

**RETROSPECTIVE STUDY ON PREVALENCE AND
CAUSE OF MAXILLOFACIAL BONE FRACTURE AT
JIMMA UNIVERISTY SPECIALIZED HOSPITAL DENTAL
CLINIC**

By:-

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(DENTAL INTERN)**

**A SENIOR RESEARCH PAPER TO BE SUMMITTED TO
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**JIMMA UNIVERISTY
PUBLIC HEALTHN AND MEDICAL SCIENCES COLLEGE**

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ABSTRACT

Back ground:-Trauma to the facial region can result in fracture to major skeletal components of face including the Mandible, Maxilla, Zygoma and Nasal bone structures. The major cause of maxillofacial trauma includes motor vehicle accident, falls, interpersonal violence, sport related accidents, and work related accidents.

Objective:- The aim of this study is to assess the prevalence and cause of maxillofacial bone fracture at Jimma university specialized hospital dental clinic from January 1 to December 31 2012.

Method:- A retrospective study was conducted on 183 patient's card to investigate the cause and prevalence of maxillofacial bone fracture using Systemic random sampling technique by recording all complain of maxillofacial bone fracture from January 1 to December 31 2012, then the interval was determined by using N/n formula which was 4. the first medical chart was selected by lottery method then by adding the interval number to the first medical chart a total of 183 chart was reviewed. the data was collected by three trained dental interns who work in dental clinic of JUSH using structured questionnaire from cards of previously examined patient's. The data was cleared, code and analyzed manually. At the end result of this study was present by statement, figures and tables.

Result:- Most traumas occurred in adults with age range from 21-30 years old. Males were more affected than females. Assault (fighting) was the major cause for maxillofacial trauma. The commonly affected bone was the mandible. Most of the cases were with one fracture line and closed reduction was the most common treatment modality for the patients who visited JUSH Dental clinic from January 1 to December 31, 2012.

Conclusion: There were a relationship between the prevalence of maxillofacial bone fracture and age and sex of patient's who visited JUSH, dental clinic from January 1 to December 31, 2012.

Recommendation: Maxillofacial trauma may cause serious cosmetic and functional deformities so early reduction, stabilization of fractures, as well as bone or soft tissue grafting is necessary.

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ABBREVIATION AND ACRONOMY

- IMF** Inter maxillary Fixation
- SRP** Student research paper
- MVA** Motor vehicle accidents
- CBE** Community based education
- JUSH** Jimma university specialized Hospital
- MMF** Maxillo mandibular fixation
- ZMC** Zygomatico Maxillary complex
- SPSS** Statistical package for social sciences.
- GSW** Gunshot wound

CHAPTER ONE

INTRODUCTION

1.1. Background

The patterns of the maxillofacial trauma in Africa especially in east Africa are poorly studied only few reports and literature have focused on these studies(1).

Understanding maxillofacial trauma helps to assess the behavioral patterns of people born in different countries and helps to establish effective measures through which injuries can be prevented and treated(2,3).

the spectrum of maxillofacial injuries presenting in the trauma unit at Johannesburg hospital, range from dento-alveolar fracture, nasal bone fracture, mandibular fracture, maxillary fracture, frontal bone fracture, naso-orbital ethmoid fracture, panfacial fracture and penetrating injuries. All or some of these injuries present either as isolated maxillofacial injuries or associated with other concomitant injuries involving other organ systems like head injury, thoracic injury, abdominal injury and limb injuries(4).

As society has become completely mobile and urbanized, trauma has emerged as one of the leading health problems, with maxillofacial trauma being no exception. Injuries to the face and jaws are among the most frequent injuries seen in many emergency rooms(5).

maxillofacial injuries, such as soft tissue injuries, dental injuries, or maxillary, mandibular and zygomatic fracture, are the most common injuries treated by maxillofacial and oral surgeons, and traffic accidents are the leading cause of these injuries(6) .

there have been a number of studies to show the incidence of maxillofacial fracture in different countries and it has been shown that the mandibular fracture are twice as common as fracture in the mid facial region(7).

whenever facial structures are injured, treatment must be directed toward maximal rehabilitation of the patient. The following surgical principles serve as a guide for treatment of facial fractures:reduction,fixation,and immobilization of the fractures. Timing of treatment is also important for best results of treatment. It is best to be treated early. The first and most important aspect of surgical correction is to reduce the fracture properly or place the individual segment into the proper relationship with each other(13,14). Then fixing with IMF and immobilized with ligatures or rubbers. For IMF arch bar is most commonly used(12,15,16).

1.2 STATEMENT OF THE PROBLEM.

Facial bone fracture (injuries) have the potential to cause disfigurement and loss of function, teeth may be knocked out or loosened, it can result in the lower jaw dislocation due to force, it is seldom life threatening due to severe bleeding or interference with the air way(18).

Various types of researches are done on the prevalence of maxillofacial fracture To investigate the possible most common causes, to differentiate the most common fractural types and to analyze its association with age and sex(19).

The epidemiology of facial bone fractures varies in type, severity and cause depending on the population studied .Maxillofacial fractures affected a significant portion of trauma patients. They can occur isolated or in combination with other serious injuries, including cranial, spinal, upper and lower body injuries(20,21).

Injuries accounted for 90% of the world's death and 12% the worlds burdens of disease in the year 2000. More than 90% of the deaths from injuries occur in low and middle income countries. Hence the following study aimed to collect information regarding the epidemiology of maxillofacial fractures from JUSH dental clinic (18,19,22).

Maxillofacial fractures are more prevalent in large cities due to heavy traffic and high incidence of violence. The causes types and sites of these fractures seem to vary across geographical location. Different

studies have shown a relationship between maxillofacial fractures, defined sex and age groups, level of Mechanization and development. As man evolved and developed more machinery to ease day to day living the incidence and severity of trauma injuries of the face also increased(23,24).

World wide differences in the distribution and occurrence of maxillofacial fractures are said to be a result of difference in socio economic, cultural and environmental influences. In a study conducted in Uganda economic and social transformation, seeing increased traffic and population pluses competition for resources in urban as well as rural areas. These factors have most likely led to changes in the patterns and severity of maxillofacial fractures and their cause(25,26).

The incidence of all injuries due to motor vehicle accident in developing countries is likely to be at least 665 per 100,000. The average age of thirty years at the time of injury reflects the fact that persons injured in motor vehicle accident in developing countries older than their counter parts in the industrial world(27).

