SNAKE BITES; A FORGOTTEN MENACE IN KENYA

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ABSTRACT.

Snake bite injury is a common problem for residents of the larger Mwingi District of Kitui County in Kenya. The resultant morbidity, mortality and economic losses are enormous. This prospective cross sectional descriptive study in a single district hospital in Kenya aims to present the patient characteristics, treatments offered and to document the outcomes of snake bites, in a rural setting, of this largely forgotten menace. The study aims to rekindle the awareness to this age old problem and notes that the lower limb was the most affected, most of the snake bites occur at night and inside the houses of the victims, there's an attendant prolonged period of hospitalization from 0 to 88 days. Several patients got alternative medical treatment including; tourniquet application in 2 patients, snake stone application for 5 patients and two patients had a non specified herbal form of treatment before arrival to the hospital. That two patients had amputations, three patients required a skin graft, three patients died and the rest of the patients recovered well in the hospital. This paper concludes that most patients who receive supportive treatment with multivalent antivenin get good results however, the mortality rate and morbidity are unacceptably high in this population in comparison to other jurisdictions. The general population in Mwingi district requires public health information on measures to snake proof their houses to help reduce the menace and to avoid harmful pre hospital practices.

KEY WORDS

Snake bite, envenomation, antivenom, antivenin.

1.0 Introduction.

Africa is home to more than 400 snake species, of which about 30 are venomous species (Bernard A, (2012)). Because medical recordkeeping is so fragmented and incomplete in Africa, the exact incidence of snakebite on the continent is unknown (Bernard A, (2012), Chippaux JP, (2011), and Russell FE, (1990)). Worldwide, at least 421,000 to 1.8 million envenomings and 20,000 to 94000 deaths occur every year from snakebite; the actual numbers, could be higher (Anuradhani K, et al (2008) and Kadir, M.F et al (2015)) consequently the WHO in 2009 declared snakebite a neglected tropical disease (Bernard A, 2012) as other publishers have reported snake bites as a misunderstood problem (Ian DS et al (2009). Health authorities, meanwhile, have largely ignored the problem, both because they do not have accurate data, and thus are unaware of the incidence rates (Bernard A, 2012), Chippaux JP, (2011), and Anuradhani K, et al (2008)). The lower estimates of snakebite incidence in sub-Saharan Africa are probably a reflection of under-reporting from many parts of this region; it has been particularly difficult to find reliable data for this region, especially for East Africa (Anuradhani K, et al (2008)). The overall average frequency of snake bite in Kenya was estimated at 13.8 per 100,000 population per year (range 1.9-67.9). The minimum rate of snake bite mortality was 0.45/100,000/year (Coombs MD, et al (1997) In sub-Saharan Africa annual mortality was estimated at 7,331 (5,148-9,568), of which 97% occurred in a rural environment (Chippaux JP, (2011) More than 95% of the snakebites occur in rural Africa where antivenin therapy is not always available within 24 hours, as recommended.. In Kenya it is reported that only 27% of snake envenomation victims sought hospital treatment (Snow RW, et al (1994)). In 1971, 1972 and 1973 there were 89, 67 and 22 deaths recorded in Kenya among 47325, 46884 and 46992 deaths, respectively, from all causes (Mbindyo BS, et al (1979). Majority of the (68%) bite cases seek treatment from a traditional healer who invariably uses local herbal preparations applied to the bite site and/or in a ring around the bitten limb. Local skin incisions are also commonly practised. (Snow RW, et al (1994)). The

traditional healers have a reputation for treating difficult snake bite cases and are trusted by their patients (Bethwell OO, et al (2006)) biomedicine ignores their practice but they serve more snake bite accident victims than modern medical practitioners (Bethwell OO, et al (2006, Kihiko DK, (2013)). It is noted that the Kamba community, where this study was done, use herbal medicines influenced by the existence of an inadequate biomedical health system and cost-effectiveness (Bethwell OO, et al (2006, Kihiko DK, (2013)). The larger Mwingi District of Kitui County has some of the most venomous serpents including black mamba, green mamba, black necked cobra, and puff adders (Kihiko DK, (2013)).

