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Human Bites as a Weapon of Violence: How Common are they and Do they Constitute a Significant Medical Evidence?

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ABSTRACT

Objective: To document the pattern of HBM seen in police clinic Benin City Nigeria.

Methods: This is a review of all the human bite mark (HBM) seen at the police clinic.

Results: HBM were seen in 68 cases of assault and included 90 separate bites. The youngest victim was 10 years old while the oldest was 59 years with a mean age of 31.9 ± 9.68 . Age group 30-39 years accounted for most cases. Female victims were more in number both as victims and as assailants. About 94.1% of the assailants were known. The major events that lead to the use of human bite (HB) were quarrel and fights which accounted for 98.5% of cases. HB was mainly used in conjunction with other weapons. About 77.9% of the HB had single bite marks while complete tissue avulsion were seen in 1.5% of cases. The arm was the commonest site (17.8%), closely followed by the fingers (15.6%).

Conclusion: This will serve as a baseline data in Nigeria, while we strongly advocate the development of a proforma for HBM examination following ABFO guideline and HIV PEP for victims with grade 4 HBM and above.

Keywords: Crime, human bite mark, police

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INTRODUCTION

The term bite mark is defined as the trauma caused on the skin from the contact of the teeth with or without the contribution of the soft oral tissues (lips, tongue) and which depicts the form of particular oral structures.¹ Bite marks can be made by human or animal teeth in the skin of live people, cadavers or unanimated objects with relatively softened consistence.² Crimes and events featuring human bite marks (HBM), but not limited to them include abuse (child, spousal and elderly), sexual assault, assault (quarrels and fights), homicide, defence against all kinds of aggressive behaviors and self injury.^{1,3}

HBM may be found on both victims of violent crimes and assailants.^{1,3} In mortal combat situations, such as the violence associated with life and death struggles between assailants and victims, the teeth are often used as a weapon. Indeed, using the teeth to inflict serious injury on an attacker may be the only available defensive method for a victim.¹ There are three major groups

of assailants: The anger-impulsive biter (often resulting from frustration and incompetence in dealing effectively with conflict situations on the part of the assailant and is "governed by time, location, situation and type of anger" as seen in quarrel/fights). The sadistic bite (said to satisfy the need for power, domination, control, and omniscience as seen in rape cases). The ego cannibalistic biter bites in an attempt to satisfy egoistical demands by annihilating, consuming, and absorbing life essences from the victim.^{3,4}

A bite mark (BM) occurs mainly due to pressure of teeth on skin. It is accompanied by mandibular closure and suction of skin (as a negative pressure).⁵⁻⁷ Upper jaw is usually stationary and holds and stretches the skin and lower jaw is moveable and gives the most biting force.⁵⁻⁷ Front teeth are the primary biting teeth in bite marks.⁵ To standardize the analysis of BM the American Board of Forensic Odontology (ABFO) guidelines is used.⁸ Following the guideline, emphasis are put on the following: history, photography, extra oral examination, intra oral examination, impressions, sample bites and study casts.⁸

The most common methods to determine if the suspect's teeth caused the BM, include techniques to compare the pattern of the teeth (shape, size, position of teeth, individually and collectively) with similar traits and

characteristics present in life-sized photographs of the injury using transparent overlays⁹ BM is in general, circular or ovoid, and can have an appearance similar to sweet dough, like a doughnut or the dental arch may be registered as horseshoe shape patches.^{5,10} The size, shape and pattern of the biting edges of the anterior teeth in the upper and lower dental arches are considered to be specific to an individual.^{5,9} Human dentition is unique and individual due to extractions, bad alignment, bad positioning, bad development, spaces, dental fractures, restorations, other numerous factors and no two people have identical teeth, just like no two fingerprints are alike.^{8,11,12} However unlike fingerprints, which are stable over the course of an individual's life, the dentition is capable of major changes in configuration, with and without professional intervention.^{5,13} Various restorative materials can change the character of the bitten surfaces or actual position of the individual's teeth. Disease process e.g. caries or periodontal diseases can change the configuration.¹³