The epidemiology of injuries in Ethiopia is poorly documented with scarce regional data, Un-established with scarce regional data, un-establish programs for surveillance and prevention. The problem is higher in Ethiopia due to unsafe technology and working conditions. The prevalence of injuries in specific factories due to Machineries and hand tools was found to be 18% and 12% respectively(28,29).

For detecting trauma to maxillofacial regions the facial bone may be divided in the three parts(30,31,32).

1. Upper third (Nasoethmoid and orbit)
2. Middle third (Zygomatc complex and zygomatic arch and maxilla-Lefort1,Lefort2 and Lefort 3)
3. Lower third mandible

Whenever facial structures injured, treatment must be directed towards maximal rehabilitation of the patient. The following surgical principle serves as a guide for treatment of facial fractures Reduction, Fixation and Immobilization of the fractures. Immediate treatment is also important and for best results of treatment, It is best to be treated early. The 1st and most important aspect of surgical correction is to reduce the fracture properly or placed the individual segment in to proper relationship with each other(13,15).

Then fixing with IMF and immobilize with ligatures or rubbers. For IMF arch bar is most commonly used(12,16).

The mode of therapy for any type of Jaw fracture is determined by the individuals and general health as well as the position, stability, and severity of the fracture the availability of dental consultation and, the skill and experience of the surgeons are also important.

There is no adequate research conducted on the fracture of maxillofacial bone in south West of Ethiopia ,Jimma zone(16).

The present study was a retrospective analysis of all maxillofacial fractures treated at Jimma university specialized hospital, dental clinic over One year period from January 1 to December 31 2012. Despite those little attention has been paid to these unexplored but the seriousness of the problem and lack of information on dimension and context the problem is visible. So this study will help to acquire recent information's on its magnitude and can be used as a base line data for the future research development.

1.3 Significance of the study

In most developed and some developing countries facial fracture information is in advanced stage having a number of research materials and journals. In Ethiopia however, with exception of few in recent days on other topics, there is no similar adequate literature to the topic "facial bone fracture", This study will give recent information about the frequency and common causes for facial bone fracture of patient who visited JUSH, South West Ethiopia, Jimma from January 1 to December 31 2012.

On the other hand, this study can be used as a base line for further investigation of related topics.

CHAPTER TWO

LITERATURE REVIEW

Maxillofacial fractures are one of the most common problem of traumatic patients, because of its frequent occurrence, severity, and consequence especially in developing countries (14).

The results of epidemiological investigations vary depending on the demographics of the population studied. Factors such as geographic region, socioeconomic status, and temporal factors including period of the year and area can influence both the type and frequency of injuries in the population(17). Applying multiple logistic regression analysis, Ribera et al 24 (2004) bosomed that maxillofacial fracture are not related to the employment status, but they are related to the education level (13).

The age distribution study of patients with facial fractures in the present study corresponding to findings of other studies 2.11.18.34 young adults usually shows greater physical activity, number of fights and self mobility. The finding that the majority of fractures is among males was similar to results of studies developed by donaldson 10 (1961) (4.49.1) van hoof et al, 30 (1977) (5:1) khalil, shalad 20(1981) (5.4:1), Hog 9 et al.

18(2000) (2.9.:1), Faslaetal 12(2003) (3.3:1), Ansari4(2004) (3.84.:1).

This fact is profitably due to a higher level of physical activity by men, and also because they are more involved in traffic accidents and fights.

Le for fractures account for 10-20% of all facial fractures. They result from exposure to a considerable amount of force. Motor vehicle accidents are the predominant causes, other cause include assaults and falls with seatbelt use and the increased use of airbags by automanufacturers, the overall incidence of midface fractures has decreased (31).

Globally, the epidemiologists of mid-face fractures are similar. Young males are the typical patient's, with motor vehicle accidents and assaults being the most common overall causes of facial and mid-facial trauma .

The incidence of mid-face fractures is far lower in children than in adults, owing to anatomic differences and the overall elasticity of children's tissues 1,2,3.

The main causes or mechanisms of injury worldwide are assaults and RTA, but the frequency varies from one country to another. Some studies have shown that assaults are more common in developing countries, where as RTA occur more frequently in developed countries(9).

In a study from United Arab Emirates, the average age of patients with facial fractures was 26.5 years. 4 The majority of patients (83%) were males. The most common cause was motor vehicles accidents (59%), followed by falls.(21%) of all the patients with facial fractures, 33% had

isolated mid-face fractures, and 14% had a combination of mid-face fractures and mandible fracture (28,30).

In a study from china, 78.6% of mid-face fractures occurred in males, motor vehicle accidents were the leading cause (33%), followed by assaults (25%) (13,16).

In a study by motamedi from Iran, 89% of maxillofacial trauma patients were males. 5 Motor vehicle accidents were the number one cause (31%), followed by assaults (10%) Le Fort II fractures were the most common (55%), followed by le for I fracture (24%) and le fort III fractures (12%) (29,35).

Many studies shows MVA as the primary cause of maxillofacial fractures 1,13,20,21,25,26,29. Ajagbeetal (1977) states that MVA occur largely because of negligence of the driver, poor maintenance of vehicles, often driving under the influence of alcohol or drugs and complete disregard of traffic laws. Because of legislative changes and preventive measures involving seat belt and airbag use as well as the reduction of drinking and driving, MVA related facial injuries have decreased in some developed countries, and interpersonal violence has emerged as the predominant cause of facial trauma, with alcohol an unemployment's as contributing factors 20,30,31,33. Hoggetal (200) demonstrated that occupants of vehicles who are not wearing a seat belts are injured in crashes at a rate more than five times higher that of occupants wearing a seat belt (32).

Beaunat (1985), found in his study, that the mandible was the most common site of fracture, followed by the middle third of the face which include the zygomatico-maxillary complex. The mandible is the site of fracture most often diagnosed, this is the result of both its prominence and its selection as a target of intentional violence (8).

The zygomatic bone was the second most frequent bone fractured (27.6%). Study conducted by Hongetal in 1983 shows the ratio 6:2:1 of mandibular, zygomatic and maxillary fracture incidence respectively. Approximately 2/3 of all maxillofacial fracture is mandibular fracture. (23)

The mandible was the most prevalent facial bone fractured, followed by the zygomatic complex and nose. It is one of the most frequent targets in fights and also a frequently fractured bone in MVA. Downe et al (1995) have found MVA to be the most common causes of maxillofacial injury patients that have serious or multiple injuries. It is most prevalent in males than females certain researches done at different areas show that the prevalence is higher in males like 84.3% at HUSM, Malaysia, (21) 80% at Toronto, Canada, (20) 83% Chiangmai, Thailand and, (3) and 78% at Khyber college of Dentistry, Pakistan (2).