2.0 Methods

A prospective cross sectional descriptive study was conducted for all patients who were bitten (as evidenced by history and a physical examination finding of fang marks) and received treatment for snake bite at Mwingi District Hospital, of Kitui county in Kenya, from August 2010 to July 2011. Mwingi district hospital serves a population of 303,828 residents of Mwingi district. Patient's demographic information, clinical presentation data, investigations, the surgical treatments offered and outcomes were the variables documented using a questionnaire. Data was coded and entered into a statistical package for social sciences version 21.0. Descriptive statistics and frequencies were employed in analysis. Categorical data was analyzed by the Chi square test and the Fischer's exact tests as appropriate and a p value of ≤ 0.05 was considered significant. Permission to carry out the study was given by the hospital's ethics and review board.

3.0 Results

Sixty five (65) patients were admitted and treated at Mwingi district hospital for snake bite injury during the study period. This gives an average hospital incidence of five patients per month (see figure one below). There was a slight male preponderance of thirty four (34) males against thirty one (31) females. The age of patients ranged from two years to sixty five with a mean of 18.1 years (std 14.48) a more youthful population was affected more as more than seventy percent of the victims are aged twenty years and below compared to the elderly population.

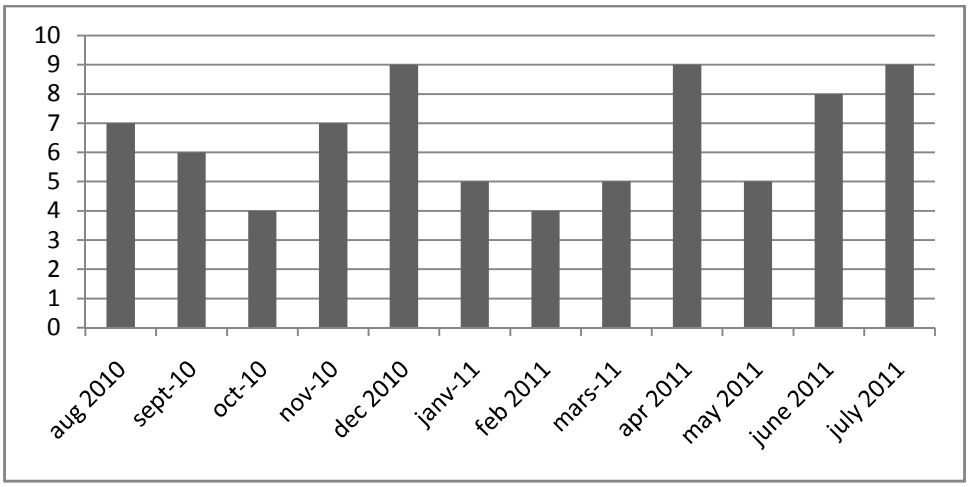

Figure one showing frequency of snake bite by month of year during the study period.

