

Human Bite Injuries: A Five-Year Retrospective Review of Cases from A Semi-Urban Area of Bayelsa State, Nigeria.

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Abstract: Human bite injuries are common presentation in the Accident and Emergency room. They are often under reported, present late, and are characterized by soft tissue complications and severe mixed synergistic infections derived from the mouth of the assailant or the skin of the victim. *Staphylococcus aureus* is isolated in 30% of cases, the hand is commonly affected and there is a risk of transmission life threatening infections like hepatitis B, hepatitis C and to a lesser extent HIV, tetanus, actinomycosis, and *treponoma palladium*. Despite antibiotic use these patients still develop advanced wound infections, and sometimes life threatening complications. We have therefore undertaken this retrospective study is to review the pattern, bacteriology and complications of HBI in our environment. This is a retrospective study in which case notes of patients who had human bite injuries at Divine Grace Medical Center Okolobiri Bayelsa State Nigeria from January 2010 to December 2015 were reviewed and the obtained data analyzed. Simple descriptive statistics and tables were used to present results. Sixty-five (65) patients were studied with a male: female of 1:1; twenty-three (23(35.384 %)) of all human bite injuries occurred in the hand. Wound infection was the commonest complication. The patients had multiple clinical presentations, with pain, bleeding, swelling, purulent discharge, fever and chills being the commonest. *Staphylococcus aureus* was the most common organism 16(24.615%) isolated, and most were resistance to antibiotics like penicillin ampicillin, cloxacillin. Early clinical evaluation, diagnosis, treatment and the use of appropriate antibiotic coupled with detailed surgical assessment are the key to achieving good treatment outcome.

Keywords: Antibiotics resistance, Complications, Human Bite Infections.

I. Introduction

Human bite injuries HBI are one of the commonest bite injuries seen in the accident and emergency room in a developing country^[1]. The incidence of human bites is unknown as most bites are associated with potentially embarrassing social circumstances such as quarrels or extreme sexual activities, which explains the high occurrence of under-reporting^[2]. HBI results from either a direct occlusive bite, or clenched fist injury during a fight. In view of the innocent appearance of HBI, they are often neglected and overlooked^[3], and therefore the patient may not seek medical attention early and this may give rise to devastating complication such as tenosynovitis, which may result to permanent hand deformity.^[4]

HBI are prone to severe mixed synergistic infections caused by oral spirochetes, aerobic and anaerobic flora found in the mouth of the assailant or the skin of the victim.^{[3],[4],[5]}, and as a result, approximately 30-40% of human bite injuries become infected and *staphylococcus aureus* is isolated in 30% of cases. The hand is often the most affected site of HBI during a fight, but no part of the body is immune to injury. HBI to the hand may look like a minor abrasion, but due to the compact anatomical structure of the hand and the underlying sheath, tendons and ligament, are often involved.^{[5],[6]} Occlusive human bite wound of the head and neck results in avulsion, laceration, and crushing of the tissues especially the nose and the ear. Dellinger et al in 1988^[6] reported that HBI has the highest incidence of poly microbial flora (92% of culture). This view was supported and emphasized by Elli J C et al.

Boyce³ was one of the first hand surgeons to prove the value of prophylactic antibiotic agents in HBI.

In addition to acute damage to tissues involved and localized infection, human bite injury can transmit life threatening infection like hepatitis B, hepatitis C and to a less extent HIV, tetanus, actinomycosis, and *treponoma palladium* among others. Delay in making a diagnosis causes unnecessary disability since early diagnosis and institution of treatment abates the complications. The main complications of HBI are tissue damage from the bite itself, infections and psychological distress. Despite the improvements in antibiotic usage, availability of hospitals, patients in the third world still come with advanced wound infections, and sometimes life threatening complications associated with human bite injury.^[4] This has led to preventable complications and disability to the patient. Whereas HBI are common in our environment, there is paucity of information about its incidence, bacteriology, sensitivity pattern and complications in our environment.

The aim of this retrospective study is to review the pattern, bacteriology and complications of HBI in our environment.

II. Patients And Methods.

The case notes of patient with human bite injury seen or admitted at Divine Grace Medical Center Okolobiri during the period from January 2010 to December 2015 were reviewed retrospectively. The following data were extracted: age, sex, occupation, anatomic site of human bite, the bacteriology, culture and sensitivity, and the complications observed were noted and analyzed. Bite injuries from dogs, cats, snakes or mothers bitten by their children during breast feeding were excluded from the study. Data obtained were analyzed using student chi square. Simple descriptive statistics and tables were also used to present results.

III. Results

Table 1 Age and sex distribution.