The most frequent site of mandible fracture depends on the site of forces impacted and the amount applied. Because of the mandible is rounded shape, a traumatic injury may cause the fracture in more than one place. The zygomatic was the second most frequent bone fractured (27.6%).

Study conducted by Hong et al in 1983 shows the ratio 6:2:1 of mandibular, zygomatic and maxillary fracture incidence respectively. Approximately 2/3 of all maxillofacial fracture is mandibular fracture (23).

A research done at Toronto General Hospital, Canada, shows that the occurrence of post-operative complications, were as follow, infection was the most frequently occurred complication followed by malunion and malocclusion. (There was chance of 5.3% occurrence of these complications that is low relative to the treatment given which is open reduction (20).

According to the study in Columbia University College of physicians and surgeons, the 1st step in treating facial trauma is to treat obstruction of air ways which can cause difficulty of breathing (12).

According to Brazilian oral research, metal arch bars secured with soft stainless wires are generally used for immobilization of comminuted mandibular and condylar fractures. Condylar fractures with open reduction in cause condylar displacement in to the middle cranial fossa, condylar displacement to the external auditory canal, impossibility to obtain an adequate occlusion by non-surgical treatment, and open joint wounds with the presence of foreign body or gross contamination are treated according to the recommendation of Bets 7(11999). And also when there are associated comminuted mid-face fractures, bilateral fractures in edentulous jaws when splinting of the arches is not possible,

and middle medical conditions that need immediate Jaw function, according to zide, Kent 32 (1983). There is no need to use internal fixation in every mandibular fracture and that using this combination of treatment (IMF+ORIF) (16,17).

It has been reported that a total of 132 patients sustaining 185 maxillofacial fractures were studied, in the state of Santa Catharina, Brazil. One hundred and seven (81.1%) were men and 25(18.9%) were women. Mandible fractures were more frequent than other injuries, representing 54.6%)of all maxillofacial fracture(23).

When we come to the Africa there are certain researches done on maxillofacial trauma at Benin city, Nigeria (19) shows that the prevalence is higher in males than females which is around 73% .Also other researches done on the prevalence facial fracture like, at two urban cities in Nigeria (26) show that the prevalence is higher in males. Research done in the above of the fracture is MASA which is (52%) in Ibadan, Nigeria, (26) (67%) in two urban center in Nigeria, (23) . They also show that the highest incidence of maxillofacial fracture occurred in age group 21-30 years in (31).

Fatal injuries caused by interpersonal violence and motor vehicle collisions are a major public health problems in south Africa(10).In his study Bowley (2002) reviewed the number of patients attending the Johannesburg hospital Trauma unit from January 1985 to December

2001. He found that the number of resuscitation for trauma in 1985 was 409 as compared to 1725 in 2001. Although the main reason for increase is due to the effect of interpersonal violence such as assault with a fist or GSW object i.e victims assaulted with the butt of a hand gun or rifle, the number of resuscitation for trauma due to accidents more than doubled during the study period (312 to 678) (10).

The severity of facial injury resulting from gunshot wounds varies depending on the type of weapon used, calibre of weapon used, the type of ammunition used the distance from which the patient is shot, close range, high velocity gunshot wounds and short gun wounds can result in devastating functional and aesthetic consequences for the patient (11).

T. Sakiris (2002) noted an increase in the prevalence of maxillofacial gunshot injuries from 9% to 37% over the period 1987-1992. He reported that from gunshot wounds to the maxillofacial region, the mandible was the more involved than the maxilla 61% as opposed to 21% (12,38).

East Africa medical journal shows that eyelet wire with IMF was used in 41.7% of the cases which in type of closed reduction. Also researches done in Nigeria shows that majority of patients were treated by closed reduction using IMF (23). In a study conducted in the North Gondar administrative zone, North West Ethiopia, the leading cause of injuries was assault (48.5%) followed by falls (18.6%) and road traffic injuries (14.7%) It is also that of paramount importance for The health center

team to understand the insecurity of proper documentation and timely reporting of injuries and the measures taken to take such problems(32).

Accident happens in conditions and individuals prone to injuries. The predisposing factors promotes injuries, some of these condition include(31):-

- A) Excessive alcohol intake and addiction of any kind. It is particularly associated with road traffic injuries.
- B) Lack of knowledge and information. Good knowledge of traffic rules and regulations save lives that could be lost due to road traffic injuries.
- C) Mental illness mentally ill people can have self inflicted injuries or cause injuries to other
- D) Negligence and careless there are some jobs which demand absolute concentration and attention otherwise leading to injuries
- E) Lack of precautionary measure appropriate use of seat belt prevent injuries.
- F) Age and sex younger age individuals and adolescent are at risk of injuries caused by alcohol induced violence and road traffic injuries.

The mechanism by which accidents happens along listed however, based on epidemiological data an injury in our country and data from other African countries of similar settings the following causes are identified.

1. Personal assault
2. Road traffic
3. Falls may occur in daily activities of individuals
4. Bullet injuries
- and 5. Sexual assaults (rapes)

The large variability in reported prevalence is due to a variety of contributing factors, such as the sex, age, environmental and socio economic status of patients, as well as mechanism of injury. For each patient the combination of the factors determines the likely hood of maxillofacial fractures. A clearly understanding of the demographic patterns of facial bone fractures will assist health care providers as they plan and manage the treatment of traumatic maxillofacial injures. Thus prevention efforts include awareness campaigns to educate the public about safety measures such as seatbelt and motorcycle helmets, laws to prevent drunk and unsafe driving(31).

CHAPTER THREE

Objectives

3.1 General Objective

- ❖ To assess the prevalence and causes of facial bone fracture in Jimma university specialized hospital.

3.2 Specific objectives

- ❖ To determine the distribution of victims by age and sex
- ❖ To identify the cause (Mechanism) of facial fracture
- ❖ To assess the treatment modality given frequently.
- ❖ To identify the most fractural region in this area.
- ❖ To assess post-operative complication.

CHAPTER FOUR

METHODOLOGY

4.1. Study area and period

4.1.1. Study area

The study was conducted at Jimma university specialized Hospital dental clinic, Jimma town located southwestern part of Ethiopia which is 356km away from Addis Ababa, Ethiopia. Jimma town has an average altitude of 1760 meters above sea level with weynadega climate condition. It's temperature ranges from 11⁰c to 30⁰c.It's also an area where cash crop products like coffee produced. According to the National population and housing Census of Central statistics of Jimma town of 2007 G.C.,the population of Jimma town is 162,300.Jimma university specialized hospital is the only referral hospital in the south west part of Ethiopia, which is administered by the federal ministry of Education.

