PRINT ISSN 1119-8362
Electronic ISSN 2659-1499

Full-text Available Online at
https://www.ajol.info/index.php/jasem
https://www.bioline.org.br/ja

J. Appl. Sci. Environ. Manage.
Vol. 29 (1) 163-169 Jan. 2025

Snakebite Envenomation in Benue State: A Study of Prevalence and Treatment Approach in Otukpo Local Government Area, Benue State, Nigeria

[1]ADA, G; [2]MALIK, R; [2]ONUH, BA; [3]PETER, Y O; [3]DAHIRU, S; [4]BABA, ND; [4]TITILAYO, MA; [5]BILBONGA, G; [6]ABEL, ED

*[1]Department of Pharmacology and Toxicology, College of Veterinary Medicine, Federal University of Agriculture Zuru, Kebbi State, Nigeria
[2]Department of Wildlife and Range Management, Joseph Sarwuan Tarka University, Makurdi, Benue State, Nigeria
[3]Department of Veterinary Pharmacology and Toxicology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Nigeria
[4]Department of Medical Biotechnology, National Biotechnology Development Agency Abuja, Nigeria
[5]Department of Animal Production and Health, Federal University Wukari, Taraba State, Nigeria
[6]Department of Crop Science, Federal University of Agriculture Zuru, Kebbi State, Nigeria

*Corresponding Author Email: dr.adagabriel@gmail.com
*ORCID: https://orcid.org/0000-0002-2709-1104
*Tel: +2348073844642

Co-Authors Email: dr.adagabriel@gmail.com; malikreuben@gmail.com ; peterofemilemaggie@gmail.com; onuhblessingabeje@gmail.com; mdsani77@gmail.com; dbabscan@gmail.com; asalatm06@yahoo.com; bilbongag@gmail.com; kingdavid2abel@gmail.com

ABSTRACT: Snakebite envenomation occurs frequently in the studied area, but the prevalence and management approach has not been verified. Therefore, the study aimed to assess the prevalence, and management of snakebite covering a period of ten years (January 2011 to December 2020). One hundred and fifty (150) questionnaires were administered to respondents and analysed using descriptive statistics. The result indicated 131(87.3%), of the snakebite victims, were males, while 19 (12.7%) were female. The incidence was highest among 30-39 years, while the least was among 60-69 years and above. In addition, farmers had the highest percentage of snakebite 140(93.3), followed by traders 6(4.0%), with the least being civil servants and other occupational 2(1.3%). More so, about 80(53.3%) of the victims had secondary education, followed by 54(36.0%) primary education, while 6(4.0%) of them obtained tertiary education and non-formal education 10(6.7%) respectively. *Dendroaspis viridis* 36(24%) with the highest number of victims, followed by *Echis ocellatus* 34(22.7%), *Bitis ariatas*,32(21.3), *Naja negricollis* 16(10.7%), *Atractaspis* species 4(2.7%), and unidentified species 28 (18.7%) respectively. Most of the snakebites occurred during the dry season with 87(58%), while 63(42%) occurred in the rainy season. About 145(96.7%) victims south for herbalists, while only 2(1.3%) for orthodox medicine and others. This result signified that victims strongly believe in the traditional way of snakebite treatment rather than orthodox medicine.

DOI: https://dx.doi.org/10.4314/jasem.v29i1.21

Cite this Article as: ADA, G; MALIK, R; ONUH, B. A; PETER, Y. O; DAHIRU, S; BABA, N. D; TITILAYO, M. A; BILBONGA, G; ABEL, E. D. (2025). Snakebite Envenomation In Benue State: A Study Of Prevalence And Treatment Approach In Otukpo Local Government Area, Benue State, Nigeria. *J. Appl. Sci. Environ. Manage.* 29 (1) 163-169

Dates: Received: 22 October 2024; Revised: 20 November 2024; Accepted: 28 December 2024; Published: 31 January 2025

Keywords: snakes; envenomation; snakebites; treatment; prevention

Snakebite envenoming is a neglected tropical disease with a significant public health impact. Bites by venomous snakes can cause acute medical emergencies involving shock, paralysis, haemorrhage, acute kidney injury and severe local

*Corresponding Author Email: dr.adagabriel@gmail.com
*ORCID: https://orcid.org/0000-0002-2709-1104
*Tel: +2348073844642

tissue destruction that can prove fatal or lead to permanent disability if left untreated.