S/No	Age Range	Sex		Total
		Male	Female	
1	0-10	2	1	3
2	11-20	5	3	8
3	21-30	11	15	26
4	31-40	9	10	19
5	41-50	4	2	6
6	51-60	2	0	2
7	61-70	0	1	1
Total		30	35	65

A total of 65 cases of bites were seen during the 5 year period under study. There were 30 males and 35 females, bringing the ratio to 1: 1.12. The youngest was 5 years while the oldest was a 62 old woman. Their age ranged between 5 and 62 years. Peak incidence (40%) of HBI was seen among those between the ages of 21-30 years.

Table 2: Showing the anatomic site of injury

S/No	Anatomic Region Involved	Sex		Total (%)
		Male	Female	
1	Face	1	3	4 (6.15%)
2	Nose	2	2	4 (6.15%)
3	Ear	1	5	6 (9.23%)
4	Breast	1	4	5 (7.92%)
5	Hand	13	10	23(35.3%)
6	Lip.	1	1	2(3.077%)
7	Abdomen	1	4	5 (7.692%)
8	Lower limb	2	0	2(3.077%)
9	Eye lid	0	1	1(1.540%)
10	Back	1	5	6(9.230%)
11	Head	1	2	4(6.154%)
12	Others	3	1	4(6.154%)

23(35.384 %) of all human bite injuries occurred in the hand, however, no part of the body was spared. The tip of the nose was bitten off in four cases involving two males and two females, while the lobes of the ear were affected in six patients.



Figure 1: The upper eye lid bite in a lady with injury to the affected eye

Table 3 Mode of clinical presentation in patients with HBI.

S/No	Clinical Presentation	f(%)
1	Pain.	65
2	Swelling	56
3	purulent discharge and odor	25
4	fever and chills	21
5	Cellulitis	15
6	Biting off of part of the body	13
7	Bleeding.	10

The mode of presentation in HBI is shown above. The commonest presentation was pain found in all the sixty-five (65) patients. Most patients had multiple clinical presentations, with some presenting with both swelling, purulent discharge, fever and chills. Ten (10) patients presented with bleeding while only six (6) had part of their body bitten off.

1.1 Bacteriology.

In sixty-five (65) patients, 25(38.462%) had recorded bacteriological culture and sensitivity. *Staphylococcus aureus* was present in 16(24.615%) and *Candida albicans* in 7(10.770%) while 7(10.770%) had no growth. Eleven (61.11%) had mixed infection (both gram negative and gram positive organism) . *Staphylococcus*, *streptococcus* species and *klebsellia* species were the most common pathogens in the mixed infection. No anaerobic organism was grown.

Table 4 Organisms isolated.

S/No	Bacteria Isolated	f(%)
1	Staphylococcus aureus	16(64)
2	Staphylococcus epidermidis	11(44)
3	Streptococcus species	8(32)
4	Klebsiella species	10(40)
5	Escherichia coli	13(52)
6	Proteus species	7(28)
7	Pseudomonas	6(24)
8	Candida albicans	7(28)
9	No growth.	7(28)

3.2 Antibiotics Sensitivity

Table 5. Antibiotics Sensitivity

S/No	Antibiotics/Organism	Staph. aureus	Staph epidermidis	Klebsiella Spp	Esch. Col i	Proteus Spp	Pseudomonas Spp	Strep. Spp
1	Penicillin	0	0	0	0	0	0	64
2	Ampicillin	0	0	0	0	0	0	64
3	Cloxacillin	25	40	0	0	0	0	0
4	Tetracycline	100	92	88	100	80	88	NT
5	Chloramphenicol	25	0	0	0	0	NT	NT
6	Erythromycin	88	92	25	88	60	64	100
7	Cefuroxime	80	80	88	100	72	76	NT
8	Gentimycin	100	80	68	84	68	100	100
9	Cephalosporin (cefuroxime)	92	100	100	100	100	100	100

NT= Not tested.; 0= No bacteria isolated sensitive; 100= All bacteria isolated sensitive.

The organisms were resistance to common antibiotics like penicillin ampicillin, cloxacillin and chloramphenicol but were sensitive to gentamycin, erythromycin, tetracycline, and cephalosporin

3.3 Complications.

The most common complication seen is local infection at the bite site followed by bleeding from bite site. Apart from immediate complication like bleeding, bitten off of ear lobes, tip of the nose and the lips occurred. The most crippling long time complications seen were those that occurred in the hand. One patient had amputation of the index finger; two had infection tenosynovitis while three had permanent hand deformity following infection. Diagnosis of injury to the tendon and its sheath was overlooked in three cases. This resulted in severe infection, deformity and permanent limb disability secondary to the stiffness that resulted.