4.2.2. Study period

The study period was done June 3 to June 10.

4.2. Study design

A retrospective study was conducted on the prevalence and causes of maxillofacial bone fracture.

4.3 Populations.

4.3.1 Source of population

It includes all patients who visited Jimma university specialized hospital dental clinic from January 1/2012 to Dec 31/2012.

4.3.2. Study population

Those patients complaining of maxillofacial bone fracture visited Jimma University Specialized hospital dental clinic from January 1/2012 to December 31/2012.

4.4 Sample size:-sample size was determined using the following formula.

$$n = \frac{NZ^2PQ}{d^2(N-1) + Z^2PQ}$$

Where Z=1.96 precise 95%

N=total number of maxillofacial bone fracture patient's(N=700).

P= Prevalence at 50% (0.5)

n= Sample size

q= 1-p

d= Marginal error 0.05%

$$n = 700(1.96)^2(0.5)^2$$

$$(0.05)^2(699) + (1.96)^2(0.5)^2$$

$$n = 248$$

$$n_f = 248 \quad n_f = 183$$

$$1 + 248$$

$$700$$

4.5 Sampling technique-

Systemic random sampling technique was used by recording all complain of maxillofacial bone fracture from January 1 to December 31,2012 to form sampling frame. Then the interval was determined by using N/n formula which was 4.The first medical chart was selected by lottery method then by adding the interval number to the first medical chart a total of 183 medical chart was reviewed.

4.6 Variables

4.6.1 Independent variables

1. Age
2. Sex
3. Cause of fracture
 - A) Fight
 - B) MVA
 - C) Falls
 - D) Industrial mishaps
 - E) Pathological fracture
 - F) Others

4.6.2 Dependent Variables

1. Fracture of mandible
 - A. site of fracture
 - B. Number of fracture
2. Treatment given
3. Post-operative complication
4. Fracture of maxilla
 - A. site of fracture
 - B. Number of fracture

4.7 Data Collection

All patients visited dental clinic were listed from daily records of the clinic then the cards were searched from the documentary room of the hospital. Data was collected by three trained dental staffs who work in the dental clinic of JUSH using structured questionnaires from cards of previously examined patients.

4.8 Data collection materials

1. Questionnaire
2. Paper
3. Pen
4. Pencil
5. Rubber

4.9 Data processing and analysis

Data was cleared, coded and analyzed manually. Result was tabulated in relevant tables and figures and then a statistical test was done to assess the significance of association.

4.10 Data quality control

To obtain adequate information first advisor did evaluate the questionnaire. Then data was collected carefully by gathering the right records for each question. Before feeding the information (data) in to the computer it was checked for completion and accuracy. Then it was feed in the computer and analyzed and interpreted.

4.11 Ethical consideration

The research proposal was submitted to SRP for ethical consideration .An official letter was written by School of Dentistry to JUSH record room professionals as ethical approval for the conduct of the study. After the permission the purpose of the study was explained politely to the record room professional and they were asked for their cooperation in providing information and to allow the data collectors to see the cards of the previously treated patents in dental clinic with complaint of facial fracture.

4.12 Limitation

1. Lack of enough previous studies in the area with similar subject for comparison.

4.13 Operational definition

-Fracture:- a sudden break in the continuity of bone

-Reduction - restoration of fractured fragments in to original anatomical position.

-Closed reduction:- alignment without visualization to the fracture line.

-Open reduction:- surgical reduction allows visual identification of fractured fragments

- Fixation:- Fixing of fractured fragments in their normal anatomical relationships to prevent displacement and achieve proper approximation.
- Immobilization:-fixation device which stabilizes reduced fragments in to their normal anatomical position until clinically bone union takes place.
- Malocclusion:- it is abnormal occlusion deviated from the normal functional occlusion after the treatment given
- Multiple fractures:- fracture of the bone more than one site
- Arch bar :- a type of prefabricated fixation materials
- Ivy (eyeleted) wire:- one of the mechanism of immobilization
- Epistaxis:- to describes a bleeding from the nose .
- Hematoma:- A localized collection of blood, often clotted in body tissue or an organ, usually due to a break or tear in the wall of blood vessels.
- Orbital fracture :- Fracture of the bone around the eye
- Le fort I fracture:- A fracture result from a blow to the upper lip region and the fracture extends horizontally through the maxilla. In this fracture the upper teeth and palate are detached from upper part of face.
- Le fort II fracture:- This is called pyramid fracture because the fracture crosses the nasal bones on the ascending process of the maxilla and lacrimal bone and crosses the orbital rim
- Le fort III fracture:- Fractures occurs when the bony attachments of the face are broken from the base of the skull.

CHAPTER FIVE

RESULTS

A total of 700 patients sustaining a 183 maxillofacial fracture were studied. from these 183 cases 75% were males and 25% were females with male to female sex ratio of 3:1.

