

CDAlert

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Yaws Surveillance and Eradication - A tool to reach the un-reached tribal areas -

India has witnessed eradication of two human scourges, smallpox and guinea worm disease, since obtaining independence. National efforts are now going on to eradicate and eliminate others. One disease, which is amenable for eradication, is yaws. This disease primarily affects tribal population living in remote, hilly and forest areas having difficult terrain. It is responsible not only for great deal of misery to the affected people but also contributes significantly to the economic strain of the already impoverished segments of our society. In the process of efforts for yaws surveillance and eradication, the areas, which are difficult to reach, are frequently visited.

About yaws

Yaws belongs to a group of chronic bacterial infections (endemic treponematoses, nonvenereal spirochetel diseases) caused by treponemes. Other diseases belonging to this group are bejel (endemic syphilis) and pinta. Yaws is the most common of all and occurs primarily in the warm, humid and tropical areas of Africa, Central and South America, the Caribbean, Indian peninsula and the equatorial islands of South-East Asia.

Yaws is characterized by a primary skin lesion followed by a late stage of destructive lesions of the skin, bone and cartilage and makes a person disabled. The organism responsible for yaws is *Treponema pallidum* subspecies *pertenue*. It is morphologically and immunologically identical to *T. pallidum* (the organism that causes venereal syphilis).

The potential for eradication of yaws exists with the following factors in favour:

- Man is the only reservoir of infection;
- a "magic bullet" is available for intervention i.e., a single injection of long-acting penicillin, which is easily available at low cost, has no toxicity and is a stable preparation and;
- the infection is localized to small pockets.

The following factors need active pursuance and action to achieve the target of eradication:

- There are 5-10 times more latent cases than clinical cases;
- there are no visible lesions during the latent stage, but infectious relapses may occur which can cause new outbreaks; therefore, after an initial control effort, communities must be frequently re-surveyed to detect remaining cases;
- serological surveillance is needed to establish that transmission of infection has been interrupted.

Global overview

In areas where yaws (English) has long been endemic, there are names for it in the local language or dialect. Some of its synonyms are *framboesia* (German, Dutch), *buba* (Spanish), *bouba* (Portuguese), *pian* (French), *Parangi* (Sri Lanka), *Purru* (Malay), *Coko* (Fiji), *Bubas* (Brazil) and *Dube* (Gold Coast).

Since the creation of WHO in 1948, the fight against endemic treponematoses (yaws, bejel and pinta) has been a priority for the Organization. In the period 1952-1964, WHO in close collaboration with UNICEF, launched the global endemic treponematoses control

**National Commitment:
National Health Policy 2002 has targeted Yaws Eradication by 2005.**

programme (TCP), which became a real success story. More than 50 million patients were treated in 46 countries, reducing the overall prevalence of these diseases by more than 95%. The control strategy subsequently changed from a vertical programme to be integrated into the basic health services. These basic health services were to cope with the remaining “last cases” of endemic treponematoses in the community until eradication has been achieved. The goal of eradication was not attained and a number of foci of transmission remained. By the end of the 1970s a resurgence of the endemic treponematoses had occurred in many areas of the world. The necessity for renewed efforts was recognized by the World Health Assembly and expressed in WHA Resolution 31.58.

Since 1984, a global conference in Washington DC, and three major regional meetings have brought the problem of endemic treponematosis to the attention of health policy makers and the international donor community. This resulted in renewed control efforts in a number of countries, but the efforts were often not fully maintained and eradication was not achieved.

A major facilitating factor for endemic treponematoses control in most communities is that care of these diseases is a perceived need for the populations, resulting in strong community support for control efforts.

Furthermore, endemic treponematoses can serve as an indicator for the effectiveness of primary health care (PHC). Effective PHC services should lead to the eradication of endemic treponematoses. Where these are still prevalent, control efforts can be used as a catalyst for developing primary health care services. Cure and eradication could induce a feeling of great achievement in PHC workers and considerably enhance their respect in the community.

