Snakebite Information Booklet for Healthcare Workers

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by

ICMR - National Institute for Research in Reproductive and Child Health, Mumbai

Snakebite Information Booklet for Healthcare Workers
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by Dr. Kedar Bhide
Director, Nature Works, Thane, Maharashtra

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Tel.: +91 -22-24192000
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Website: www.nirrch.res.in

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Message

सत्यमेव जयते

डॉ. राजीव बहल, एमडी, पीएचडी
DR. RAJIV BAHL, MD, PhD

सचिव, भारत सरकार
स्वास्थ्य अनुसंधान विभाग
स्वास्थ्य एवं परिवार कल्याण मंत्रालय एवं
महानिदेशक
भारतीय आयुर्विज्ञान अनुसंधान परिषद
Secretary, Government of India
Department of Health Research
Ministry of Health & Family Welfare &
Director-General
Indian Council of Medical Research

MESSAGE

Snakebite envenomation is a major public health problem in rural India. It is estimated that more than 1 million snakebite cases are reported every year and we lose 58000 lives to snakebite envenomation in India. In 2019, ICMR constituted a National Task Force for Snakebite Research in India in line with the World Health Organization's action plan to halve the mortality associated with snakebite by 2030. Core components of the WHO strategy include improving the availability and utilization of effective and safe anti-venoms, capacity building of medical doctors, and generating awareness among the community and healthcare workers regarding prevention and first aid after snake bite. Snakebite is one of the priority research areas for the Indian Council of Medical Research (ICMR) under Hon'ble Prime Minister's vision for New India 2022 and thereafter.

I am happy to note that ICMR-NIRRCH has been contributing towards reducing the incidence of snakebites and providing mentoring support to the state health systems in Maharashtra and Odisha. These efforts of ICMR-NIRRCH team to capacitate health system and communities are commendable. This booklet for frontline health workers is a valuable addition to ICMR's efforts towards empowering the primary health care system in India.

I congratulate ICMR-NIRRCH for developing this booklet and I hope that this would also be useful for other South East Asian countries to address the high burden of snakebite envenomation.

Best wishes

Rajiv Bahl

(Rajiv Bahl)

V. Ramalingaswamy Bhawan, Ansari Nagar, New Delhi-110029
Tel. : 011-26588204, Website : www.icmr.gov.in, E-mail : secy-dg@icmr.gov.in

Message

Dr. Swapnil Vishnu Lale
C.E.O. (State Mental Health Authority)
Director (Addl. Charge), Health Services
Addl. Director (Mental Health)

GOVERNMENT OF MAHARASHTRA
Commissionerate of Health Services
"Arogya Bhavan", 7th Floor, St. George's Hospital Compound,
P.D'mello Road, Fort, Mumbai - 400 001.
Tel. : 022-2262 1006 / 2262 0292
E-mail : director.dhs-mh@gov.in

Message

Snakebite envenomation is a major challenge faced by the public health system in Maharashtra, especially in the rural, tribal, forested, and difficult-to-reach areas in the state. The National Snakebite Project by the ICMR-National Institute for Research in Reproductive and Child Health (ICMR-NIRRCH), Mumbai is a positive step towards reducing the death and disability caused due to snakebite envenomation.

Training of Medical Officers and healthcare workers is a pivotal prerequisite to ensure delivery of adequate and effective healthcare to the snakebite victims. The Dahanu snakebite project reduced the snakebite case fatality rate from 4.4% to 0.4% with effective training of doctors. I am hopeful that this booklet will further the capacity building effort and extend it to the frontline healthcare workers like ASHAs, ANMs and MPWs for the betterment of the health systems in the state.

I congratulate the research team of ICMR-NIRRCH for developing this booklet and I believe that it will significantly contribute towards reducing the incidence of snakebites situation in Maharashtra and other regions of the country.