HBM are most often found on the skin of victims, and they may be found on almost all parts of the human body, though it occurs more in some parts.¹⁴ The crime type, age and sex of the victim affect anatomical location of a bite injury.^{5,13} Females are four times more likely to be bitten than males, whereas over 50% of the male BM victims were the suspects in the various cases seen in America.¹⁴ Findings from America, based on total incidence, reported that the arm, legs, breast and face (in that order) were the commonest sites with an incidence of 22.4%, 12.1%, 16.7% and 10.7% respectively, though a previous study 6 years earlier reported the following sites as the commonest locations: breast, arm, genitalia and back in that order.^{14,15} Females are most often bitten on the breasts, thigh, legs and around parts of the body associated with sexuality during sexual attacks (including sexual homicide, rape and child sexual abuse), whereas bites on males are commonly seen on the arms, shoulders, chest, penis and back.^{9,14,16-18} In cases of homosexual assault in male victims BM are found on the back of the shoulder, arm or armpit, chest and penis. In cases of self-defense the victim can bite on the hands and arms of an assailant.^{9,15-17} Adolescent self-inflicted bites are usually seen on the medial aspect of the arm.¹⁷ In defensive circumstances, as when the arms are held up to ward off an attacker, the arms and hands are often bitten.⁹

In Nigeria, very few works have been done with respect to HB to the face only, which reported that the unmarried female in her third decade dominated both as victim and assailant and

relationship problems was the commonest cause while the lower lip was most prone to being bitten.¹⁹ There is no previous work on the general pattern of HB seen in any Nigerian setting, talk less of making attempts to use it for identification or for medical evidence. The objective of this study is to document the pattern of HBM seen in police clinic Benin City Nigeria.

SUBJECTS AND METHODS

This is a review of all the assault cases where HB were used as a weapon, conducted by the police pathologist (a senior police officer) and medical officers at the Police Clinic, Benin City, Edo State, Nigeria, from January 1st 2013 to December 31st 2013. Whenever there is a complaint of assault in any police station or post in Benin City Nigeria, the attending/investigating police officer will refer the victim to the Police Clinic. The aim of sending the victims to the clinic is to treat the injured, confirm and determine of the extent of injuries claimed by the victim and to ascertain if the victims were actually injured for those with not so much obvious injuries. The major sources of information were the assault registers and reports of the police clinic. The socio-demographic features of the victims, interval between the assault and presentation to the hospital, circumstances during which the assault occurred, anatomical site of the BM, instruments used in addition to biting, characteristics and the distribution of the assailants were analyzed statistically using SPSS version 17 (Chicago, Illinois, USA) and P-value of <0.05 was accepted as significant. Ethical clearance was given by the Ethics and Research Committee of Police Clinic.

RESULTS

HBM were seen in 68 cases of assault and included 90 separate bites. The youngest victim was 10 years old while the oldest was 59 years with a mean age of 31.9±9.68. Age group 30-39 years accounted for most cases (38.2%), closely followed by age group 20-29 years (36.8%) while age group 50-59 years accounted for the list number of cases as shown in table 1. Female victims were more in number (63.2%) with a female to male ratio of 1.7:1. Most of the victims were self employed with majority been traders (30.9%), while civil servants accounted for 17.8%. Forty one point two percent of the victims had secondary education, while 26.5% had tertiary education with 4.3% of the victims not having any form of education.

Table 2 shows the type of assailant. Two major types of assailant groups were seen; those where the assault occurred in a 2 persons conflict (single

cases i.e. an assailant and a victim) and in situations where the assault occurred during more than 2 persons conflict (group actions). For single cases, females accounted for 25% of cases while males accounted for 22.1% of cases. For group assailants, 2 females were commonest (13.2%), closely followed by husband and wife assailant cases (11.7%) and cases which had more than 2 assailants accounted for 10.3%. About 94.1% of the assailants were known with majority of them (72.1%) been acquaintances and business associates, while 14.6% were contents to the victims. HB was the only weapon used during the assault in 32.4% of cases. In an

exactly equal number of cases, a combination of HB and fist was used. HB and wood, HB and stone, HB and bottle were used as weapons in 13.2%, 7.4% and 2.9% of cases respectively. Table 3 shows the details of the forensic history and examination. The major events that lead to the use of HB as weapon were quarrels and fights which accounted for 98.5% of cases. Armed robbery attack accounted for 1.5% of cases. Following the assault, 79.4% of victims reported to the police/clinic with 24 hours of incidence occurrence, while 14.7% reported one day after. Following examination, most of the HB had single bite marks (77.9%). Two HBM and 3 or