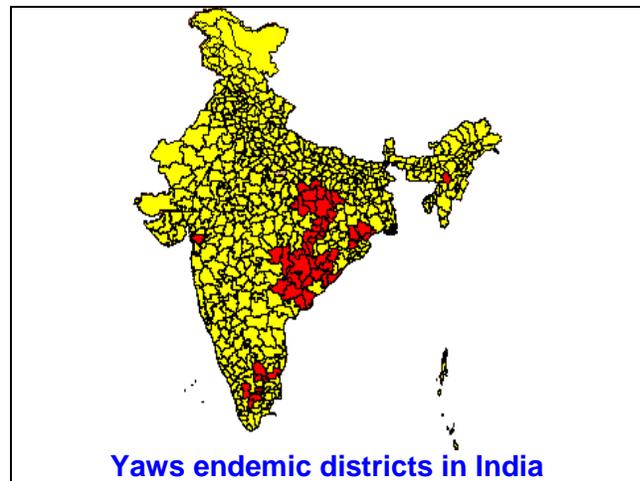
Indian scenario

In India, literature on yaws is rather scanty. Reports suggest that yaws was non-existent in India till 1887 when the cases were first noticed among tea plantation labourers in

Assam. From Assam, yaws later spread to the states of Orissa, Chattishgarh, Madhya Pradesh and other areas.

In India, the disease is mostly known by the name of the tribes affected most in any region. Thus for example, the disease is called ‘Madia Roga’ and ‘Gondi Roga’ in Bastar area of Chattishgarh and Sironcha area of Maharashtra respectively and ‘Koya rogam’ in Andhra Pradesh and Orissa. Some synonyms of yaws are based on its clinical features e.g. it is called ‘Domaru Khahu’ in Assam which indicates a fig like eruption. ‘Chakawar’ is a term used for chronic ulcers so commonly seen in Central India and part of Uttar Pradesh.

The disease has been reported from the communities living in hilly and forested areas in the tribal inhabited districts in states of Chattishgarh, Orissa, Andhra Pradesh and Maharashtra. Madhya Pradesh, Tamilnadu, Assam, Bihar, Uttar Pradesh and Gujarat are other states from where cases had been reported.



In 1950s, mass campaign launched with assistance from WHO and UNICEF resulted in marked reduction of yaws cases in India and disease prevalence was brought down from 14.0 per cent to below 0.1 per cent in many areas. Following this dramatic decline in disease transmission, active anti-yaws activities were abandoned in the majority of the States. In 1977, yaws resurgence occurred in Madhya Pradesh. In 1981, the National Institute of Communicable Diseases

(NICD), Delhi undertook a rapid survey to assess the situation; data indicated that transmission of yaws continued to occur in some areas of the country. In addition, a new focus was suspected in Dang district of Gujarat. In 1985, NICD collected information using mailed questionnaire method from various districts of five states (Andhra Pradesh, Madhya Pradesh, Orissa, Maharashtra and Tamil Nadu). The data suggested that problem of yaws continues to linger on in India albeit at a low level. In this backdrop, a "Workshop on Yaws Eradication" was convened at the (NICD), Delhi during 19-22 January 1987 to discuss the feasibility of yaws eradication from the country and to formulate operational strategies for the same. The approaches for eradication were discussed in the Workshop and it was resolved that there was a need for evolution of a national programme directed towards interruption of disease transmission in the affected states and ultimately its eradication from the country. Accordingly in 1995, NICD prepared a project document on Yaws Eradication Programme in India, which was approved by Government of India for initiating the programme in Koraput district (undivided) of Orissa and was then expanded to cover all the yaws endemic states of the country.

Epidemiology

Season

Because of the humid environment during rainy season, transmission of infection increases & the incidence of new cases and eruption of lesions in latent cases results in high prevalence of infectious yaws lesions.

Person

Early yaws is primarily a disease of children and adolescents in the endemic situation.

Reservoir of infection

Man is the only reservoir of infection. The cases of early (infectious) yaws serve as the source of infection.

Incubation period

9-90 days (average, 21 days)

Mode of transmission

Yaws is transmitted by direct (person-to-person) contact with the exudate or serum from infectious yaws lesions. The capability of the treponemae to penetrate through the intact skin is doubtful, and the presence of minor skin lesions, abrasions and even scratches seem to facilitate penetration and infection by the treponemae. Indirect transmission by insects and contaminated utensils (fomites) is generally of limited significance.