(Dr. Swapnil Lale)
Director, Health Services
Maharashtra

Message

GOVERNMENT OF ODISHA

Dr.BIJAYA KUMAR MOHAPATRA, MS (SURGERY),
Director of Health Services, Odisha

Bhubaneswar
dt.22.02.2023

MESSAGE

I am delighted to see this snakebite information booklet for healthcare workers developed and released by ICMR-NIRRCH, Mumbai. The frontline workers are the connecting link between the victims of snakebites in the community and the health system. This booklet will enlighten them about the identification of poisonous and non-poisonous snakes, the correct methods of first aid, and also provide them with material to empower the communities they serve regarding various measures to prevent snakebites.

The booklet is more important in states like Odisha and Maharashtra which bear a significant burden of snakebite cases, deaths, and disability. Tribal, remote, and hard-to-reach areas pose a major challenge for the health system. The ICMR National Snakebite Project, currently ongoing in the Khordha block of Khordha district and Kasipur block of Rayagada district will strive to reduce this challenge and will serve as a model for all districts in India with a high snakebite case burden.

I congratulate the research team for the development and timely release of this booklet. Once this booklet is translated into Odia and other regional languages, I am hopeful that this booklet will serve its purpose well.

Dr.Bijay Kumar Mohapatra

Foreword

डॉ. गीतांजलि सचदेवा
पी एच डी, एफ एन ए एस सी
निदेशक
आई सी एम आर – राष्ट्रीय प्रजनन एवं
बाल स्वास्थ्य अनुसंधान संस्थान
स्वास्थ्य अनुसंधान विभाग, स्वास्थ्य और परिवार
कल्याण मंत्रालय, भारत सरकार

Dr. Geetanjali Sachdeva
PhD, FNASc
Director
ICMR-National Institute for Research in
Reproductive and Child Health
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

Foreword

Snakebite envenoming kills more than one lakh people globally every year and most of these victims are often from poverty-stricken sections of society. Mortality and morbidities associated with snakebites further amplify the state of poverty of affected families. The World Health Organization aims to reduce snakebite deaths to 50% by 2030 to break this vicious cycle. Unfortunately, approximately 50% of global snakebite deaths are in India. This calls for urgent action at different levels in India.

Towards this, ICMR-NIRRCH successfully demonstrated that with capacity building of health systems, snakebite-related mortality can be significantly reduced. This research conducted through the Model Rural Health Research Unit in Dahanu, district Palghar of Maharashtra revealed many myths, unnecessary clinical practices, and a lack of information. Our Dahanu model was then upscaled by the ICMR National Task Force to an implementation research project that is currently implemented in Maharashtra and Odisha. Under this National Snakebite Project, medical officers are being trained in snakebite diagnosis and management. Awareness is also being created among the general public regarding the prevention of snakebites. This booklet is a compilation of critical instructions to be followed for the diagnosis and management of snakebites.

The booklet covers all important aspects of snakebites including identification of snakes, symptoms of snakebites, correct first aid, and prevention measures. The booklet will also be translated into Marathi and Odia languages for the benefit of communities. I congratulate Dr. Rahul Gajbhiye and the research team of the ICMR National Snakebite Project for this very important initiative. I am confident that this booklet will prove to be an extremely valuable resource in preventing snakebite-associated mortality and morbidity.

Dr. Geetanjali Sachdeva
Director

जहांगीर मेरवानजी पथ, परेल, मुंबई - ४०००१२, भारत
Jehangir Merwanji Street, Parel, Mumbai - 400 012, India
Tel : +91-22-24192000 / 24192002 Fax : +91-22-24139412
Website : www.nirrch.res.in Email : dir@nirrch.res.in

Foreword

आई.सी.एम.आर - आयुर्विज्ञान क्षेत्रीयअनुसंधान केंद्र, भुवनेश्वर
स्वास्थ्य अनुसंधान विभाग, स्वास्थ्य एवं परिवार
कल्याण मंत्रालय, भारत सरकार

ICMR-Regional Medical Research Centre, Bhubaneswar
Department of Health Research,
Ministry of Health & Family Welfare,
Government of India

Foreword

I congratulate the research team of the ICMR National Snakebite Project for developing this information booklet and training booklet for frontline healthcare workers.