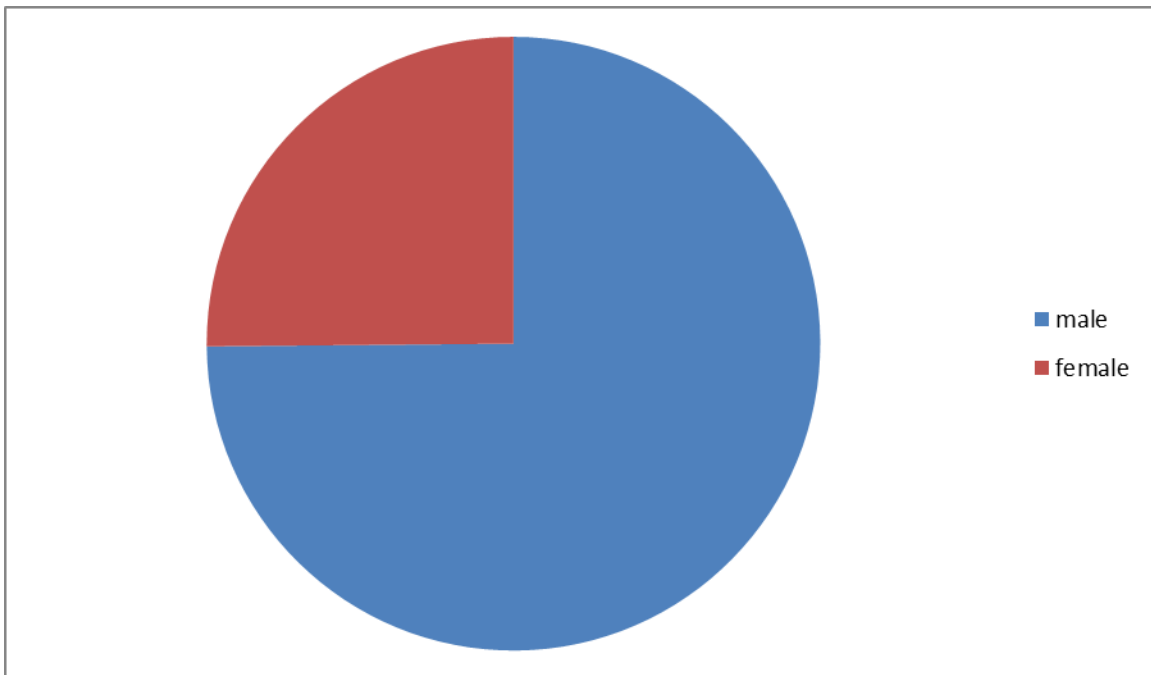


FIGURE 1. Pie chart showing Sex distribution of maxillofacial bone fracture patients who visited JUSH, dental clinic, Jimma, south western Ethiopia 2012 G.C.

Among the 183 cases of maxillofacial fracture accidents most of the patients were within the age range of 21-30 years old which is followed by the age group 11-20 and the least affected population were within the age range of 41-50 and 51-60 years old.

TABLE 1. Age distribution of maxillofacial bone fracture among patients who visited JUSH, dental clinic, Jimma, south western Ethiopia from January 1 to December 31 2012G.C.

Age group in years	Frequency no.	%
1-10	17	9.3%
11-20	62	34%
21-30	67	36.6%
31-40	21	11.5%
41-50	8	4%
51-60	8	4%
>60	-	-

In table 2 below patients were divided in age groups from 1-10 years, 11-20 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years and >60 years and result from table 2 shows there is statistically significant association between age and sex of the patients, the significant association is seen mostly in the male patient's. the greatest percentage of maxillofacial trauma in males occurred on age group range 21-30 years 36.5% followed by the age group from 11-20 years 27% and the greatest

percentage of maxillofacial trauma in females occurred on age group range 11-20 years 54.3%.

TABLE 2.Distribution of maxillofacial bone fracture according to age and sex on patient's who visited JUSH, dental clinic, Jimma, south western Ethiopia from January 1 to December 31 2012G.C.

Age group in year	Sex				Level of significance
	Male		Female		
1-10	13(9.5%)	9.5%	4	8.7%	X ² =20
11-20	37(27%)	27%	25	54.3%	Df=5
21-30	50(36.5%)	36.5%	17	37%	P=0.001
31-40	21(15%)	15%	-	-	
41-50	8(6%)	6%	-	-	
51-60	8(6%)	6%	-	-	
>60	0(0%)	0%	-	-	

Result from table 3 below shows that the most prevalent fractured facial bone were the mandibular ones n=91(49.7%) followed by maxilla n=49(26.8%) and the least fractured maxillofacial bones among the cases were nasal bone fracture n=16(8.8%)

TABLE 3.Patterns of maxillofacial bone fracture among patients who visited JUSH, dental clinic, Jimma, south western Ethiopia from January 1 to December 31 2012G.C.

Bone	Frequency No	%
Mandible	91	49.7%
Maxilla	49	26.8%
Zygoma	27	14.7%
Nasal	16	8.8%

Figure 2 below shows that the most fractured site in the mandible was on the body and the ramus of the mandible but least mandibular fracture occurred on the coronoid process.

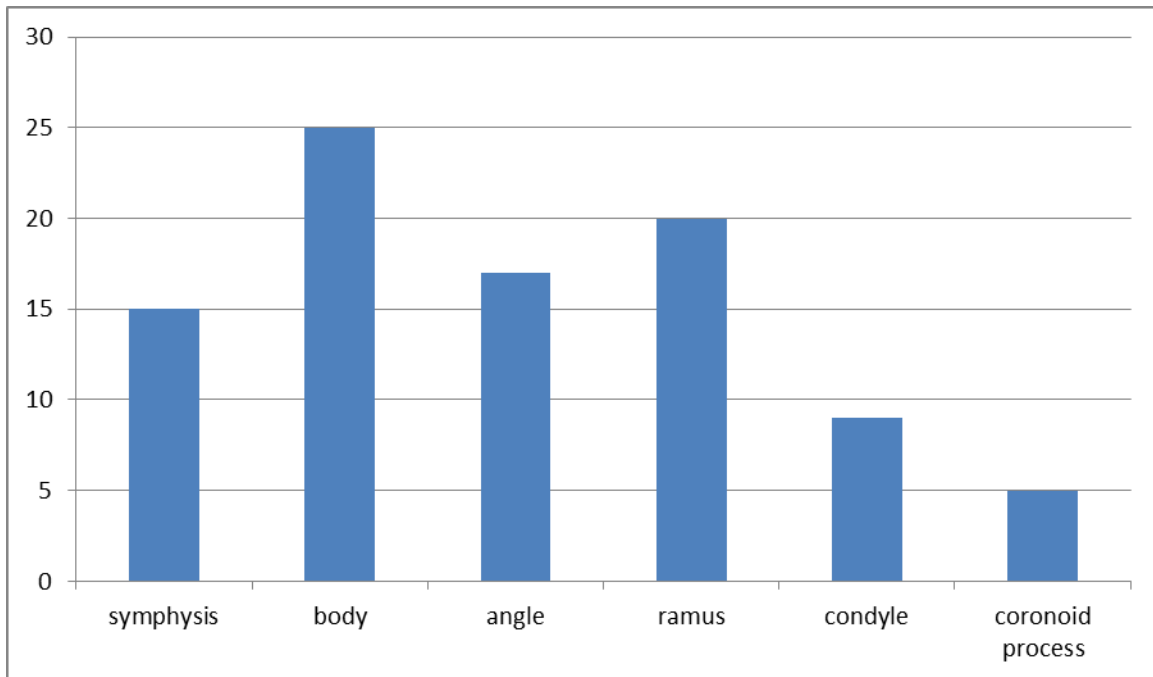


FIGURE 2: Bar chart showing distribution of Site of mandibular fracture among patients who visit JUSH, dental clinic, Jimma, south western Ethiopia from January 1 to December 31 2012G.C.