Clinical manifestation

Yaws manifests in two phases:

i) Early or infectious yaws: The lesions are characterised by exudates which may dry up to form scabs and yellow crusted granulomatous eruptions on the skin. The lesions may take different shapes and size and are:

- Papillomata may appear like cauliflower like eruption (Fig. 1 & 2).
- Ulceropapillomata (Fig. 3).
- Crab yaws seen on plantar surface causing limping in gait (Fig. 4).
- Hyperkeratosis palmar and plantar (Fig. 4 & 5).
- Nodules
- Polydactylitis due to inflammation of interphalangeal joints (Fig. 6).
- Osteoperiostitis which is characterised by nocturnal bone and joint pains (Fig. 6).
- Gondou – hypertrophic osteitis of nasal process of maxilla.

Nocturnal bone pain and tenderness of the tibia shaft and other long bones due to periostitis are common during the first five years of disease onset.

The initial lesions may persist for 3-6 months and heal spontaneously, often leaving a scar.

ii) Late yaws: Usually after five years of onset of illness, destructive and often deforming lesions of the skin and bones may appear. The late lesions are non-infectious. These are:

- Gummas of skin and subcutaneous tissues
- Hyperkeratotic lesions

- Chronic ulcers of skin and subcutaneous tissues (gummas)
- Scars from deep ulcerated nodular lesions (Fig. 7)
- Multiple pathological fractures (Fig. 8)
- Ulcerated nodules (gangosa etc.) (Fig. 9)

Yaws also exhibits latency. Most latent and incubating cases are found in clusters around an infectious case and can usually be diagnosed by epidemiological tracing. After

initial yaws, which lasts for few months, the disease may remain latent for many months to years. However, lesions which reappear within 5 years may be infectious.

Differential diagnosis

Yaws simulates the lesions of scabies, impetigo, skin tuberculosis, tinea versicolor, tropical ulcer, leprosy and psoriasis. It may also accompany these diseases. Penicillin



Fig.1 Mucocutaneous **early yaws**



Fig.2 **Early yaws** papillomata on the wrist before treatment



Fig.3 **Early** ulceropapillomatous yaws on the leg

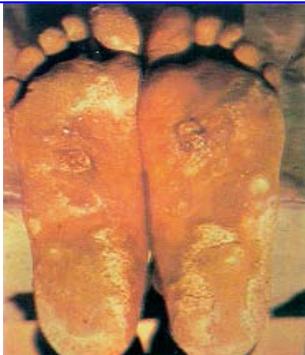


Fig.4 Plantar papillomata with hyperkeratotic macular plantar **early yaws** ("crab" yaws). These lesions are painful



Fig.5 Hyperkeratotic macular palmar **early yaws**



Fig.6 Osteoperiostitis and polydactylitis of **early yaws**



Fig.7 Scars from deep ulcerated nodular **late yaws**. Deformity is caused by osteoperiostitis and scar tissue.



Fig.8 Pathogenic fracture and malunion causing deformity of both hands & legs, due to **late yaws**

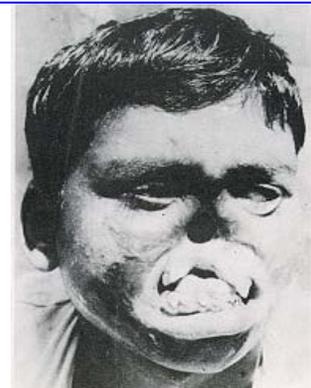


Fig.9 Gangosa-ulcerated nodular **late yaws** lesion

Table 1 : Dosages of drugs used in Yaws Eradication Programme

| Age | Drug | Dose | Route | Duration |
|----------|------------------------------|--|-------|-------------|
| < 10 yrs | Benzathine benzyl penicillin | 0.6 million units | IM | Single dose |
| > 10 yrs | Benzathine benzyl penicillin | 1.2 million units | IM | Single dose |
| < 8 yrs | Erythromycin | 30 mg/ Kg body weight in 4 divided doses daily | Oral | 15 days |
| 8-15 yrs | Tetracycline or Erythromycin | 250 mg four times daily | Oral | 15 days |
| > 15 yrs | Tetracycline or Erythromycin | 500 mg four times daily | Oral | 15 days |

Tetracycline or erythromycin are given to patients allergic to penicillin. Tetracycline is not given to pregnant and lactating mothers and children below 8 years.

treatment is very useful in differential diagnosis because of miraculous relief seen in yaws but not in other skin diseases.