Table 1: Socio demographic characteristics of bite mark victims

Age group	Frequency			Percentage
	Male	Female	Total	
10 – 19	1	4	5	7.4
20 – 29	8	17	25	36.8
30 – 39	12	14	26	38.2
40 – 49	3	5	8	11.8
50 – 59	1	3	4	5.9
Total	25	43	68	100
Occupation				
Self employed				
Traders	21			30.9
Drivers	6			8.8
Students	5			7.4
Under graduates	4			5.9
Others	24			35.3
Civil servants	8			17.8
Level of education				
Primary	8			11.8
Secondary	28			41.2
Tertiary	18			26.5
Incomplete primary	1			1.5
Incomplete secondary	10			14.7
None	3			4.3

more HBM were seen in 13.2% and 8.8% of situations respectively. Examination of the BM showed that in 79.4% of cases, there was obvious bruising with discrete areas associated with teeth. Partial avulsion of tissue with some laceration indicating teeth and complete tissue avulsion were each seen 1.5% of cases.

Anatomical distribution of HBM is shown in Table 4. The arm was the commonest site (17.8%) generally, followed by the fingers (15.6%) and the back (11.1%). In cases of single bites, the fingers accounted for most bites (12.2%). For the cases with 2 or more HB marks, the arm was most commonly involved, distantly followed by shoulder, finger and hand (Table 5).

DISCUSSION

HBM are found when teeth are used as weapons. They can be used as weapons of anger; weapons of excitement; weapons of control or weapons of destruction.¹⁴ Bite mark analysis, in a forensic investigation, can elucidate the kind of violence and the elapsed time between its production and the examination. It can show if the bite was produced *intravital* or *post-mortem* and, in case of several bite marks, identify the sequence of them.² The specific pattern of marks on victim's body gives a clue about the type of abuse.⁵

HB was used as a weapon in 11% of all assault cases seen during the period of study. This rate signifies that it is commonly used in our environment, hence the need for its proper

documentation and characterization. All except one HBM occurred during a quarrel/fight. This agrees with studies by Asuku et al. but completely differs from studies from Western countries, which reported crimes like homicide, sexual assault and child abuse.¹⁴⁻¹⁹ Most of the quarrels/fights were due to disagreements between business associates, acquaintances, neighbors and cotenants, with few cases of problems in relationship reported. However Asuku et al reported that relationship issues (love gone sour) was the major cause of fight in their series.¹⁹ That no case of child abuse or self inflicted HBM was reported may not be a completely true,

because when parents or care givers use bite when beating children, it is taken as an act of disciplining the child, therefore not an assault or a reportable offence.

HBM victims were mainly females. This is similar to all previous studies.^{14,15,17-19} In the studies from western countries, sexual assault was the leading cause and as such females were more of the HBM victims since they suffer such crimes more.

Age groups 20-39 years accounted for 75% of cases. This is similar to findings by Asuku et al and Freeman et al, though our rate is higher.^{18,19} This reason for this could not be explained. Asuku et al reported that this age group was mainly involved due to the high premium placed on marriage,

Table 2: Human bite assailants

Sex	Frequency	Percentage
Single assailant cases	n = 32	47.1
Males	15	22.1
Females	17	25
Multiple/group assailant cases	36	52.9
Husband & wife	8	11.7
2 females	9	13.2
2 males	1	1.5
>2 = 5 males	4	5.9
>2 = 5 females	2	2.9
>2 = 5 missed sex	7	10.3
> 6 missed sex	5	7.3
Identity of assailant		
Known	64	94.1
Acquaintances/associates	52	76.6
Cotenants	10	14.6
Neighbors	2	2.9
Unknown	4	5.9
Passengers	3	4.4
Armed robbers	1	1.5
Weapons of assault		
Human bites only	22	32.4
Human bites / use of fist	22	32.4
Human bites / fist / wood	9	13.2
Human bites / stone	5	7.4
Human bite / broken bottle	2	2.9
Human bite / others	8	11.7