The most fractured site from the maxillary bone were the dentoalveolar n=27(55%) which is followed by Lefort I N=14(28.5%) with the least fracture cases of Lefort III.

TABLE 4.Type of fracture of the maxillary bone among patients who visit JUSH, dental clinic, Jimma, south western Ethiopia from January 1 to December 31 2012G.C.

Type of fracture	Frequency No.	%
Lefort 1	14	28.5%
Lefort 2	8	16.3%
Lefort 3	0	0%
Dento alveolar	27	55%

Figure 3 below shows that The cause for maxillofacial bone fracture were varied however the primary causative factor was fighting(assault) 43% followed by MVA 27.3%

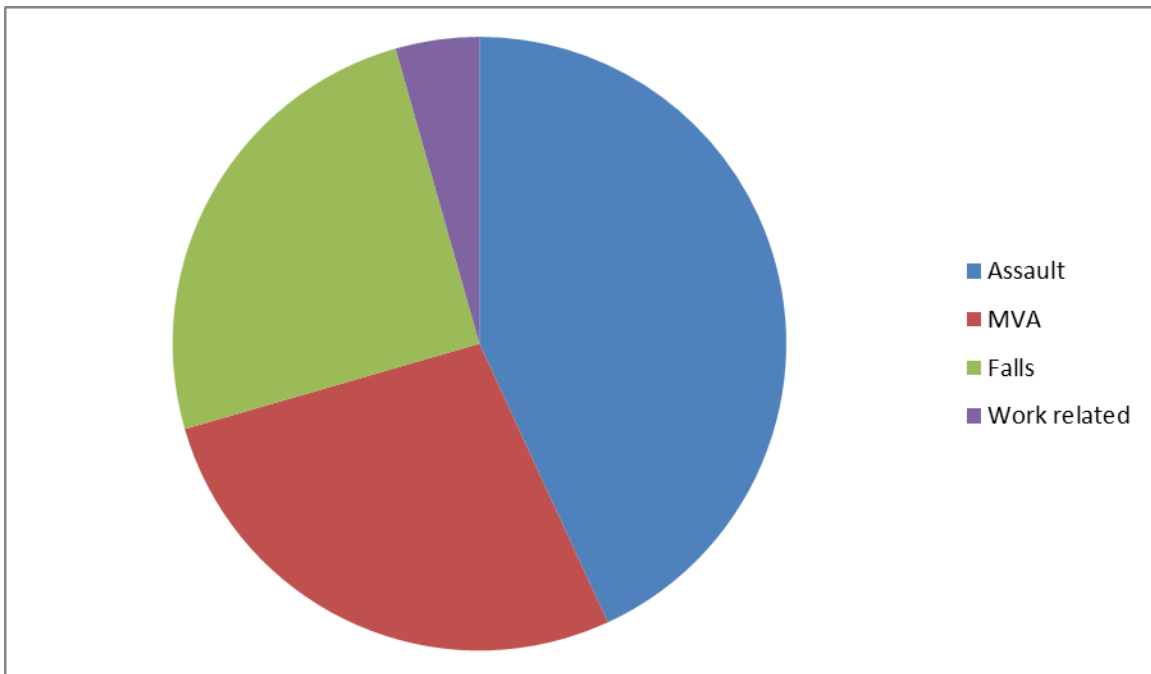


FIGURE 3: Pie chart showing distribution of causes of maxillofacial bone fracture among patients who visited JUSH, dental clinic, Jimma, south western Ethiopia, from January 1 to December 31 2012G.C.

cause for maxillofacial bone fracture were varied however the primary causative factor in females were Assaults and MVA in the age group range 11-20 years on the other hand the primary cause for maxillofacial bone fracture in males were assaults in the age group range 21-30 years as the most common age.

TABLE 5: Cause distribution of maxillofacial bone fracture according to age and sex among patients who visited JUSH, dental clinic, Jimma, south western Ethiopia, from January 1 to December 31 2012G.C.

Cause	Sex	Age					
		1-10	11-20	21-30	31-40	41-50	51-60
Assaults	Male	-	17	29	4	4	4
	Female	-	13	4	4	-	-
MVA	Male	4	13	12	-	-	-
	Female	-	13	8	-	-	-
Falls	Male	9	4	8	13	4	4
	Female	4	-	-	-	-	-
Work related	Male	-	4	4	-	-	-
	Female	-	-	-	-	-	-
Sport related	Male	-	-	-	-	-	-
	Female	-	-	-	-	-	-

The cause and pattern of maxillofacial bone fracture were varied however the most common cause for mandible, maxilla and zygoma was Assault

39.5%,53.06% and 51.58% respectively, with MVA as the primary cause for nasal bone fracture 50%.

TABLE 6.Distribution of cases of maxillofacial bone fracture according to etiology and type of fracture among patients who visit JUSH, dental clinic, Jimma, south western Ethiopia 2012 G.C.

Cause	Pattern of bone fracture							
	Mandible		Maxilla		Zygoma		Nasal bone	
	No	%	No	%	No	%	No	%
MVA	24	26.6	11	22.44	7	25.9	8	50%
		%		%		2%		
Assaults	36	39.5	26	53.06	14	51.5	3	18.75
		%		%		8%		%
Falls	27	29.6	8	16.32	6	22.2	5	31.25
		%		%		2%		%
Work related	4	4.3%	4	8.16%	-	-	-	-
Sport related	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-

Regarding the number of fracture lines in the maxillofacial skeleton 90.7% of the cases shows only one fracture lines and 9.3% of the cases shows two fracture lines. Most of the treatment modality of maxillofacial fracture was closed reduction (79.8%) of the cases, this treatment modality incorporates Arch bar with IMF, Arch bar only and conservative treatment with (no fixation).the rest of the patients(20.2%)of the cases were treated using open reduction.

CHAPTER SIX

DISCUSSION

Epidemiological studies are necessary to determine the requirements of any population to improve the quality of life and health of citizens of any country. The epidemiology of maxillofacial trauma can provide information about how people are injured and know how the geographic area, the socioeconomic status, the traffic and social behaviors can influence this type of trauma. Furthermore, monitoring trends in the occurrence of maxillofacial trauma allows adjustments to be made in training and continuing professional development in a timely fashion. Comparing the data of this study with the study conducted in Brazilian maxillo facial fractures shows that the mandible fracture occurs most frequently. Brazils reported an incidence of 44.2%, Chearnovic reported

incidence of 39.97%. The frequency of mandible fracture in our group population was 49.7 % (20).