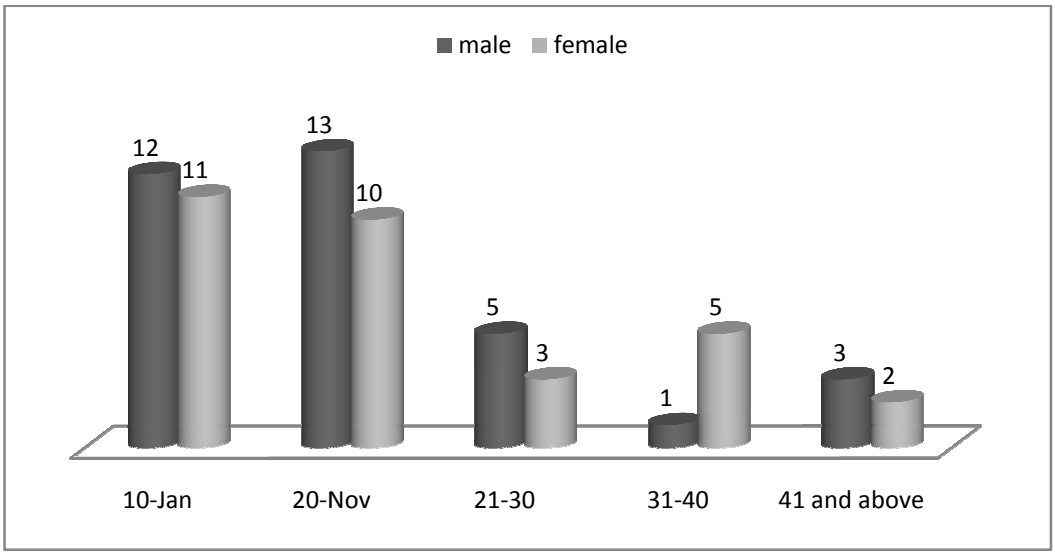

Figure two showing the distribution of bite victims by age group and gender.

There was no statistically significant difference between the sexes bitten by the snakes (p=0.452). The Most common site of bite was on the lower limbs (53.8%) followed by the upper limbs (41.5%), the head was bitten in 3.1% of cases and one patient was spit in the eyes by a spitting cobra which had invaded her chicken house as she went to check the source of commotion. Ninety four percent (n=61) of the patients had a single bite and four patients who were children of age ranging from 2-12 years had multiple bites. For an unfortunate fourteen year old boy, it was the second time he was being bitten by a snake.

Most of the patients were bitten at night (44.6%) while a sleep in their houses, other victims were bitten in the morning (10.8%), around midday (35.4%) and in the evening (9.2 %).

The commonest physical examination finding at presentation to the emergency department was a soft pitting oedema of the affected limb, followed by tissue necrosis around the site of bite. Features of systemic toxicity were present in ten patients (representing 15.4%) and they included hypotension (n=4), paraesthesias and dysaesthesia (n=5), blood oozing from site of bite (n=1). None of the patients presented with haemoptysis, haemolysis, petechiae or epistaxis as a systemic feature of anti coagulation causing venom.

	yes	no
Soft pitting oedema	50	15
bullae	2	63
Erythema/discolouration	1	64
Local tissue necrosis	32	33
Continuous blood oozing from site of bite	1	64
Systemic toxicity	10	55

Table one showing the presentation after the bite on physical exam.

The patients were hospitalized for a period ranging from 0 to 88 days with a mean of 11.72 days (std 16.2).After the bite most of the victims (n=50, 76.9%) did not receive any form of traditional treatment before they arrived in hospital .The remainder had some form of "first aid" given by their relatives before they came to hospital. These treatments included tourniquet application for seven patients (10.8%), snake stone application n=6 (9.2%), potassium permanganate application (n=1) and one other patient applied some un recognised herbal remedy. No bloodletting or mouth suctioning was reported in any of our patients.

	Yes (%)	No (%)
Antibiotics and tetanus toxoid	63 (96.9%)	2 (3.1%)
amputation	2 (3.1%)	63 (96.9%)
fasciotomy	2 (3.1%)	63 (96.9%)
Skin grafting	3 (4.6%)	62 (95.4%)
Anti snake venom	12 (18.5%)	53 (81.5%)
steroids	59 (90.8%)	6 (9.2%)

Table two showing the various treatments offered to patients bitten by snakes

Three patients died despite the medical treatment. The first a 19 year old male who was bitten once on the lower limb developed bullae and hypotension at presentation to hospital was given anti snake venom, steroids, antibiotics and tetanus toxoid he succumbed shortly after admission. The second and third were four year old males who died on the first and second days of hospitalisation respectively, one developed difficulty in breathing and another may have died from a coagulopathy, both had received anti snake venom, steroids, antibiotics and tetanus toxoid in the course of treatment.