The World Health Organization (WHO) estimates that 81,000–138,000 people die each year from snakebites worldwide, and about three times that number survive but are left with amputations and permanent disabilities (World Health Organization (WHO), 2019).

In Nigeria, it is common that rural populations are frequent victims of snakebites as they go about their daily farming and animal-rearing activities and as they reside in their homes (Igawe *et al*., 2020).

The situation remains a global medical and socio-economic problem, especially in tropical and sub-tropical countries (Williams *et al.,* 2019). In Sub-Saharan Africa, where the burden is second only to that of Asia, there is only one Antivenom producer based in South Africa (Habib *et al.,* 2020).

There are our main families of snake family in Nigeria; Viperidae, Elapidae, Colubridae and Actraspididae have been identified to be responsible for this problem in Nigeria with three species from the first two families - carpet viper (*Echi socellatus*), black-necked spitting cobra (*Naja nigricollis*) and puff adder (*Bitis arietans*) being the most common culprits for envenomation in Nigeria (Habib *et al*., 2020).

Therefore, this research aimed to assess the prevalence and management of snakebite envenomation from (January 2011 to December 2020) in a study area.

MATERIALS AND METHODS

Study area: Otukpo is a town in Benue State, and also a local government area, located in the Middle Belt Region of Nigeria, and is the headquarters of Idoma and Otukpo Local Government Area, comprised of Ogobia,, Upu,, Otukpoicho, Otobi,, Adoka, Oyagede, and Akpa-Igede.. The coordinates for Otukpo are 7°11′35″N 8°8′47″E

Snake of Medical Importance in Otupko LGA, Benue State, Nigeria: There are different types of snakes found in the study area, however, the photographs of Some Snake of Medical importance in Otupko LGA are presented in Plates 1 to 5.

Methodology: One hundred and fifty (150) questionnaires were administered to respondents in the study area, covering ten years (January 2011 to December 2020), and it was analysed using descriptive statistics.

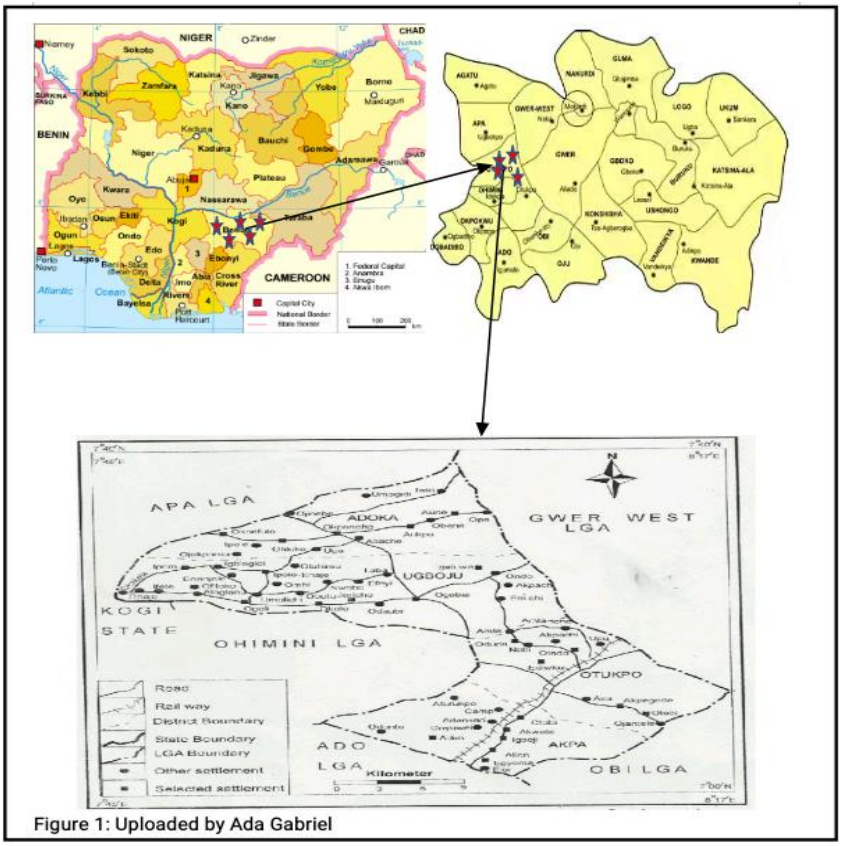
Plate 1: Idoma: Owa; English: Puff adder; Scientific Name: *Bitis arietans*