Both Maharashtra and Odisha bear a high burden of snakebite envenomation in terms of mortality and morbidity. Under the ICMR National Snakebite Project in Odisha, health system capacity-building activities are being carried out for effective management of snakebite envenomation. This booklet will prove useful to the ASHAs, ANMs, and MPWs who generally, are the first point of contact for snakebite victims.

I hope that this collaboration between the ICMR-NIRRCH, Mumbai, and the ICMR-RMRC, Bhubaneswar will lead to a significant reduction in the mortality and morbidity caused by snakebite envenomation in India. Upscaling the successful model of this project to all high-burden states in India will definitely aid in attaining the World Health Organization's objective of reducing mortality associated with snakebites by 50% by 2030.

I extend my best wishes to the research teams at both institutes.

(Dr. Sanghamitra Pati)
Director

चंद्रशेखरपुर, भुवनेश्वर, ओड़िशा-751023, भारत
Chandrasekharpur, Bhubaneswar, Odisha -751023, India

Tel:+91-674-2301322 (Dir), 2301332 (PS), 2305611 (AO), 2345613 (ACO)
Fax: +91-6742301351
dir.rmrcb@icmr.gov.in | www.rmrcbbr.gov.in

Preface

आई सी एम आर - राष्ट्रीय प्रजनन एवं
बाल स्वास्थ्य अनुसंधान संस्थान, मुंबई
स्वास्थ्य अनुसंधान विभाग, स्वास्थ्य और परिवार
कल्याण मंत्रालय, भारत सरकार

ICMR - National Institute for Research in
Reproductive and Child Health, Mumbai
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

Dr. Rahul K. Gajbhiye, *MBBS, PhD*
Scientist E (Deputy Director)
DBT Wellcome India Alliance Clinical and Public Health Intermediate Fellow
Nodal Officer, Model Rural Health Research Unit, Vani, District Nashik, Maharashtra

Preface

Snakebite envenomation is a neglected tropical disease of public health importance. India alone contributes to more than 50% of the total snakebite mortality globally. To address this disease predominantly affecting marginalized sections of our society, ICMR-NIRRCH is making strenuous efforts through capacity building and community awareness. These strategies led to a significant reduction in snakebite mortality from 4.4% to 0.4% in Dahanu, District Palghar of Maharashtra.

This evidence encouraged the ICMR National Task Force on Snakebite Research to recommend upscaling the Dahanu model. The ICMR National Snakebite Project (INSP), along with the training and awareness component, includes public health facility assessment, knowledge assessment of frontline healthcare workers, focus group discussions with most affected communities, and collection of retrospective and prospective snakebite data.

While conducting these activities, we realized that easy access to a comprehensive information booklet will be of great help to the ASHAs, ANMs, and MPWs in identifying snakebites early, providing effective first aid, and timely referral to the nearest healthcare facility. This booklet pictorially depicts the commonly found snake species, signs and symptoms of snakebite envenomation, and outlines first aid and preventive measures for the same. We hope that the use of this booklet in all the high-burden areas across India proves effective in reducing deaths and disabilities associated with snakebite envenomation.

Dr. Rahul K. Gajbhiye

जहांगीर मेरवानजी पथ, परेल, मुंबई - ४०००१२,भारत
Jehangir Merwanji Street, Parel, Mumbai - 400 012, India
Tel : +91-22-24192000 / 24192002 Fax : +91-22-24139412
Website : www.nirrch.res.in Email : dir@nirrch.res.in, seniorao@nirrch.res.in

Contents

Background Information

India is called the global snakebite capital. Snakebite causes approximately 58,000 deaths in India every year. Most people get snakebites while working, fetching drinking water, sleeping on the ground, going to school or walking barefoot. There is a need to increase community awareness on snakebite prevention, provide proper first aid and to transfer the snakebite victim to a health facility as early as possible. Implementation of the National Snakebite Management Protocol (2009) as well as the Standard Treatment Guidelines (STG), 2017 is also necessary to reduce death and disability. There is no formal training program on snakebite for Medical Officers working in the public health system in India.