Others include a single case each of cutlass + wood + bite; head butt + wood + bite; shovel + wood + bite; shovel + bottle + cutlass + wood + bite (×2); razor blade + fist + bite; kick + bite; car key + bite.

Majority of the HB victims (73.5%) had secondary education or less. The level of education may have played a role in the manner in which the victims easily got engaged in fights. An individual's level of education is known to go with some level of exposure and further determines how the individual will respond to a difficult circumstance. Most of the HB victims were self employed petty traders, drivers and artisans which meant survival

of the fittest and as such quarrels and fights can easily start from little misunderstanding.

Female assailants were higher in number for both single assailant and multiple assailant cases. This is similar to observation by Asuku et al but different from Western reports where male assailants dominated.^{14,15,17-19} Pretty et al reported that over 50% of the males, who were HB victims were the suspects in the case – reinforcing the

Table 3: Forensic history and examination

Preceding Crime	Frequency	Percentage
Quarrel / fight	67	98.5
Armed robbery	1	1.5
Interval before reporting to police		
= 1 day	54	79.4
2 days	10	14.7
3 – 7 days	2	2.9
>7 days	2	2.9
Number of bites		
One	53	77.9
Two	9	13.2
Three and above	6	8.8
Grading of bite mark		
Mild bruising	5	7.4
Obvious bruising	54	79.4
Obvious bruising with lacerations	5	7.4
Numerous lacerations	2	2.9
Partial avulsion	1	1.5
Complete tissue avulsion	1	1.5

Table 4: Anatomical site of the HBM

Anatomical Sites	Frequency	Percentage
Arm	16	17.8
Finger	14	15.6
Back	10	11.1
Fore arm	7	7.8
Breast	7	7.8
Lip	6	6.8
Shoulder	5	5.6
Hand	4	4.4
Wrist	4	4.4
Cheek	3	3.3
Ear	3	3.3
Forehead	2	2.2
Neck	2	2.2
Abdomen	2	2.2
Jaw	2	2.2
Buttocks	1	1.1
Penis	1	1.1
Thigh	1	1.1
Total	90	100

need to examine carefully this group of individuals for bitemark evidence.¹⁴ The nature of the crime associated with the HBM may be the major reason. In Nigeria, biting an opponent during a fight is considered an act of been a weakling and men try not to be associated with that. Though the findings also showed that in some fights involving 2 men, one can easily bite the other. Apart from the cultural believes, (of been a weakling), most of the assailants could be said to have given their victims, the anger-impulsive bite (often resulting from frustration and incompetence in dealing effectively with conflict situations on the part of the assailant and is “governed by time, location, situation and type of anger”).^{3,4} HB as an only weapon was used in 32.4% of situations. Bitemark injuries that are found in some serious crimes may often be the only physical evidence available, especially in the late presenting living victim¹⁴ During most other fights, it was used in conjunction with other weapons. This makes it one of the ready to be used, easily assessed arsenal/weapon in a fight. More than one assailant was involved in the fights in 53% of cases, though in such fights, the biter may just be one of the assailants. The problem with this is that at times the exact person that bit the victim was not known, though in 94.1% of the fights, the co fighters were known.