Plate 2:: Idoma: Owahe; English: Black spiting cobra; Scientific Name: *Naja nigricollis*

Plate 3: Idoma: Egwa Oleyi'epa; English: Burrowing snake; Scientific name: *Feylina currori*

Plate 4: Idoma: Achi-meme; English: Green member; Scientific name*: Dendroaspis viridis*)

Plate 5: Idoma Name: Igbeji; English name: Carpet viper; Scientific name: *Echis ocillatus*



Otukpo Coordinates: 7°43'50"N 8°32'10"E

Fig 1: A map showing Otukpo Local Government Area where the study was carried out

RESULTS AND DISCUSSION

The study was carried out in the Otukpo Local Government area of Benue State, with 150 questionnaires administered to respondents, it demonstrated that snakebites were more common among males (51.4%) than Females (48.6%) as in Figure 2, this could be due to a fact that the major risk factor to snakebites is farming, hunting in

developing countries and is mostly engaged by male counterpart in Otupko Local Government area. This is similar to the result observed by Malik *et al*., (2018), which suggests that males are more likely to be bitten by snakes than females. Instead of risks incurred during farming and hunting activities and are therefore liable to have more frequent encounters with snakes.

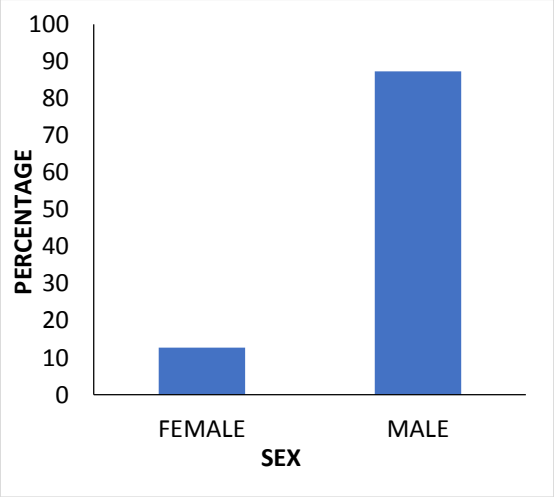


Fig 2: The bar chart shows the gender distribution of Snakebite in Otupko Local Government Area, Benue State, Nigeria from 2011 to 2020.

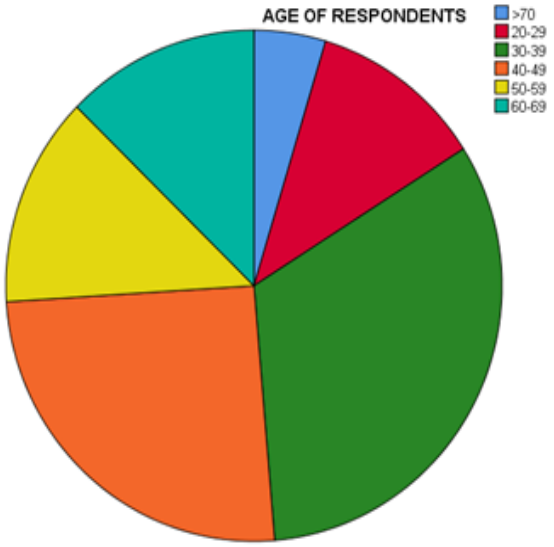


Fig 3: Distribution of age of respondents bitten by a snake in Otupko Local Government Area, Benue State, Nigeria from 2011 to 2020