Laboratory diagnosis

Serological tests to detect treponemal antibodies will be useful in diagnosis of yaws only if sexual transmitted syphilis is excluded. In field situation, these tests support a clinico-epidemiological diagnosis of yaws but are not as specific as the dark-field examination. Commonly used tests are Venereal Disease Research Laboratory (VDRL) test and the rapid plasma reagin (RPR) test. The reagents and control sera needed to perform these tests have been standardized and are commercially available. Both the tests (VDRL & RPR) are inexpensive, rapid and simple to perform. It takes time for sero-positivity to appear after the onset of disease and hence, initial (mother) case may be sero-negative.

Treatment

Drug of choice - Inj Benzathine penicillin

Alternate drugs - Tetracycline
Erythromycin

Dosage schedule of recommended drugs under the Programme is given in Table 1. Treatment is the same for cases as well as contacts.

Though reaction to penicillin in tribal areas is rare but intradermal skin test to detect penicillin hypersensitivity should be performed in every case. In patients allergic to penicillin,

alternate drugs as mentioned above may be used.

Yaws Eradication Programme

Though yaws does not kill, it cripples the affected persons thereby contributing to the disability and economic drain of the already underserved and under privileged section of the society. The disease is still a significant health problem in certain parts of India but is amenable to eradication. A simple, effective, affordable, feasible and cost effective tool is available for eradicating the disease. The WHO expert Committee on Venereal Infections and Treponematoses has also stressed that from technical considerations, eradication is possible. This gives us an opportunity to eradicate this disease and save preventable morbidity and disability among the tribal, unreached and under privileged section of the society. The Yaws Eradication Programme will also, through its modalities, bring the mainstream health services to the doorstep of the tribal people.

Programme initiation and expansion

Govt. of India approved Yaws Eradication Programme as a central sector health scheme (Pilot Project) for undivided Koraput district, Orissa during the year 1996-97. Subsequently, the scheme was extended to the States of Andhra Pradesh, Gujarat, Madhya Pradesh, and Maharashtra. In March 1999, the Standing Finance Committee of Government of India approved extension of the scheme to cover all the endemic states. The programme now covers 49 districts in 10

states from where yaws cases have been reported.

| States | Districts |
|-----------------------|--|
| Andhra Pradesh | Khammam, Warangal, West Godawari, East Godawari, Vizianagaram, Srikakulam |
| Assam | North Cachar Hills |
| Jharkhand | Palamau, Garhwa |
| Chattishgarh | Bastar (Jagdalpur), Kanker, Dantewara, Raipur, Dhamtari, Mahasamund, Bilaspur, Zanzgir (Champa), Korba, Ambikapur (Surguja), Korla (Bainkatpur), Raigarh, Jaspur |
| Madhya Pradesh | Shahdol, Umariya, Rewa, Sidhi |
| Maharashtra | Gadchiroli, Chandrapur |
| Orissa | Koraput, Malkangiri, Nabrangpur, Rayagada, Balasore, Keonjhar, Dhenkanal, Kandhamal, Mayurbhanj, Kalahandi |
| Gujarat | Ahwa Dang |
| Uttar Pradesh | Mirzapur, Sonbhadra |
| Tamil Nadu | Dharmapuri, Salem, Kallakurichi, Karur, Dindigul, Coimbatore, Palani, Theni |

Programme objective

The Yaws Eradication Programme aims to interrupt the transmission of yaws infection in the country (i.e. no infectious case) and ultimately achieving the goal of yaws eradication (i.e. no sero reactivity to RPR/VDRL in < 5 yr children).

Programme management

NICD is the nodal agency identified by the Government of India for planning, guidance, co-ordination, monitoring and evaluation of the programme. The programme is implemented by the State Health Directorates of yaws endemic states utilizing existing health care delivery system with the co-ordination and collaboration of Department of Tribal Welfare and other related departments/ institutions.

