Contribution of X-ray Section towards TB control programme

Radiography is one of the two prominent diagnostic tools along with bacteriology. Just as bacteriology has its technical intricacies, Radiography too has its. These intricacies begin with the type of X-ray unit, film preferred, dark room, presentation of readable films to the radiographer and finally improvements involved in upgrading the quality of film etc,.
During the 1950's India was a new comer and was importing mostly stationary x-ray units which were maintainable only in big hospitals or sanatoria. Beginning with the concept of surveys, which began around that time, several mobile units and the paraphernalia to be used were imported and put to use in certain centers only, e.g. NDTB, Madanapalli etc,.

By the time the NSS took off in 1955-58, surveys were operational and the concept of MMR units was firmly in place. The basic concept of utilizing of MMR units in district TB centers also emerged. Since more that 500 such units had to be bought by the Govt., and supplied to the various state TB centers, is was thought prudent to test which of the available units was best, most economical and less troublesome. Once the units were in place, a lab to process the x-ray films and films also had to be made available.

When the National TB Institute was established in the year 1959, a full fledged X-ray section was also formed with a competent engineer as head and several technical assistants.

The first x-ray units that were made available to the NTI for its technical use were from different companies - Siemens, Philips, Watson & IGE. Some of these units were huge in size, mounted in buses and a separate vehicle had to be provided to carry the power generator along with the x-ray units. These x-ray units were very troublesome and technically very cumbersome to handle. There were several breakdowns making field operations extremely difficult without interruptions. The section made detailed observations of these problems. X-ray section recommended to the DGHS which of the mobile units that were available in world market to be most efficient and suitable to Indian conditions. Later after using these x-ray units in field operations they were recommended to be supplied to the state centres. The section also had to take care of maintenance/service needs of these supplied x-ray units, hence the spare parts for servicing of the unit were stored at stores, NTI.

The main objective of the Section is to advise and assist in the selection, repair and maintenance of X-ray equipment for the National Tuberculosis Program and to conduct X-ray examinations for studies carried out by different sections of the Institute.

X-ray facilities

X-ray Section is basically a service unit of the Institute. The section has been rendering service to various sections of Institute for several research studies/surveys undertaken by them from time to time.

The Directorate General of Health Services, GOI, New Delhi with assistance from UNICEF/WHO/SIDA between 1960-1990 had supplied over 500 Mass Miniature X-ray units (MMR) to STCs/DTCs/XCs of the country for implementation of the National Tuberculosis Control program. Although the initial cost involved for supply of the MMR was high

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Training

compared to conventional x-ray unit, it was cost effective over large x-ray units. Operation and maintenance of MMR unit is different from conventional X-ray units. Hence, One Seriophos 5 and one Ergophos-4M X-ray unit were installed at NTI basically for training the X-ray Technicians/Radiographers from the STCs/DTCs/X-ray centers from all over the country at NTI on the working and maintenance aspects of these units. NTI was hitherto conducting 8 week training course & the only Institute in the country where training was imparted in operation and maintenance aspects of MMR X-ray units and Dark room technique. X-ray section staff were also training the Medical officer/District TB officers regarding the MMR units available at DTCs.

- Training imparted at NTI was more practical oriented, which took about 2 to 3 weeks of personal attention for each candidate.

- Report on condition of X-ray unit (RCXU) was a unique practical training that was offered to the XT trainees at NTI. This was aimed at detecting minor problems in the X-ray units and rectification of the same. This training instilled confidence in the XTs to rectify minor defects themselves without taking the services of the company Engineer and save the expenditure incurred by the Government. Most of the XTs trained at NTI are now self-independent and only seek technical advice from NTI when a major breakdown occurs in their X-ray unit.

- Theory classes are important to understand the working principles of the X-ray Unit. A minimum of 30 hours of Physics, 12 hours of X-ray Dark room technique and 18 hours of XT manual classes are required for the XTs to completely understand these aspects.

- Field visit to practically see the working of a DTC was required, here X.T can observe the X-ray room, dark room, procedures adopted for registration, reporting of breakdown and other related formalities.

- Trainees were appraised on hurdles faced in field conditions

    - Uneven ground for parking x-ray vehicle which results in faulty positioning of persons for chest x-rays.

    - Inadequate parking space for the x-ray vehicle in the field thereby resulting in crowding for x-raying.

    - Lack of ample shadowed place for parking x-ray vehicle, else parking the vehicle in direct sunlight results in light fog on the x-ray films.

Repair and Maintenance of MMR X-ray unit and its accessories

A) Staffs of X-ray section were undertaking field visits for servicing of the X-ray units supplied by the DGHS. In addition the section played a pivotal role in the service and repair of Roll Film Cassette (RFC) received from various centers across the country. Manufacturing and servicing of

RFCs has been stopped by the company. NTI is the only Institute in the country where the servicing of RFCs was undertaken. NTI store has some spares for servicing of RFCs, Siemens Ergophos-4M 300ma and Siemens Seriophos-5 MMR units. District Tuberculosis Programs requiring spares could contact the Director for further information. Over 600 RFCs have been serviced till date at NTI. Apart from this, section also monitored the status of MMR units in the country through Report on Condition of X-ray Unit (RCXU) reports and they were advised remedial actions accordingly.

b) Maintenance of stationery X-ray units, mobile units and generators of the Institute.
c) Render technical advice to state governments for purchase/servicing/shifting/installation of MMR X-ray units of their TB centers. Planning of X-ray room/darkroom of TB centers in the country.