4.0 Discussion.

This study has established that snake bites are common in Mwingi district of kitui county-Kenya. The snake bite incidence averages from four to nine patients monthly. Considering that only 27% of patients bitten by snakes in Kenya visit the hospitals for medical care the problem could be enormous (Snow RW, et al (1994)).The prevalence of snake bites could be due to the climatic conditions where the area is mostly hot and dry and a lot of farming activities take place. Secondly the kind of housing that the residents of this district have are thatch and brick walled which seems to encourage the snakes to hide in the thatch and crevices in the walls as they seek rodents and stored water in the same dwellings bringing them in direct conflict with humans (Kihiko DK, (2013)). The slight preponderance of males could be due to the activity of herding livestock in the shrubbery found in the area. The victims have been noted to be mainly youthful with age below twenty years accounting for more than 70% of the patients in this study. This compares with what was noted by Kihiko DK that 60% of his patients were children and students and that this could be due to poor judgement on the part of children as to the danger these snakes pose and the fact that most of the young are actively involved in tending for the livestock as compared to the elderly (Kihiko DK, (2013)).

The lower limbs are the most bitten site when the victims step on these snakes as they go about their activities. The Public should be educated to increase use of protective wear such as use of boots while herding livestock or walking at night to reduce the incidence of snake bite.

Children had multiple bites either a manifestation of ignorance on their part or because the snakes could outrun them as we know the black mamba which is found in this region (Kihiko DK, (2013)) can run very fast and can bite repeatedly in quick succession.

Most of the patients were bitten at night (44.6%) while a sleep in their houses this is twice the findings by Kihiko where twenty percent of the bites were at night. In Mwingi this occurred either when the victim stepped on the snake accidentally or when the snakes visited the victims' households in search of rodents, to seek warmth and stored water. Measures to snake proof homesteads such as sealing all holes and crevices, keeping lawn short, flower beds to be far from houses and traps to eliminate rodents and mice and provision of water outside the house could go a long way in dissuading invasion of snakes into human dwellings.

Most patients presented with features of local toxicity such as swelling/oedema, local tissue necrosis, bullae and erythema. Only ten of the patients had systemic features of toxicity and they were adequately treated with polyvalent antivenin though sadly three of them died.

Traditional treatments for snake bites were encountered where use of tourniquets, snake stone application, potassium permanganate and herbs were encountered. It has been demonstrated that some of these therapies can be more harmful than the bite eg application of tourniquets and therefore there is need to educate the residents of this region to abandon this harmful practices (Snow RW, et al (1994), Bethwell OO, et al (2006, Kihiko DK, (2013)).

5.0 Conclusions

This study concludes that snake bites are rampant in Mwingi district. The morbidity and mortality from snake bites is still unacceptably high in this region. Most patients who receive supportive treatment with multivalent antivenin in the hospital get good results. The general population in Mwingi district requires public health information concerning snake bites to avoid harmful pre hospital practices such as application of tourniquets. Most of the snake bites occur at night and inside the houses of the victims. Measures to snake proof the houses can help to reduce the menace.

6.0 Recommendations

The general population in Mwingi district requires public health information concerning snake bites to avoid both the snake bites and harmful pre hospital practices and that when bitten by a snake they should seek medical attention in hospitals as quickly as possible. Further, the residents should cover all holes that may lead to their houses and maintain neat well manicured lawns, and, flower beds should be away from houses. They should also seal cavities and keep rodents away from their houses and provide water outside the houses. Medical personnel should be dissuaded from unhelpful practices such as routine parenteral steroids for all snake bite victims. The state agencies must ensure availability- in adequate quantity- of multivalent antisnake venin for treatment of patients to avoid unnecessary mortality.

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