The arm was the commonest site of HBM, followed closely by the fingers. The arm was also reported as the commonest site in 3 previous studies.^{15,17,18} However Pretty et al reported breast as the commonest in their series.¹⁴ An important observation is that all the previous studies reported leg as the 2nd most common site.^{15,17,18} The frequency of occurrence of bite injuries at specific locations is known to vary with the type of crime, sex and age of the victim, specificity and distinctiveness of the populations analyzed.^{15,17,18} Also these variations may be explained by the variations in sources of data, types of cases surveyed, and the life status of the victims in the various cases. Each of these previous studies looked at specific populations. Vale et al researched on cases from corners offices, (here the bites were on predominantly deceased subjects).¹⁷ Pretty et al worked on appellate cases from the United States Court of Appeals database, while Freeman et al did an extensive questionnaire based study involving dental practitioners from 10 countries (responses were mainly from USA and only one response was from Africa).^{14,18} Common between the index study and previous works is the finding that the upper limb is the commonest anatomical site associated with biting assault generally.

Table 5: Sites of multiple HBM

Sites	Frequency (n= 37)
Arm / Finger	1
Arm / Abdomen	1
Arm / Fore arm	1
Wrist / Finger	1
Wrist / Hand	1
Wrist / Back	1
Breast / Arm	1
Breast / Hand	1
Breast / Finger	1
Cheek / Hand / Jaw	1
Cheek / Lip / Arm	1
Arm / Shoulder / Breast	1
Breast / Shoulder / Back	1
Arm / Fore arm / Back	1
Lip / Ear / Shoulder / Arm	1

In a case, there was complete avulsion of the lower lip, while in another case, there was partial avulsion of the ear cartilage with multiple lacerations indicating teeth. Majority showed obvious bruising and discrete areas associated with teeth. This grading though retrospectively done, offers some vital information that the bites associated with fights though intended to cause harm, do not generally result in extensive tissue damage and loss. Generally, the effect of bite duration, movement between tissues and teeth, bite force and hence injury on tissues like breast, arm and legs can be difficult to determine due to their high mobility.^{21,22}

Majority of the victims presented within 24 hours of assault. The main reason for presenting was not to seek medical attention, but they presented to the police to report the assailants and for possible prosecution. For the few that presented after 24 hours, HBM examination showed mainly ABFO grade I lesions (mild bruising and no individual tooth marks) due to the time elapsed before presentation. Physical and biological evidence from a HBM begins to deteriorate soon after the bite is inflicted and this poses a great challenge in forensic dentistry.⁹ The best or only opportunity to collect the evidence is when it is first observed.⁹

In 22% of the victims, there was 2 or more HBM. This collaborates previous studies that victims usually get more than a bite during assaults, though this rate is less than 43% reported by Freeman et al and Pretty et al.^{14,18} The small sample size may have been the reason. The maximum number of bites from a single crime in the index study was 4. Up to 45 HBM have been reported in a victim following a single crime.¹⁸

Prompt medical attention should be provided for the living victim since HB has a higher potential for infection than animal bites and injuries that disrupt the integrity of the skin's surface should be treated as soon as possible.^{9,23} The potential risk of HIV-1 infection following human bite although epidemiologically insignificant, it is biologically possible.²⁴ The oral tissues support HIV replication and may serve as a previously unrecognized HIV reservoir.²⁴ Primary HIV infections following a HB, where-in the saliva was not blood stained but it got smeared on a raw nail bed of a recipient has been reported and victims with severe and bleeding bites should be considered for HIV post exposure prophylaxis.²⁵ In our series all the victims were given tetanus toxoid but none was given HIV PEP because of low incidence of suspicion.

About 5.9% of the assailants were not known and attempts were not made to discover them.

During the process of biting and also during kissing and sucking, saliva is deposited on the skin's surface. It has been shown that this trace evidence is present in sufficient quantity and quality to enable PCR-based typing of the DNA that is present in saliva from white blood cells and possibly from sloughed epithelial cells.²⁶ When this is analyzed, it can help determine who contributed this biological evidence.⁹

The limitations of this work include, the small sample size, lack of the services of a dentist (let alone the services of a forensic odontologist) lack of use of standard HBM analysis guidelines y ABFO.

CONCLUSION

In conclusion, fights are the major crimes associated with HBM in our environment and arm and fingers are the common involved sites, while females are the most common victims and assailants. This will serve as a baseline data in Nigeria, while we strongly advocate the development of a proforma for HBM examination following ABFO guideline and HIV PEP for victims with grade 4 HBM and above.

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