The intensity of exposure and bite frequency appears to be highest in active productive years from the age of 30 to 39, 40 to 49, and with the lowest at >70, 60 to 69 and in the <20 twenties as illustrated in Figure 3. The observed age range is in agreement with the work of Tchoffo *et al*, (2019), who said snakebite victims are more among the productive age of society. The majority of snakebite victims in our study were farmers (93.3%), followed by traders (4.0%), while civil servants and individuals in other occupations accounted for 1.3% of cases, as shown in Figure 4, this underscores the connection between snakebite morbidity and agricultural activities (Mise et al., 2019). The study also revealed the educational levels of the victims (Figure 5), with 53.3% having secondary education, followed by 36.0% with primary education, 4.0% with tertiary education, and 6.7% having no formal education..

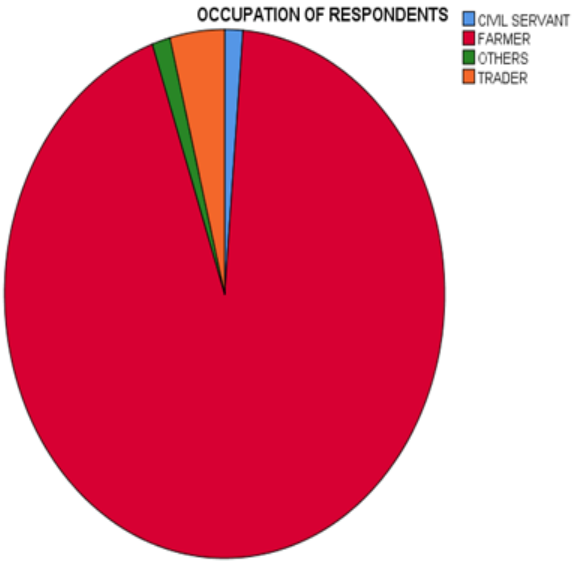


Fig 4: Distribution of snakebite victims according to the occupational status of the respondents in Otupko Local Government Area, Benue State, Nigeria from 2011 to 2020.

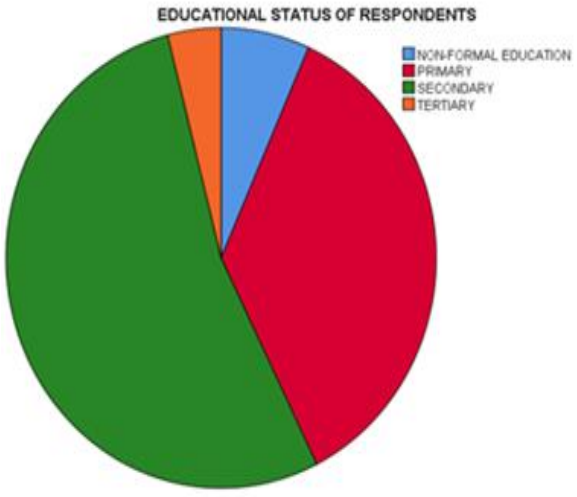


Fig 5: Distribution of snakebite victims according to the educational status of the respondents in Otupko Local Government Area, Benue State, Nigeria from 2011 to 2020.