Programme strategy

The Programme envisages achieving its objective through adopting following strategies:

- Manpower development
- Case finding
- Treatment of cases and contacts simultaneously
- IEC activities
- Multisectoral approach

Manpower development: The medical officers of the Programme have been imparted one day training under the Programme with support from NICD faculty. They have also been provided Operational Manual of the Programme for future reference and guidance. The trained medical officers then imparted training to paramedical staff in their respective primary health centers.

Case detection and treatment: Case finding is being done actively by making house to house visits by trained para-medical workers and community level functionaries at frequent intervals. Cases thus detected are treated simultaneously and immediately after detection along with their contacts. Injection Benzathine penicillin is the drug of choice given in single dose. In penicillin sensitive cases, erythromycin or tetracycline is used in the recommended doses for a period of 15 days. To facilitate the detection of cases, coloured disease recognition card and other health education materials have been developed and made available to the peripheral level functionaries of health and associated sectors to facilitate case detection and increasing community awareness about the disease.

Active search operations are being undertaken as per the guidelines in the programme districts. Two active searches are required to be carried out every year of which one should be in the post monsoon season for better yield of cases. Every effort is being made to have a high level of coverage during these searches so that all cases are detected and treated along with their contacts to break the transmission cycle. Funds for procurement of drugs and other accessories are provided under the Programme.

It is essential that in bordering districts, the search activities are coordinated and carried out simultaneously to take care of population

movement and maximize coverage. Meetings of the nodal officers from the border districts of different states are also organized to facilitate this.

IEC activities

No health programme can be successful without the involvement of the community and YEP is no exception. Education of the community regarding the disease, its transmission, prevention and control is essential to involve the community in the programme. As the Programme is in operation in difficult and remote areas inhabited by tribal population, a strong input of IEC is required. Target specific strategies using appropriate media are being utilized for creating community awareness and involvement in the programme.

Multisectoral approach

One of the main strategy of the YEP is to involve other sectors in undertaking different components of the Programme particularly in creating community awareness about the disease, case detection and treatment. Besides efforts being made by the local health authorities, meeting of the representatives from different departments including senior officer from the Union Ministry of Tribal Affairs, Integrated Tribal Development Agency (ITDA) and state and district nodal officers are organized to identify the areas for collaboration and modalities to operationalise them.

Monitoring and supervision of programme implementation

The state/ district health authorities are implementing the programme with technical and financial support from Govt. of India through NICD. The State and District nodal officers are responsible for monitoring and supervising programme implementation at the peripheral level. The programme is being monitored through field visits to the programme states/ districts by NICD officers and review meetings of programme officers to assess programme implementation, sorting out bottlenecks and making action plans.

Independent appraisal of YEP is also being carried out regularly in which experts not involved in programme implementation visit the programme states and districts to review the programme and suggest measures to strengthen the programme. Two such appraisals have been carried out so far, the first during April-May 2000 and the second during February 2002. As per the observations and recommendations of the experts, follow-up actions are being undertaken.

The Task Force on Yaws Eradication Programme has been constituted under the Chairmanship of Dr. S. P. Agarwal, Director General of Health Services, Government of India. It has senior officers from Dte.GHS, SEARO, ICMR, Safdarjung Hospital, CHEB, NICD, Union Ministry of Tribal Affairs and state health directorates of Andhra Pradesh, Madhya Pradesh, Maharashtra and Orissa as its members. The progress made in the Programme implementation and strategies to strengthen the Programme are reviewed at the highest level in the task force meetings. The National Task Force has met thrice so far, in April 2000, October, 2001 and July 2002 and reviewed the progress made in implementation of the programme and discussed the steps to further strengthen it.

Impact of the Programme

Analysis of the reports received from 8 programme districts shows that while Koraput, Rayagada, Gadchiroli and Raipur districts have reported nil cases, Bastar, Vizianagram, West Godawari and Khammam districts have reported 12, 66, 39 and 163 cases of Yaws respectively in 2001 indicating persistence of disease transmission (Fig.10-12).

