representing 82.2%. This finding is similar to previous study reports.<sup>6,7,16</sup> There is a significant difference in etiology of mandibular fracture in developing and developed countries. RTAs are a common cause of mandibular fractures in developing countries, while in developed countries is assault.<sup>6,7</sup> These differences reflect differences in the socioeconomic, behavioral, infrastructures and regulations of the nations.<sup>13</sup> The high incidence of mandibular fractures related to RTAs in a developing country such as Indonesia due to inadequate road safety awareness and poor road conditions.

**Table 1** Characteristic of mandibular fracture patients

| Variables           | Frequency                     |           |
|---------------------|-------------------------------|-----------|
|                     | Categories                    | N (%)     |
| Age (years old)     | 11-20                         | 15 (33.3) |
|                     | 21-30                         | 17 (37.8) |
|                     | 31-40                         | 8 (17.8)  |
|                     | 41-50                         | 3 (6.7)   |
|                     | 51-60                         | 2 (4.4)   |
| Mechanism of injury | Road Traffic Accidents (RTAs) | 37 (82.2) |
|                     | Sport Accident                | 4 (8.9)   |
|                     | Work Accident                 | 3 (6.7)   |
|                     | Assault                       | 1 (2.2)   |
| Gender              | Male                          | 38 (84.4) |
|                     | Female                        | 7 (15.6)  |
| Fracture Site       | Parasymphysis                 | 24 (39.3) |
|                     | Symphysis                     | 8 (13.1)  |
|                     | Corpus                        | 5 (8.2)   |
|                     | Alveolar                      | 3 (4.9)   |
|                     | Angulus                       | 10 (16.4) |
|                     | Condyle/Sub condyle           | 9 (14.8)  |
|                     | Coronoid                      | 2 (3.3)   |

**Table 2** Cross Tabulation between Age and Mechanism of Injury

| Age (year) | Mechanism of Injury |                      |                     |               |
|------------|---------------------|----------------------|---------------------|---------------|
|            | RTAs N (%)          | Sport Accident N (%) | Work Accident N (%) | Assault N (%) |
| 11-20      | 11 (73.3)           | 4 (26.7)             | 0                   | 0             |
| 21-30      | 14 (82.4)           | 0                    | 2 (11.8)            | 1 (5.9)       |
| 31-40      | 7 (87.5)            | 0                    | 1 (12.5)            | 0             |
| 41-50      | 3 (100)             | 0                    | 0                   | 0             |
| 51-60      | 2 (100)             | 0                    | 0                   | 0             |

The most common anatomical site of mandibular fractures in this study was parasymphysis region (39.3%), which is consistent with the study by Sultana et al.<sup>13</sup> Although mandibula is the strongest bone in facial, its prominent position makes it vulnerable to trauma, especially parasymphysis region.<sup>17</sup> In contrast, Samman et al. found condyle fracture was the frequent site of mandibular fracture. These differences are influenced by several factors such as the mechanism of injury, direction, and magnitude of the pressure also mandible characteristics of person.<sup>18,19</sup>

## CONCLUSION

The characteristics of mandibular fracture patients describe trauma patterns in the community. This finding is similar with some readily available literature with RTAs was the most common etiology of mandibular fractures.

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## ETHICAL CLEARANCE

This study has obtained ethics approval from the Ethics Committee of Udayana University prior to the study conducted.

## CONFLICT OF INTEREST

We declare that there were no conflicts of interest in this study.

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## AUTHOR CONTRIBUTION

All of authors are equally contributed to the study from the study framework, data gathering, data analysis, until reporting the result of study.

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