Table 6 Complications

S/No	Complications	Male	Female	Total
1	Bleeding from site of bite.	3	7	10
2	Amputation of the finger	1	0	1
3	Biting off ear lobes.	1	5	6
4	Biting off tip of nose	2	2	4
5	Avulsion of lower lips	1	1	2
6	Osteomyelitis.	2	0	2
7	Abscess formation	3	2	5
8	Septic arthritis	1	0	1
9	Infectious tenosynovitis	2	0	2
10	Necrotizing fasciitis	0	1	1
11	Cosmetic impairment	1	2	3
12	Permanent hand deformity	3	0	3
13	Transmission of diseases-(tetanus, HIV, Hepatitis B and C)	0	0	0

Table 7 Treatment modalities in patient with HBI.

S/No	Treatment modality	f (%)
1	Wound cleansing	65 (100)
2	Wound debridment	10(15.4)
3	Antibiotics.	65 (100)
4	Tetanus toxiod.	32 (49.2)
5	Analgesics	65 (100)
6	Abscess drainage	5 (7.7)
7	Immobilization.	7 (10.8)
8	Suturing	15(23.1)
9	Immunization(hepatitis B.C)	0 (0)
10	Post exposure prophylaxis	0 (0)

Most patients had antibiotic and analgesics and about 60 patients of them had wound cleansing. Only 10 patients had debridement and 32 of them had Anti-tetanus toxoid. None had Immunization against Hepatitis. B and C, and no patient had post exposure prophylaxis. Six patients had Immobilization of the limb and five cases had their abscesses drained.

IV. Discussion.

HBI occur world- wide and are potentially harmful and dangerous trauma.^{[1]-[13]}The true incidence of human bite injury is difficult to estimate because minor injuries are often concealed or ignored and therefore unreported and patients may fail to seek medical attention.^{[1],[2],[3],[12],[15],[16]} The incidence in our series was 3.2% of the total number of patients (1540) seen in the clinic within the period of study. This figure is slightly lower than the report of human bite injuries from advance world like Europe whose incidence rangers between 3.6-23% of all bite injury ranking after dog and cat injuries.^{[1],[2],[3],[6],[8],[12],[15],[16]}

A higher male to female ratio has been reported in other studies.^{[1], [2], [3], [5] [6],[7]} because males are more active than females and are more likely to be involved in fight and assault which predisposes them to human bite injury. However, in our series, there were slightly more females than males. This is in contrast to the report from other centers.^{[1]-[8]}

The peak incidence of human bit injury in our study occurred in the second and third decade of life and this is in keeping with the reports of HBI from other studies.^{[1],[2], [3]}

In 1949, Boyce et al, reported a series of 90 human bites in which 74 involved the hand.³. Our study showed that no part of the body is immune to human bite injury, but the complications following a bite are more likely to occur in injuries to the hand, eyes, nose, lip and ears. This result agrees with the report from other centers.^{[1], [2], [3] [4], [5], [6]}

Infection following HBI depends largely on the local oral flora found in the biting assailant's mouth or the skin flora of the victim. The rate of infection following HBI has been found to be between 10-40% in other studies.^{[2],[3], [4], [10],[11]} In our study, 61.5% had wound infection following HBI. Though this rate of infection is statistical (P<0.0001) significantly higher than those from other center, our report agrees with the high incidence of infection following HBI. Majority of the patients (40) came with infected wounds especially those on the hand. This is because the typical clenched fist injury from a punch may appear innocuous due to the multiple planes of injury that alter alignment in different hand position.

Culture done yielded poly microbial organism and the most common organism identified was staphylococcus aureus, followed by streptococcus, and E coli.^{[11], [12] [13], [14], [15], [16]}. A study by Narsete and associates of 64 case of human bite injury revealed the same wide range of organism;^[7] these again agrees with