ICMR-NIRRCH under the Model Rural Health Research Unit, Dahanu, district Palghar, Maharashtra has been working on community awareness and capacity building of medical officers since 2014. Dr. Rahul Gajbhiye, Scientist E (Deputy Director) with Dr. Himmatrao Bawaskar, national snakebite expert could bring down the snakebite case fatality rate from 4.4% to 0.4% in Dahanu block of Maharashtra. The Dahanu Snakebite Project highlighted the unnecessary practice of doing the ASV sensitivity test before actual administration of ASV to snakebite victims. The study also revealed that the ASV manufacturers wrongly recommended the ASV sensitivity test in their inserts (DOI:10.13140/RG.2.2.30053.22245).

ICMR-National Task Force Expert Group for 'Research on Snakebite in India' recommended upscale of the Dahanu model to a Health System Research project using a similar multi-sectoral approach for attaining the WHO goal to reduce snakebite mortality by 50% till 2030. The phase I of the *'ICMR National Snakebite Project on capacity building of health systems on prevention and management of snakebite envenomation including its complications'* is being implemented in Maharashtra and Odisha and the protocol paper has been published (DOI: 10.1371/journal.pone.0281809). The study has collected two years of retrospective data on snake bites from health facilities in the study blocks. Focus group discussions have been conducted in each study area to understand the knowledge, perceptions and behaviors associated with snakebite envenomation. Culturally appropriate IECs, information booklet for health workers have been developed. Facility assessment has been conducted to understand the distribution and utilization of ASV and healthcare workers are being interviewed to understand knowledge gaps. Prospective data is also being collected and the implementation of the National Snakebite Treatment Protocol (2017) is monitored regularly.

The National Snakebite Project is using a multi-sectoral approach to reduce the burden of snakebite. It intends to contribute to community empowerment and capacity building of the public healthcare system on the prevention and management of snakebite. The results could be useful for upscaling to other Indian states, South Asia and other tropical countries. The findings of the study will provide critical regional inputs for the revision of the National Snakebite Treatment Protocol.

Dr Rahul Gajbhiye was invited for a meeting with the NITI Aayog on 19th May 2022 where he put forth the idea of having a national program on prevention and management of snakebite. It is commendable that the suggestion was upheld and a national program is currently in development in India.

Venomous and Non-venomous snake identification

There are two types of snakes

1. Venomous

2. Non-venomous

1. Venomous Snakes – The Big Four Snakes

Indian Cobra

- V/U mark on hood
- Lives in wooden piles, small shrubs and cattle shed
- Immediate pain after bite followed by swelling and darkening of skin
- Can cause blurring of vision, difficulty to speak and breathe and paralysis

Common Krait

- Found mostly during the monsoon season
- Hides in small pits, burrows and ditches
- Enters through small door gaps, bathroom pipes
- Causes severe abdominal pain, vomiting and weakness
- Can cause blurring of vision, difficulty to speak and breathe and paralysis

Venomous and Non-venomous snake identification

Russell's Viper

- Thick in appearance
- Makes sound like whistle of a pressure cooker
- Hides in sugarcane and cotton fields, tall grass
- Causes big wound at the bite site and bleeding
- Bleeding can occur through any body orifice (nostrils, mouth, ears, anus)

Saw Scaled Viper

- Hides in grass and pile of wood
- It bites when the victim is walking through grass
- The bite usually feels like a thorn prick
- Causes swelling at bite site and bleeding
- Bleeding can occur through any body orifice (nostrils, mouth, ears, anus)

2. Non-venomous Snakes

Indian Rat Snake

Common Trinket

Vine Snake

Common Cat Snake

Buffed Striped Keelback

Indian Rock Python

Indian Sand Boa

Checkered Keelback

Wolf Snake

Symptoms of snakebite envenomation

- The symptoms enlisted below commonly occur within 15 minutes to 10 hours after snakebite.
- If any of the following symptoms are seen after a snakebite, immediately take the victim to the nearest health facility where a qualified doctor and an anti-venom treatment is available