Research:- X-ray services were rendered for field work for over 42 research studies undertaken at NTI so far. MMR X-rays were done for eligible persons in the study, processing of the exposed film rolls, arranging the films for reading and storage of processed film rolls for future reference.

X-ray services rendered to the following studies

1) RP/101: Protocol for Estimation of Incidence of Tuberculosis Disease and Follow-up of Cases, Suspects and other X-ray Abnormals at Shorter intervals in the Rural Community.

2) RP/103: Protocol for estimation of more precise Prevalence of Bacteriologically Confirmed Disease in General Population.

3) RP/108: Integrated recording and reporting under the District Tuberculosis Programme and general health services.

4) RP/10: Protocol for Pilot study on a Awareness of Tuberculosis in some villages.

5) RP-114: Sub-Protocol for comparison of Prevalence of Tuberculosis infection and Disease in 62 villages of Tumkur District at an interval of 11 years after the initial study.

6) RP:117: Protocol for a five year Follow-up study of patients intaken in RP/98.

7) RP:118: Sub-protocol for repeat Epidemiology survey to compare the infection and disease.

8) RP/119: Long Term Observation of a District Tuberculosis Programme. Sub-protocol: Study of awareness and action taking of persons with Pulmonary Tuberculosis cases.

9) RP/120: Sub-Protocol problem of Prevalence of Tuberculosis among population around 2 miles of around the Health Institutions.

10) RP/125: Study on changes in Tuberculosis infection rates between two points of time & prevalence of Non-specific sensitivity in rural community.

11) RP/12: Plan for a pilot study on the applicability and acceptability of INH treatment in Kirangur(Madhya Pradesh).

12) RP/137: Repeat Epidemiology Survey in a rural population of South India. Fourth follow up study.

13) RP/144: Use of Computer Technology for developing Pseudo color rendition of Chest X-rays to improve training in X-ray reading.

14) RP/14: Comparison of the relative value of 3 different X-ray Procedures.

15) RP/152: An Epidemiological Survey in a Rural Population of South India to study the Prevalence (and incidence) of Infection.

16) RP/163: Protocol for Tuberculosis Longitudinal Survey in a Rural Population of South India.

17) RP/164: Protocol for the Surveillance of Tuberculosis through Cheaper Epidemiological Tools.

18) RP/163: Protocol for Tuberculosis Longitudinal Survey in a Rural Population of South India.

19) RP/164: Protocol for the Surveillance of Tuberculosis through Cheaper Epidemiological Tools.

20) RP/171: Study of the Effect of Referral of Out-Patients for Periodic Sputum Camps Organized at PHIs.

21) RP/172: Demonstration District Tuberculosis Program (An Action cum Research Project.)

22) RP/173: Protocol for the Study of Estimation of the Prevalence of Chest Symptoms and Bacillary Tuberculosis in a Community to form a Basis for Surveillance of NTP.

23) RP/186: Study on Tools of Tuberculosis Surveillance: Tuberculosis in Children and Fate of Tuberculosis Cases.

24) RP/193: The Fate of Patients of Pulmonary Tuberculosis Lost from Treatment under Program Conditions in a South Indian District.

25) RP/194: Evolution of Chest Symptoms and Action taking Pattern among Cases and Suspects over a Period of Time.

26) RP/19: Protocol for a Baseline Tuberculosis Prevalence Survey in Tumkur District.

27) RP/22/1: Sub-Protocol for X-ray Case-Finding in Mass Campaign Approach (First Phase).

28) RP/22/2: Sub-Protocol for X-ray Case-Finding in the Community Development Approach (First Phase)

29) RP/22/3: Sub-Protocol for X-ray Case-Finding in the Community development Approach (First Phase)

30) RP/22/4: Sub-Protocol for X-ray Case-Finding in the Community Development Approach (II Phase)

31) RP/22/5: Sub-Protocol for X-ray Case-Finding in the Mass Campaign Approach in Conjuction with MCS (III Phase)

32) RP/22/6: Sub-Protocol for X-ray Case-Finding in the Community Development Approach in Conjuction with CDS(RP/23/6)(III Phase)

33) RP/22/7: Sub-Protocol for X-ray Case-Finding in the Community Development Approach in Areas Previously Covered(Phase IV)

34) RP/22/9: Sub-Protocol for X-ray Case-Finding in the Mass Campaign Approach-Phase VI

35) RP/22: Protocol for X-ray Case Finding.

36) RP/23/1: Sub-Protocol for Sputum Case-Finding in the Mass Campaign Approach.

37) RP/23/2: Sub-Protocol for X-ray Case-Finding in the Community Development Approach.

38) RP/23/3: Sub-Protocol for Sputum Case-Finding in the Mass Campaign Approach-(II Phase)

39) RP/31: Protocol for a Follow up of X-ray Abnormals of the 20 last “Untreated” Villages of Baseline Survey.

40) RP/33: Protocol for Longitudinal Survey in Rural Communities.

41) RP/35: Protocol for Baseline Tuberculosis Prevalence Survey in Anantapur.

42) RP36: Protocol for study of Reasons for not Utilizing the X-ray Diagnostic Opportunity Offered in Connections with the BCG Program in Bangalore city.