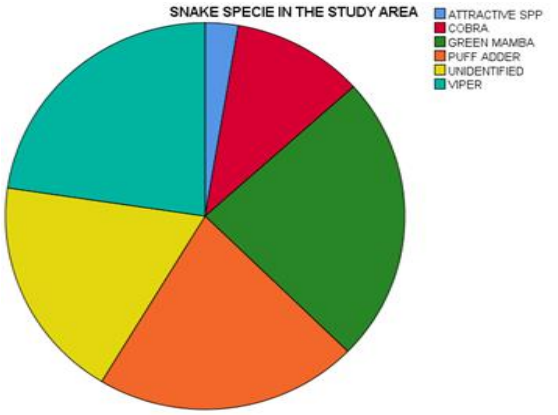


Fig 6: Distribution of snake species that is bitten people in Otupko Local Government Area, Benue State, Nigeria from 2011 to 2020. *Dendroaspis viridis* 36 (24%): *Echis ocellatus* 34(22.7%), *Bitis ariatns*, 32(21.3), *Naja negricollis* 16 (10.7%), *Atractaspis* spp 4(2.7%)

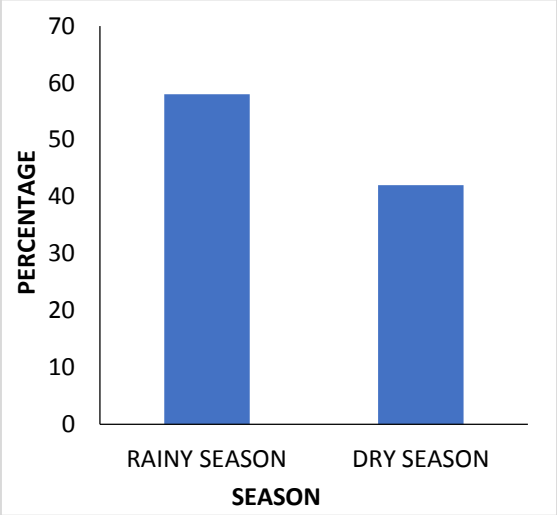


Fig 7: Seasonal distribution of snakebite in Otupko Local Government; rainy season and dry season with incidence from 2011 to 2020.

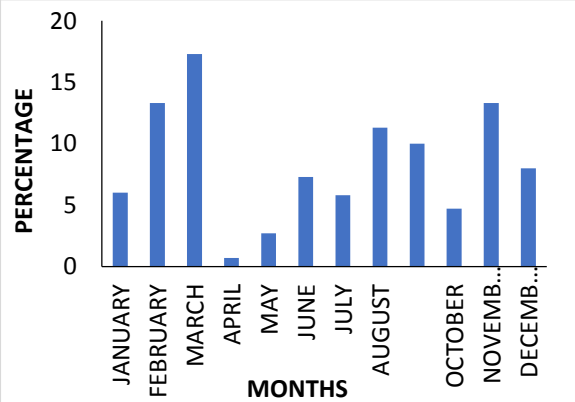


Fig 8: Distribution of snakebite victims according to the months in Otukpo Local Government Area, Benue State, Nigeria from 2011 to 2020.

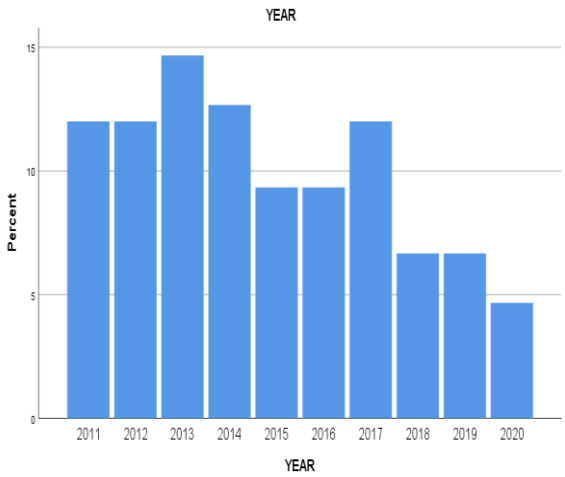


Fig 9: Distribution of snakebite victims according to the years in Otupko Local Government Area, Benue State, Nigeria from 2011 to 2020.