Abdominal Pain

Vomiting

Diarrhea

Excessive Sweating

Bleeding through any body orifice

Swelling at bite site

Difficulty in breathing

Unable to open eye lids

Unconsciousness

First aid for snakebite envenomation

- Most important aspect after snakebite is taking treatment only as per a qualified doctor's opinion
- First aid the crucial in saving a victim's life before reaching the doctor for anti-venom administration
- Following steps are recommended after a snakebite

1. Slowly take the victim away from the snake

2. Not every snake is venomous. Provide reassurance and calm the victim down

3. The victim should avoid running/ walking fast

4. Swelling may occur at site of snakebite. So shoes, finger rings, wrist watch, bracelets or tight clothing must be removed as soon as possible (refer picture below)


1


2


3

5. The bitten limb should be immobilized with a wooden stick in such a way that the limb is not excessively constrained and blood flow is not interrupted (refer pictures below)

Make use of any easily available item in the house / at the farm to immobilize the bitten limb. e.g. Newspaper rolls or a wooden stick or a steel ruler

6 Correct way of bandaging after snakebite

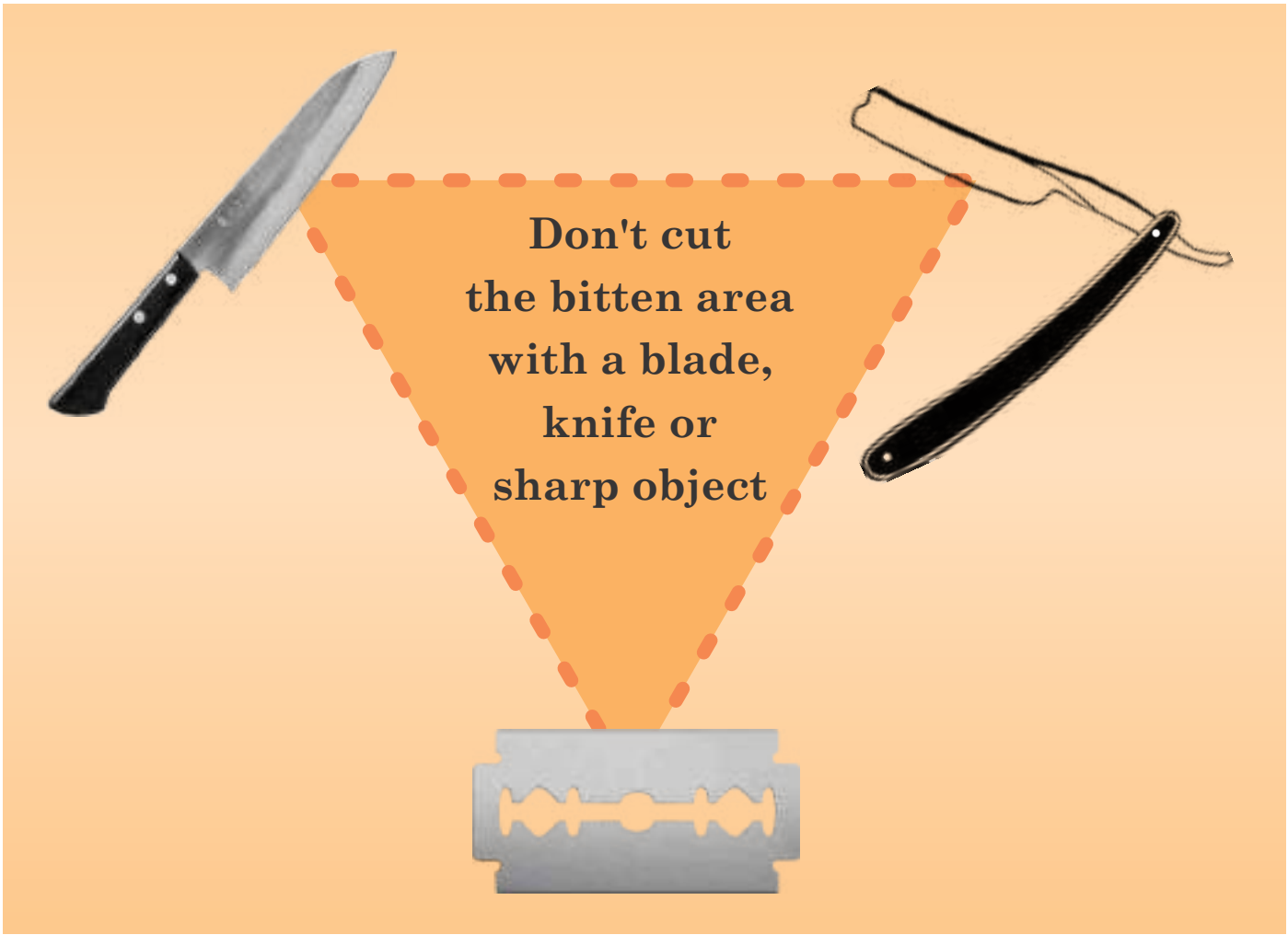
Correct way to carry a victim to hospital on a motorcycle

