

Current Reality of Snakebite in India

A public health and socio-economic crisis

Introduction

India loses between forty and fifty thousand people to snakebite each year. Added to this are a far greater number of people who suffer some permanent loss of life function. The combined mortality and morbidity caused by venomous snakebite each year is staggering.

Medical Scenario

Reports from around the country indicate that farmers and manual labourers are the greatest victims. These people rely on free healthcare at the Primary Health Center level. Although most of the PHCs have stocks of antivenom, they are seriously lacking in the equipment and skills to deal with the medical emergency of snakebite. There are no ventilators, dialysis machines or even stocks of adrenalin. There is also a misunderstanding of the venomous snakes of each region and the affect of their venoms. This is true of doctors across the board. Even in private hospitals, often myth and hearsay are rampantly followed. There still isn't a standardized medical protocol for snakebite.

Hurdles

There are a few aspects that will make finding solutions quite challenging.

- **Regional differences in venomous snake species-** Different parts of the country have different species of medical significance. This issue is not addressed at all. Until less than a decade ago, it was believed that there were only four species of medical significance in the country: the spectacled cobra (*Naja naja*), the common krait (*Bungarus caeruleus*), the Russell's viper (*Daboia russelli*) and the saw-scaled viper (*Echis carinatus*). Numerous other species causing significant mortality and morbidity have now been identified. Most of these have local significance but do not have wide distributions. Work is being carried out to identify these species, understand their venoms and mark out their distributions.

Solution- On-ground surveys in different regions, ascertaining the species of medical importance. The creation of nodal venom production centers.

- **Intra-specific geographic variation in venom-** The venom of a single species could vary from one region to another. For example, the venom of a Russell's viper in Chennai could be very different from that of a Russell's viper in Punjab or Kerala. The problem with this is that all the venom used in the production of antivenom comes from the "Irula Tribal Snake Catchers' Cooperative Society" just South of Chennai. All the snakes used in the production of venom come from a fifty-kilometer radius of the

cooperative. This does not cover any of the snakes from other regions and existing antivenom is reported to have varying efficacy in different parts of the country. There are locations where it has almost no effect.

Solution- On ground analysis of venom from different species in different geographies. We need to understand the potency (LD50), response to existing antivenom (ED50) and the molecular structure of each of these venoms. This involves actual collection of venom samples from the medically important species throughout their range.

- **Antivenom Production follows obsolete protocols-** Although India was the first place to produce antivenom over a century ago, it has since fallen behind on its antivenom production processes. The antivenom that we use today is reported to be of poor quality. The producers claim that this is because of the low pricing structure of antivenom. Experts point out that new processes would cost very little and the efficacy of each vial of antivenom would increase with fewer cases of allergic reactions.

Solution- Updating antivenom production processes (for example caprylic acid-fractionated IgG antivenom). Creation of new production facilities utilizing venom collected from as wide a geographic distribution as possible.

- **No mandated treatment protocols-** Medical practitioners in rural regions need to be updated in the latest protocols for treatment of snakebite. Training modules are generally absent and there is very little for a PHC doctor to fall back on.

Solution- Creation of and dissemination of a standardized protocol that is available to all relevant medical practitioners.

- **Untrained PHC Staff-** A minority of PHC and rural hospital staff are trained in the treatment of snakebite. Antivenom is often wasted by administering it when there is no need to do so. This also needlessly puts the patient at risk due to the possibility of anaphylactic shock. Further, there is a fundamental ignorance about the right way to treat snakebite medically. First aid protocols are also alarmingly lacking and much of the first aid that is practiced is based on myth.

Solution- District level training on snakebite first aid for all PHC and rural hospital staff. Education and awareness material and campaigns.

- **Lack of imperative equipment and drugs-** PHCs are not equipped with ventilators and dialysis machines. The former is imperative in treating neurotoxic snakebites. Referring patients to larger hospitals during a neurotoxic snakebite case is very damaging as the time taken to mortality is very short. Dialysis machines are also required but patients suffering from hemotoxic snakebite have more time at their disposal and can be referred to larger hospitals.

Drugs like adrenalin, corticosteroids and neostigmine are invaluable in the treatment of snakebite. These drugs are not available in most PHCs.

Solution- Equipping PHCs and Block Hospitals. Creation of snakebite treatment centers centrally located within districts/*zilas*.

- **Poor ground connectivity-** The time taken to transport a victim to medical help is tremendously long. In some places, it could take over two hours to travel 30 kilometers. This is especially dangerous in the case of neurotoxic bites, where time is more critical than in the case of hemotoxic bites.

Solution- Equip and train rural ambulance services such as 408 in snakebite first aid, antivenom administration and assisted breathing. Perfect and distribute the 'ambucycle' for remote, roadless rural areas.

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MITIGATION OF SNAKEBITE IN INDIA

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