This is lower than 70.8% and 60.67% recorded in study done in Pakistani (2) and Malaysia (21) respectively, the difference is may be due to higher MVA risk for the mandibular bone in different societies (21). However it is in the same range with 35-55% reported in Toronto General Hospital Canada (20). In this study Mandibular fracture was the most frequently occurred event in maxillofacial trauma. This was the second hospital based study on the prevalence and causal mechanisms of maxillofacial fracture done at JUSH dental clinic Jimma, Ethiopia.

The causes of maxillofacial fracture vary according to the area in which the survey was taken, the socio economic and ethnic status of the community. Consistent with finding in Toronto , Finland , Brazil , and Sweden , the present study has found that badly assault (fighting) as the most common cause. While it is different from other recorded results in countries like Malaysia , Pakistani , Thailand , Libya , Nigeria , which was MVAs as most common cause(2,3,17,18,20,21,22,27,32), these difference may be explained by the environmental and social characteristics under the study.

The male to female ratio was 3:1 in this study. This pattern is dominant and is comparable with other studies worldwide, However this ratio varies considerably from country to country (Korrey et al.,1992;Asadi and Asadi; 1997

as reported 5.37:1 in Malaysia(21),2.7:1 in Nigeria(3) and male to female ratio of 4:1 in Kuwait(Bader E At Mahmmed,BDS,Robert E.Morris,DDS,MPH,Ibrahim M.Al yassrn,BDS,Mohammed S.Belal,BDS,Abbas Al-Ramzy,BDS;Bader Al rasheed,BDS.;et al.Maxillofacial trauma in Kuwait:A retrospective study(1985-1989) page(13-16).

The ideal time to treat maxillofacial fractures depends on the location of the trauma and age of the patient. Nasal bone fractures usually repair

during the first 15 days after trauma, while mandible fracture can be manipulated with elastics until 45 days after trauma. The preferred technique for simple, non-comminuted mandibular angle fracture in this group were single mini-plate on the superior border of the mandible (champer Technique) with or without arch bars.

The zygomatic complex fractures were also treated by the using hook to reduce the fracture, without the use of plates to fixate the bone. It is interesting to note that no statistical relation was found between the modality of the treatment and age group studied.

The most commonly used treatment modality for maxillofacial fracture in this study area was closed reduction 79.8%. It is definitely different with the result recorded in Toronto general hospital Canada (12.4%) and Finland (21.7%),the difference for these treatment modalities may be due to lack of proper material supply by the government and increasing cost of equipment and operating time for the treatment of open reduction.

But it is nearly similar with the result reported in two cities of Nigeria which account 83.2% (23).

The length of the hospital stay varies according to the surgical procedure performed, the type of trauma, whether it is located or not, and the overall health status of the patient. The majority of patients had their fractures treated under general anesthesia and stayed at hospital for postoperative follow- up to 48 hours. This means that maxillofacial trauma usually is not life- threatening and treatment can be performed in an elective way.

CHAPTER SEVEN

CONCLUSSION AND RECOMMENDATION

7.1. CONCLUSION

- The body of the mandible is the most common site of fracture.
- Interpersonal violence and rood traffic accidents are the main etiologic factor associated with maxillofacial trauma.
- Most of the treatment modality of maxillofacial bone fractures in this study was closed reduction, this treatment modality

incorporates Arch bar with IMF, Arch bar only and conservative treatment with no (fixation).

- Young adults are more severely injured and are more frequently involved in accidents.
- Male patients account the higher proportion of the cases and it has a male to female ratio of 3:1.

7.2. RECOMMENDATION

- Supervise occupational environment and give training for workers on how to prevent and control accidents in work places and home environment can reduce the trauma
- Educate the public not to practice certain traditional behaviors that may result in injuries also important.
- From the result most of the cases are police cases thus the commission and the road traffic authority has a greater role in reducing the incidence of MVAS and personal disputes. Especially the road traffic authority should implement the rule and regulation.
- Preventive strategies should be enforced considering quality life, disability and cost of rehabilitation by considered bodies.

ANNEX I

REFERENCE

1. OusmanM,KebedeY,Anberbir S. Pattern and magnitude of accident and injury in North Gondar Administrative Zone.Ethiop med.J.2003 Jul:41(3):213-20.
2. Ahmed s, M.mushta, zia – ur – RahmanQureshi. Frequency of mandibular fracture at the angle of the mandible as the result

- of maxillofacial trauma at the Khyber college of Dentistry, Peshawar (1991-1997) Pakistan oral and dental Journal. 1997;28(1):31-2.
3. Ajagbe HA, Daramola JO, Oluwasanmi JO. Civilian type of facial injuries. A retrospective study of cases seen at the university college Hospital, Ibadan, Nigeria Niger Med J. 1977; 7:432-6
4. Moola MA. A retrospective audit determining the prevalence of head injuries associated with maxillofacial trauma, Johannesburg, 2007.
5. Luce EA, Tubb TD, Moore AM. Review of 1000 major facial fractures and associated injuries. Plast Reconstr Surg 1979;63:26-30.
6. Yokoyama T, Motozawa Y, Sasaki T, Hitozuqi .A retrospective analysis of oral and maxillofacial injuries in motor vehicle accidents. J oral maxillofacial surg. 2006 Dec;64(12):1731-5.
7. Arrive alive Campaign: A report back on the arrive alive campaign December 2006 to January 2007. 2007.
8. Beaumont E, Lownie JF, Cleaton-Jones FE, Neetyon NP: An Analysis of fractures of the Facial Skeleton in three populations in the Johannesburg urban Area J Dent .Assoc. Afr. 1985 Nov;40(11):633-8.
9. Simsek S, Simsek B, Abubaker O: A retrospective study of mandibular fracture in the United States and Turkey. J oral maxillofacial surg 2007; 36:395-397.
10. Bowley DMG, Khavandi A, Boffard KD, Macnab K, Eales J, Vellema J, et al: The malignant epidemic --changing patterns of trauma. S. Afr. Med J. 2002;92(10):798-802.