- While taking the victim to hospital on a motorcycle, the victim should be placed in the middle
- The victim should be held firmly by the person sitting in the back so that the victim does not fall
- The feet of the victim must be kept on the motorcycle footrest

Very Important

Following things should NOT BE DONE after snakebite

- Spending time in finding / capturing / killing the snake
- Incising the bitten area with a blade, knife or sharp object
- Sucking out the venom from the bitten area by mouth
- Wasting time in taking unproven medicines or visiting the tantrik
- Waiting for symptoms to occur before taking to hospital
- Tying an ice slab, wet or hot cloth on the bitten area
- Tying a rope or cloth very tightly around the bitten area
- Medicating without a doctor consultation
- Letting the victim run / walk / drive after the bite



Wrong Ways

of tying a bandage / tourniquet after snakebite

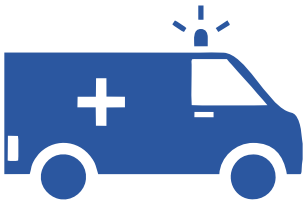
What steps

should be taken immediately after a snakebite?

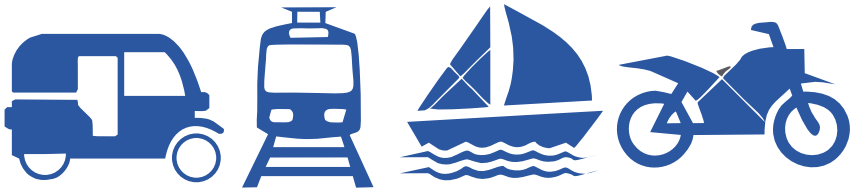
1. **Immediately call for help**

2. **Provide correct first aid measures**

3. **Dial 108 or 102 to get an ambulance**



4. **If ambulance is not available, use any of the following as per availability and need**



5. **Call the health facility to inform about the patient and ask if ASV is available there or not**

6. **After recovery, go back home only after doctor has cleared a discharge from the hospital**

Common hiding places for snakes

Measures to prevent snakebite

Use a stick while walking

Use gum boots while working

Avoid going in dense vegetation

Use torch at night

Use a cot and bed net while sleeping

Measures to prevent snakebite

Move a wooden stick before cutting grass

Caution while pulling out wooden sticks & swimming

Use a big wooden stick while walking
through forest / field / tall grass

Snakebite Treatment: Anti-Snake Venom

ASV or Anti-Snake Venom is the only effective treatment for snakebite envenomation Before taking any snakebite victim to a health facility, it is recommended that you should first call and enquire about the availability of ASV and a qualified doctor at the facility. Take the victim to nearest facility where ASV is available. Do not waste time in going to a facility where ASV is not available

The Standard Treatment Guidelines for Management of Snakebite in India recommend that the