the result of our study. Although, no anaerobic culture was done, it is our believe that the organism will be the same as was found in the other centers. Boyce³ was the first hand surgeon to recognize and prove the value of prophylactic antibacterial agents in cases of human bites. He believed that if such a wound is not treated prophylactic with appropriate antibiotic, they will eventually be infected and this may lead to devastating consequences.^[9] He used the early antibiotics penicillin, streptomycin and sulfadiazine to treat his patients. These suggestions is true and scientific, but in our environment, patient often present late to hospital with advanced infection by which time the value of prophylactic antibiotic is lost. In our series, most isolate from human bite injury shows extended multidrug resistance to commonly used antibiotic like ampicillin, septrin, and penicillin.^{[1], [2],[3] [12], [13] [14] [15]} However, the organisms were sensitive to erythromycin, tarivid, gentamycin, and cephalosporin. This is not surprising since those antibiotics are sold off the counter, are readily available and are largely abused in our environment. *Eikenella corrodens* a gram negative organism resistance to cephalosporin is commonly isolated from human bite injury.^{[1],[5], [12], [15],[16]} In our series none was isolated. This may be the inability of our center to isolate and culture the bacterial. The most common complication recorded in our series was local wound infection(40) followed by avulsion of parts of the body (18.5%) the ear, tip of nose and lower lip as seen in 12 patients. The presence of multi-bacterium in the mouth of the assailant and the skin of the victim may account for the high rate of wound infections in these patients. Our findings agrees with the results of studies from other centers. Diagnosis of injury to the tendon and its sheath was overlooked in three cases. This resulted in severe infection, deformity and permanent limb disability secondary to the stiffness that resulted from tenosynovitis and arthritis. Though there was a delay of about three days before presentation in each case, the attending physician failed to critically evaluate and make diagnosis of the impending danger.

Human bite injury has been known to transmit diseases like hepatitis B, hepatitis C, HIV, herpes virus, actinomycosis, tetanus and other dangerous diseases. None of these diseases was linked to our patient in our series and none of them had post exposure prophylaxis. In our series, all the patients seen had empirical antibiotic, analgesics, but only had tetanus toxoid prophylaxis. Antibiotic were administered to prevent and treat impending infection, while tetanus toxoid were given only to those whose wound were extensive, dirty and infected. Those who had severe wound infection slough and deep tissue abscess had wound debridement and their abscesses drained. It is important to note that human injury may appear like a minor abrasion, which is often ignored and neglected but may lead to devastating complication. As a result of the poly bacterial inoculums present in human saliva and on the skin of the affected patient, infection rate following HBI is high. The morbidity of HBI is related to the high rate of infection, its sequelae and the neglected trivial trauma following HBI. Therefore, early clinical evaluation, diagnosis, treatment and the use of appropriate antibiotic coupled with detailed surgical assessment are the key to achieving good treatment outcome.

References

- [1]. Bashirs M I, Ibahim S A, Fatal necrotizing soft tissue infection following Human bite: a case report and review of literature. British journal of medicine and medical research. 2014. 4 (20) 3826-3833.
- [2]. De Smet, Stoffelen D. Clenched fist injury: a pitfall for patients and seogeons. Acta orthop Belg 1997; 63:113-117.
- [3]. Boyce F F, Human bites. South Med. Journal. 1949, 35: 631-638.
- [4]. McMaster P E, Human bites infections. AM J. surg. 1939, 45: 60-65.
- [5]. Talan DA, Abrahammina FM, MoranGT ae al, Clinical presentation and bacteriologic analysis of infected human bite in patients presenting to emergency department. Clin infect Dis . 2003. 37, 1481-9.
- [6]. Dellinger P E. Hand infection, bacteriology and treatment. Arch. Surg. June 1988. 123: 745-750.
- [7]. Visser A, Visser HF, biting off more than you can chew; microbiology flora isolated from human and animal bite wounds. SA orthop J 2012; 11(2) 43-48.
- [8]. Fleisher G. the management of bites wounds. N Engl J Med. 1999; 340; 138- 140
- [9]. Rittner A V, Fitzpatrick K et al, Best evidence report. Are antibiotics indicated following human Bites? Emerg. Med. J 2005, 22 : 654.
- [10]. Swatz MN. Cellulites N Engl J Med. 2004; 350 904-912.
- [11]. Perron AD, Miller MD, Brady WJ, Orthopaedic pitfalls in the ED: Fight Bite. Am J Emerg Med. 2002; 20 114-117.
- [12]. Patil PD Panchabhai T S Galwankar SC. Managing human bites. J Emerg Trauma shock, 2009,2 (3) 186-190.
- [13]. Goldstein E Biles. Mandel Douglas. Principles and practices of infectious diseases. Churchill livingstones. 2005 P 3553-6.
- [14]. Goldstein EJ, bite wounds and infections. Clin infect. Dis 1992, 14 : 633- 8.
- [15]. Morgan M. Management of animal and human bites. J Hosp Infect. 2005, 61: 1-10.
- [16]. Bartholomew C F, Jones A B, Human bites: a rare risk factor for HIV transmission. AIDS 2006, 20: 631-2.
- [17]. Nasete et al. T A, Omer G E, Moneim M S. hand infection from human bite injury. Rev 1983 : 12 :81