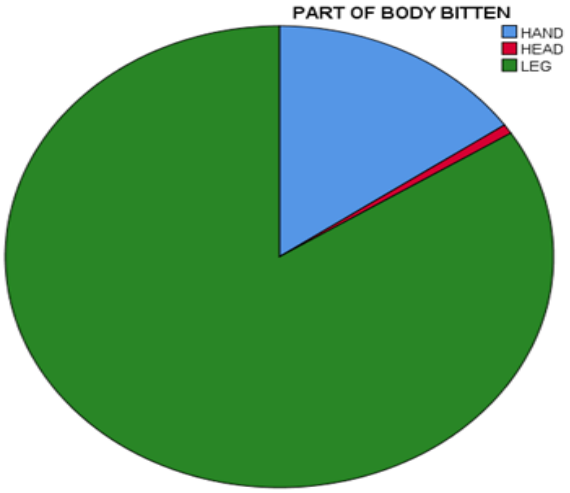


Fig 10: Distribution of respondents to the parts of the body bitten by snake in Otupko Local Government Area, Benue State, Nigeria from 2011 to 2020.

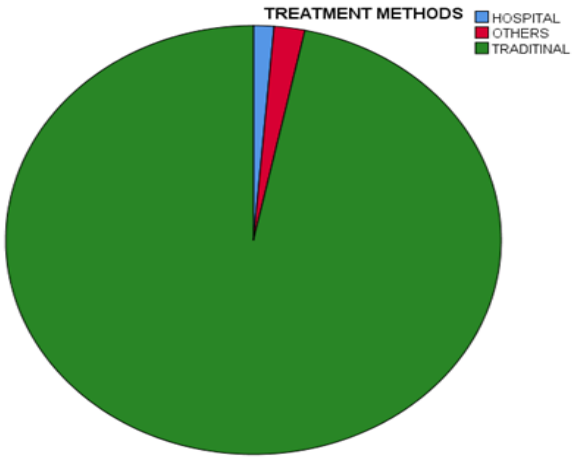


Fig 11: Distribution of snakebite treatments in Otupko Local Government Area, Benue State, Nigeria from 2011 to 2020.

The study indicated that Puff adder has the highest bite rate of 21.3%, followed by unidentified species at 18.7%, Viper i.e Echis species at the 22.7%, Cobra at 10.7%, Green member at 24%, and Atracstaspis spp 2.7% respectively (Figure 6). The current study revealed that snakebite cases were more frequent during the rainy season (58.0%) compared to the dry season (42.0%), as shown in Figure 7. This percentage of snakebite envenomation in the rainy season coincided with dense vegetation cover and vigorous farming activities within the period, a preferred habitat for snake camouflage and ambushed for their prey (Musah *et al*., 2019). The monthly record of snakebite over a study period is very low in April, May with 0.7 and 2.7% while in March 17.3%, February and November with 13.3%, respectively (Figure 8), which is significantly high which might be due to increase farm harvesting and bush burning for hunting activities in Otupko area. Snakebites envenomation tended to occur more frequently during the harvesting and increased hunting activities, the months coincide with the period of hunting to catch rodents by the youth of the Otukpo area and the availability of their prey (Nike, 2021). These snake densities are high, particularly in grain agriculture which attracts the largest rodent and amphibian populations that are eaten by snakes (Mise *et al*., 2019).

The study showed total snakebite (Figure 9), from 2010 to 2020 is 150, with a reasonably narrow uncertainty range throughout, except for 2020 with a decline. Most bites were inflicted on limbs and Leg accounted for (84.0 %), with hands (15.3) and heads (0.7 %) (Figure 10). The overall epidemiological profile of snakebite cases in our study revealed that the majority of bites occurred on the lower limbs, consistent with findings from other studies on snakebite envenomation (Magalhães *et al.*, 2019). Most victims (97%) initially sought care from traditional healers, while others opted for remedies such as the Jerusalem stone or prayer (2.0%). Only 1.3% of snakebite cases were reported to health facilities, as shown in Figure 11.