ASV Intradermal Test OR ASV Sensitivity Test OR ASV Test Dose

should NOT be administered

Remember

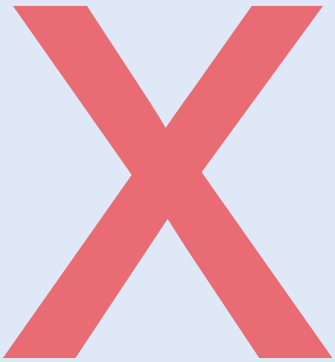
The Lyophilized (powder) form of ASV should not be stored in a freeze or freezer. It should be stored in a cool and dark place. Storage of powder ASV in freezer will make them ineffective against snake venom and also the chances of anaphylactic reaction after administration of such ASV are higher than ususal

Snakebite: Some Misunderstandings

There are many misunderstandings about snakes and snakebites.

All the things given below are misunderstandings. You **should not believe** them.

- A snake remembers the killers and takes revenge
- There is a diamond on head of the Indian Cobra
- Snake loves smell of Chrysanthemum flowers
- Snake is the protector of a hidden treasure
- If the Sand Boa touches someone, the person gets leprosy
- Cattle stops giving milk if they see Rat Snake and die soon after
- If kerosene is poured on a dead snake, the snake becomes alive again
- Snake watches the funeral of the person who dies due to snakebite
- Snakes found in the house are incarnation of forefathers
- If a victim sees green colour after snakebite, the venom spreads faster
- Snakes drink milk
- All the snakes that bite are venomous
- Leprosy gets cured if bitten by Indian Cobra
- The vine snake can attack and break the skull
- Neem tree extract helps to reduce envenomation
- Snake venom can be sucked out through a hen's rectum
- Faith healers can reduce envenomation by chanting mantras
- Snake can listen to the sound of the snake charmer's trumpet
- Checkered keelback is non-venomous in water but venomous on land



Acknowledgement

We sincerely acknowledge Dr. Vishwa Mohan Katoch, Former Secretary, DHR and Director General, ICMR, New Delhi and Dr. Kiran Katoch, Chairperson, RAC, Model Rural Health Research Unit (MRHRU), Dahanu for their support while setting up the MRHRU in Dahanu and conceptualization of snakebite project.

We thank Dr. Raman Gangakhedkar, Former Head, ECD, ICMR, New Delhi, Dr. Harpreet Kaur, Scientist F, ECD, ICMR, New Delhi and Tribal Health Research Forum for supporting and funding the study on snakebite implemented through the MRHRU, Dahanu, Maharashtra.

We are grateful to Dr. R S Dhaliwal, Scientist G and Head, Division of NCD at ICMR, New Delhi, Dr. Joy Chakma, Scientist E and Program Officer, Division of NCD at ICMR, New Delhi, Dr. Ashoo Grover, Scientist F at ICMR, New Delhi and all members of the ICMR National Task Force on Snakebite Research for supporting the study on snakebite.

We are thankful to the Principal Secretary, Public Health Department, Government of Maharashtra, Managing Director, National Health Mission, Maharashtra and Secretary, Directorate of Medical Education and Research, Government of Maharashtra for permitting the implementation of the project in Maharashtra. We acknowledge Directorate of Public Health, Department of Health and Family Welfare, Government of Odisha for supporting the project implementation in Odisha. We acknowledge the support of Dr. Arun Yadav, Assistant Director of Health Services, Government of Maharashtra for the project.

We thank the Dean, Rajiv Gandhi Medical College and Chhatrapati Shivaji Maharaj Hospital, Kalwa, district Thane, Dean, Government Medical College, Chandrapur, Dean, AIIMS Bhubaneswar for their support in securing snakebite patient records. The Civil Surgeons and District Health Officers of Thane and Gadchiroli district in Maharashtra along with the Chief District Medical Officers of Khordha and Rayagda district in Odisha are acknowledged for their help in project implementation. We thank the Medical Superintendents of Civil Hospital Thane, District Hospital Gadchiroli, Capital Hospital Bhubaneswar, District Hospital Khordha and District Hospital Rayagada for their help in data collection. We thank the Tauka Health Officers of Shahapur and Aheri blocks in Maharashtra and Khordha and Kasipur blocks in Odisha for facilitating data collection. We thank all the Medical Officers, frontline healthcare workers, community members and all the study participants.