Some important issues

Ownership of the Programme

The programme is being implemented by the state/ district health authorities with support by the Govt. of India in the form for technical guidelines, training for manpower development and funds for drugs, IEC activities and to carry out searches. However, the programme is not perceived as their own programme by the state and local health

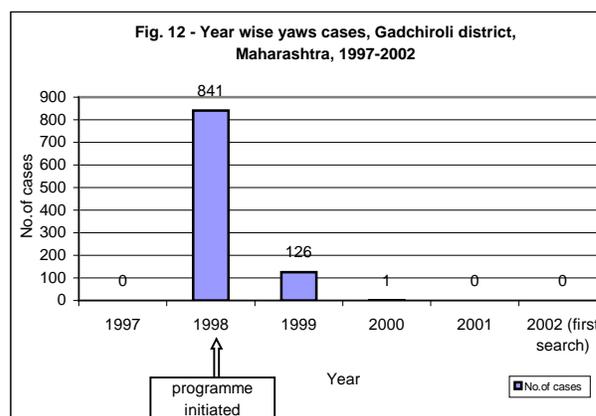
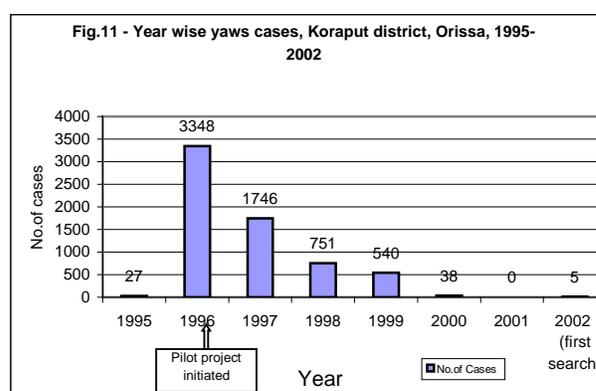
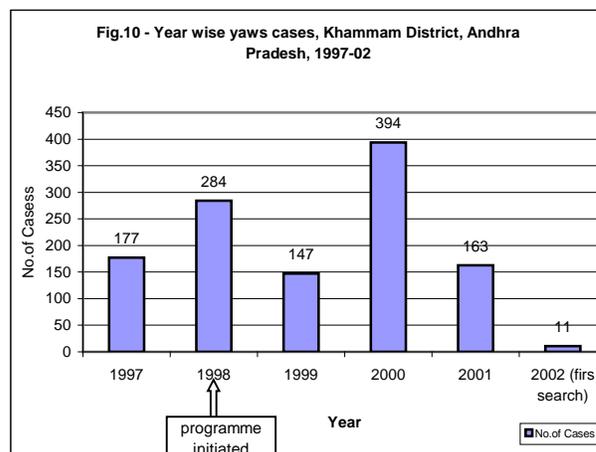
authorities. In some of the states there is a feeling among the health functionaries, including those at the managerial level, that yaws is not a significant health problem in their area and as a result the commitment to the programme is not there to the extent desired. Involvement of local school officials and NGOs may help in motivation of community and local leaders.

Overemphasis on laboratory diagnosis

As the Programme aims at eradication, it is essential that all cases and their contacts are detected and treated immediately. However, some states insist and wait for the laboratory confirmation before giving the treatment. This can result in continued transmission of the disease and loss of the case to treatment. Despite clear guidelines this practice still continues in some districts

Complexities of the area

To make the programme successful, reaching the total population and applying the intervention universally - case detection and treatment- is crucial. However, physical (inaccessibility due to lack of proper roads, difficult terrain) and social barriers (poverty, ignorance, illiteracy and different social milieu of the tribal population) have to be overcome to do this. Commitment and motivation of the health functionaries at all the levels, involvement of other sectors especially tribal welfare, *anganwadi* workers, NGOs and more importantly local tribal community leaders like headman, teachers, religious leaders will probably overcome these barriers and efforts are being made to achieve this to make the Programme a success.



Yaws Eradication Programme should be carried out on the primary health care level to achieve the success. This needs intensified education on the targeted population and also involvement of all sections of society in a particular region. The diagnosis and treatment is simple, rapid and sure leading to arrest of further transmission.

...about CDAIert

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