Conclusion: There are strong and institutionalized traditional snakebite treatment methods that are ongoing in this locality, that are yet to be improved. On a negative note, most of the respondents frankly rejected orthodox treatment for snakebite, which was supported by a decreasing trend of reporting their snakebite cases in the hospital. Intensive research on the locally available (currently unreported) snakebite management principle in the Otukpo Local Government area, that is yet to be utilized for the treatment of snake envenomation.

REFERENCE

Habib, AG; Musa, BM; Iliyasu, G, Hamza, M; Kuznik, A; Chippaux, JP (2020). Challenges and prospects of snake antivenom supply in sub-Saharan Africa. *PLoS Negl. Trop. Dis.* 14(8): e0008374. https://doi.org/10.1371/journal.pntd.0008374

Igawe, PB; Muhammad, JO; Nwokoro, UU; Abubakar, JD; Isah, SI; Aketemo, U; Balogun, MS; Nguku, P. (2020). Snakebite outbreak and associated risk factors in Donga, Taraba State, Nigeria, June 2016. *The Pan. Afr. Med J. 37*, 82. https://doi.org/10.11604/pamj.2020.37.82.17288

Magalhães, SFV; Peixoto, HM; Moura, N; Monteiro, WM; Oliveira, MRF. (2019). Snakebite envenomation in the Brazilian Amazon: a descriptive study. *Transactions of the Roy Soc. of Trop. Med. and Hyg.* 113: 143–151.

Malik, R; Bukie, J O; Oigocho, JJ. (2018). Assessment of Snake Bite in Some Selected Communities in Benue State, Nigeria. *Proceedings of 6th NSCB Biodiversity Conference; Uniuyo 2018 (61-64 pp)*

Mise, Y.F; Lira-da-Silva, RM; Carvalho, FM. (2019). Fatal Snakebite Envenoming and Agricultural Work in Brazil: A Case-Control Study. *Am. J. Trop. Med. Hyg.*100: 150-154.

Musah, Y; Ameade, EPK; Attuquayefio, DK; Holbech, LH. (2019) Epidemiology, ecology and human perceptions of snakebites in a savanna community of northern Ghana. PLoS *Neg. Trop. Dis.*13(8): e0007221. https://doi.org/10.1371/journal.pntd.0007221

Nike, AT. (2021). Nigeria records 2,000 deaths from snake bites every year – Minister: States with the most cases of snake bites in Nigeria are Gombe, Plateau, Adamawa, Bauchi, Borno, Nasarawa, Enugu, Kogi, Kebbi, Oyo, Benue, and Taraba. September 21, 2021, Reading Time: 2 mins read

Sani, UM; Jiya, NM; Ibitoye PK; Ahmad, MM. (2013). Presentation and outcome of snake bite among children in Sokoto, North-Western Nigeria. *Sahel Med. J.*16:148–53

Tchoffo, D; Kamgno, J; Kekeunou, S. (2019). High snakebite underreporting rate in the Centre Region of Cameroon: an observational study. *BMC Public Health* 19, 1040 https://doi.org/10.1186/s12889-019-7363-3

Silveira, PV;Nishioka, SA. (1995). Venomous snake bite without clinical envenoming (drybite). A neglected problem in Brazil. *Trop Geogr Med.*, 47(2):82-85.

WHO (2019). Snakebite Envenoming—Key Facts (2019). Available online: https://www.who.int/news-room/fact-sheets/detail/snakebite-envenoming (accessed on 22 April 2020).

Williams, DJ; Faiz, MA; Abela-Ridder, B; Ainsworth, S; Bulfone, TC; Nickerson, AD. (2019). Strategy for a globally coordinated response to a priority neglected tropical disease: Snakebite envenoming. *PLoS Neg. Trop. Dis.* .2019; 13(2): e0007059.https://doi.org/10.1371/journal.pntd.0007059 pmid:30789906