We acknowledge Dr. Kedar Bhide, Director, Nature Works, Thane, Maharashtra, Dr. Priyanka Kadam, Snakebite Healing & Education Society, India and Dr. Sadanand Raut, Director Vighnahar Nursing Home, Narayangaon, District Pune, Maharashtra for providing images and inputs for this booklet. We thank Dr. Prabhjeet Kaur, Library and Information Officer and Mr. Vaibhav Shinde, Technician – II, Library at ICMR-NIRRCH, Mumbai for their help in formatting and beautifying the booklet.

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“We thank the following members of the ICMR National Snakebite Project's Technical Advisory Committee for their critical review and inputs during development of this booklet”

Dr. Dayal Bandhu Majumdar
Senior MO (Grade II),
Calcutta National Medical
College & Hospital, Kolkata, West Bengal

Dr. Yogesh Kalkonde
Public Health Practitioner and
Researcher, Sangwari,
Ambikapur, Chhattisgarh

Dr. Jaideep Menon
Professor, Dept. of Cardiology,
Amrita Institute of Medical
Sciences and Research Centre, Kochi, Kerala

Dr. Joy Kumar Chakma
Scientist E, Division of
Non-Communicable Diseases,
ICMR HQ, New Delhi

Dr. Kedar Bhide
Director, Nature Works
Hill Spring, Kavesar,
Thane, Maharashtra

Dr. Milind Vyawahare
Associate Professor,
Dept. of Medicine, Govt. Medical College,
Nagpur, Maharashtra

Research Team : ICMR-NIRRCH, Mumbai

Dr. Smita Mahale
Former Director and
Emeritus Scientist
ICMR-NIRRCH, Mumbai

Dr. Himmatrao Bawaskar
Co-Principal Investigator
Bawaskar Hospital and
Research Centre, Mahad

Dr. Rahul Gajbhiye
Principal Investigator
ICMR-NIRRCH,
Mumbai

Dr. Hrishikesh Munshi
Scientist C (Medical)
ICMR-NIRRCH,
Mumbai

Dr Kanna Madavi
Co-Investigator
Aheri, district Gadchiroli
Maharashtra

Dr. Manohar Bansode
Co-Investigator
Shahapur, district Thane
Maharashtra

Mr. Milind Gavhande
Project Technical Officer
Shahapur, district Thane
Maharashtra

Mr. Ganesh Bhad
Project Technical Officer
Aheri, district Gadchiroli
Maharashtra

Research Team : ICMR-RMRC,Bhubaneswar

Dr. Sanghamitra Pati
Director
ICMR-RMRC,
Bhubaneswar

Dr. Amarendra Mahapatra
Site Principal Investigator
ICMR-RMRC,
Bhubaneswar

Mr. Jagdish Prasad Dash
Project Technical Officer
Kasipur, district Rayagada
Odisha

Ms. Bijaylaxmi Mohanty
Project Technical Officer
Khordha, district Khordha
Odisha

"Snakebite is an unwarranted, preventable but often fatal disaster for farmers, labourers and rural people. The earning member or the female member is often the victim causing extreme emotional and financial setback. This further results in poor education for children and a bleak future for the entire family. Healthcare workers use their knowledge to diagnose snakebites and immediately refer victims for management, saving countless lives. The service they provide to needy people is equivalent to service provided to God and the country. The joy of seeing a snakebite victim recover back to good health is unparalleled. No healthcare worker should miss out on it. We must consider a snakebite victim as our own family member, stay away from blind beliefs or superstitious practices and work for building a healthy nation"

Padmashri Dr. Himmatrao Bawaskar
National expert on snakebite
prevention and management

ICMR - National Institute for Research in Reproductive and Child Health
Jehangir Merwanji Street, Parel, Mumbai, Maharashtra - 400012