11. Hollier L, Grantchavora E P, Kattash M: Facial gunshot wounds: a 4 year experience. *J oral maxillofacial surg.* 2001;59:277-282.
12. Ugboko VI, Odusanya AS, Fagadeo. Maxillofacial fractures in a semi-urban Nigerian teaching hospital. A review of 442 cases. *Int oral maxillofacial surg* 1998 ;27(4):286-9.
13. Goldschmidt MJ, Castiglione CL, Assael LA, Litt MD. Craniomaxillofacial trauma in the elderly. *J oral and maxillofacial surg.* 1995 Oct;53(10):1145-9.
14. Khalil AF, Sholodi OA. Fractures of the facial bones in the eastern region of Libya. *Br. J. oral surg.* 1981; 19(4):300-4.
15. J. Peterson, E. Ellis, J.R. Hupp, M.R. Tucker. *Contemporary Oral and Maxillofacial Surgery* text book. 4th ED: Mosby; 2003; P 527-58.
16. Stark H, Olsson J. Facial fractures: a review of 922 cases with special reference to incidence and etiology. *clin otolaryngol Allied sci.* 1982 Dec;7(6):405-9.
17. Down KE, Boot DA, Gorman DA, Gorman DF. Maxillofacial and associated injuries in severely traumatized patients: implications of a regional survey. *Int J Maxillofac. surg.* 1995; 24(6): 409-12.
18. Havg RH, Prather J, Indresano AT. An epidemiologic survey of facial fractures and concomitant injuries. *J oral Maxillofac surg.* 1990 Sept;48(9):926-32.
19. Ahmed HEA, Javer MA, Fanas SKA, Karas M. The pattern of maxillofacial fractures in Sharjah United Arab Emirates: a review of 230 cases. *Oral Med. Oral Pathol. Oral Radiol. Endod.* 2004 ;98(2):166-70.
20. Alexander J. S, Tiana M, George KB, Cameron M.I. The epidemiology of maxillofacial fractures treated at the Toronto General Hospital, (1995-2001). *Can Dent Assoc* 2001;67 (11): 640-4.

21. Umar K, Abudulla P. Mandibular fracture at Husm: A 5-year retrospective study at school of dental sciences, university sains Malaysia (2002- 2006). Archives of Oro facial Sciences. 2009; 4(2): 33- 35.
22. Brasilerio BF, Passeri LA. Epidemiological analysis of maxillofacial fractures in Brazil a five-year prospective study. oralsurg, oral med, oral pathol, oral radiol Endod. 2006; 102 (1): 28-34.
23. Lundin K, Ridella A, Sandberg N, Ohmon A. One thousand maxillo-facial and related fractures at ENT-clinic in Gothenburg. A two year prospective Study. Otolaryngol. 1973 Apr; 75(4): 359-61.
24. Telfer MR, Jones GM, shepherd JP. Trends in the etiology of maxillofacial fractures in the United Kingdom (1977-1987). Br J oral maxillofacial surg 1991; 29(4): 250-5.
25. Adekeye EO. The pattern of the facial skeleton in Ibadan, Nigeria. A survey of 1,447 cases. oralsurg oral med oral pathol . 1980; 49(6): 491-5
26. Hogg NJU, Stewart TC, Armstrong JE, Giroth MJ. Epidemiology of maxillofacial injuries at trauma hospitals in Ontario, Canada, between 1992 and 1997. J Trauma 2000 ; 49(3): 425-32.
27. Kaban LB, Mulliken JB, Murray JE. Facial fractures in children and analysis of 122 fractures in 109 patients. plast. reconst. surg. 1977; 59: 15-23.
28. Bataineh AB. Etiology and incidence of maxillofacial fractures in the north of Jordan. Oral surg oral Med oral pathol oral radio. Endod 1998; 86(1): 31-5 .
29. Brook IM, Wood N. Aetiology and incidence of facial fractures in adults. Int J oral surg. 1983 Oct; 12(5): 293-8.
30. Oikarinen K, Kauppi H, Altonen M, Laitakari K. Causes and types of mandibular fractures in northern Finland in 1980-1986 Proc Finn dent. soc. 1988 ; 84(4): 227-33.

31. Donaldson K.I. Fractures in the facial skeleton a survey of 255 patients. NZ dent. J. 1961; 57:55-64.
32. Ruberui MF, Marcenes w, croucherR, sheiham A. The prevalence and causes of maxillofacial fractures in patients attending accident and emergency departments in recife-Brazil Int Dent. J .2004;54(1):47-51
33. P-K Ghosh. synopsis of oral and maxillofacial surgery (An update over view) P.164-73.
34. O.N. Obuekwe, M.A ojo. O. Akpata and M. Etetafia. Maxillofacial Trauma Due to road traffic accidents in Beninciy, city, Nigeria prospective study, annals of African medicine vol 2 No. 2:2003:58-63.
35. Motamedi MH. An assessment of maxillofacial fracture: a 5-year study of 237 patient's. J oral maxillofac. surg. 2003 Jan; 61(1):61-4.
36. Tay AG, Yeow VK, Tan BK, Sng K, Huang MH, Foo CL. A review of mandibular fractures in a craniomaxillofacial trauma center, Ann Academy Singapore. 1999 ;28:630-3.
37. Tanaka N, Tomitsuka k. Shionoyak, AndouH, kimjjima y, tashiro T. Etiology of maxillofacial fracture. Br J oral maxillofacial surg 1994 ;32(1):19-23.
38. Tsakiris p, cleaton jones PE, Lownie M A: Airway status in maxillofacial gunshot injuries in Johannesburg South Africa. SAfr Med J. 2002; 92:803-6

ANNEX II
QUESTIONNAIRES

Jimma university community based education questionnaire to assess the prevalence and cause of maxillofacial bone fracture at Jimma university Specialized hospital Dental clinic

Date -----

Card No -----

I. Identification

26. Age 1-10 31-40 > 60
27. 11-20 41-50
28. 21-30 51-60
29. Sex male..... female.....

1. Chief complain of the patient during presentation

2. Cause of fracture

- a. Fighting of assault
b. MVA
c. Falls
d. sport related
e. Work related
f. Other -----

3. Type of fracture

- a. Mandible

- 1. Angle
- 2. Condyle
- 3. Body
- b. Zygoma
- 4. Symphysis
- 5. Ramus
- 6. Coronoid process
- C/ Nasal bones
- D/ Maxilla
- 1/ Lefort I
- 2/ Le Fort II
- 3/ Le Fort III

4. According to number of facial fractures lines

- I/ One
- II/ Two on the same side
- III/ Two on different side
- IV/ > two fracture line

5. Treatment modality

Closed reduction

Open reduction

- Arch bar with IMF
- IVY loops
- No fixation
- Plates only
- Intraosseous wiring

- Plates and IMF
- Plates and IMF
- Wire and IMF

6. Post operative complication

- Malocclusion
- Malunion
- Infection
- None

Data collector -----

Signature -----

Date -----

THANK YOU !

