The History of a leprosy sanatorium in India.
A literature Review

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Summary
Objective: Karigiri was set up initially to be a sanatorium with a difference, and the objective of this review is to study whether this had been achieved.
Methods: A broad search of 43 various publications from Karigiri.
Results: Stigma towards leprosy lead to the creation of this sanatorium, and within 20 years of its existence it made a significant contribution to the knowledge and treatment of this disease through research, and provided skilled manpower for both India and other developing countries.

Introduction

Any understanding of leprosy will be incomplete without understanding the evolution of surgical, medical, rehabilitation management and the leprosy control activities that had taken place in and around Vellore in South India. This took place at the Christian Medical College (CMC) and at Karigiri leprosy sanatorium which is situated 20 kms away from Vellore – a district headquarters town, 130 km west of Chennai in the State of Tamil Nadu.
‘Karigiri’ is the name of the village that forms a major part of the land housing the institution. It is located on the lower slopes of a hill – Karigiri in Tamil, the local language, ‘Kari’ means elephant, ‘giri’ means hill. It has 250 acres of lush greenery – an oasis in the wilderness. The sanatorium was established in 1955 and is named after Dr. William J Schieffelin, the first Chairman of the American Leprosy Missions (ALM), who provided the initial funding. Today a number of member organisations in the International Federation of Anti-Leprosy Association provide funding support. During the sanatorium era it differed from other leprosaria both within India and elsewhere in terms of its breakthrough research in various aspects of leprosy.

In this report an attempt has been made to reconstruct a part of its history, and that of the history of leprosy from the publications of Karigiri.

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Methods

This study was carried out by a search in the archives stored at the library of Karigiri, India. It was sorted into four sets of documents as follows:

1. Documents consisting of research papers published from this sanatorium in peer reviewed journals and chapters in books in different aspects of leprosy between 1955–1975.
3. Annual reports, Souvenirs of this institution and Karigiri Review journals.
4. Text books written by personnel from Karigiri between 1955–1975, as well as contribution of chapters by them during the same period of time.

The collected information was sorted into two categories, namely: (i) the events that took place during the sanatorium era (1955–1975) in patient care and training; (ii) research into different aspects of leprosy and the epidemiological statistics of 1955–1975 – some 43 documents. Tables and a graph were constructed based on the information available in these documents; reconstruction of the history of the sanatorium was also attempted from the above documents.

Results

EMERGENCE OF LEPROSY SANATORIA

Most sanatoria in India were constructed during the British Raj for chronic and stigmatising diseases like insanity, TB and leprosy, and these often provided long-term care. In the early 19th century in India the care for leprosy patients started in leprosy asylums. Seeing the inhuman treatment of ‘lepers’ in these asylums, Wellesley Bailey, an Irish missionary, started leprosy sanatoria in Ambala, Punjab, in 1874, and in Purulia, Bengal, in 1888. He tried treating the patients with Gurjan oil extracted from teak trees. Until the middle of the 20th century leprosy was considered a dreadful and contagious disease with no promise of a cure. Leprosy patients were ostracised from communities and even from their families. In such a situation sanatoria served the function of removing the sick from the general population and thereby reducing the risk to others.

In the post-colonial period with the advent of sulfone drugs such sanatoria/leprosy homes/leprosarium were replaced by acute care hospitals. A number of their inmates were sent home for simple domiciliary anti-leprosy treatment regimens. Interestingly, while others were being transformed into hospitals, a new sanatorium was opened on June 20th, 1955 at Karigiri, India, called Schieffelin Leprosy Research Sanatorium (SLRS) which continued in this role for 20 years before being converted into a leprosy centre/hospital with emphasis on acute care and short-stay treatment. The earlier publications showed the need for starting such a sanatorium.

SCHIEFFELIN LEPROSY RESEARCH SANATORIUM

In the late 1940s a wave of optimism – even of euphoria – swept the leprosy world with the advent of sulfone drugs that could cure this disease. A few overseas missionary doctors working in India at that time realised that it was not possible to give sufficient care and
treatment to leprosy patients in the CMC, as this disease was greatly feared and the admission of such patients would upset the other patients. They also felt that leprosy could not be controlled unless more scientific knowledge was elicited about *M. leprae* and the factors that determine the spread of this disease. For this, a disease-specific hospital that would support research was considered essential. Close proximity to CMC was imperative so that their doctors and scientists in every specialty could participate in research work for leprosy and make use of the modern equipment available there.

Dr. Robert Cochrane, an eminent leprologist, and then Principal of CMC, felt strongly that the problems of leprosy would never be solved if they were studied in isolation. Leprosy was so stigmatised that it forced doctors into isolation also. This allowed and even encouraged leprosy doctors to become dogmatic and self-assured because they were not exposed to either the ideas or the criticism of their peers in other related fields of study. Initially he planned to build this sanatorium just across the road from the CMC at a place called Otteri, but this was turned down by the local authorities.

After many enquiries they found a barren, isolated, uninhabited stretch of wasteland, near a small hill called Karigiri, in 1948. The nearest village was three kms away and the distance between CMC and Karigiri was some 20 kms. The local government agreed to lease this land at a nominal rate. In his reminiscence Prof. T.N. Jagdishan said: ‘I recall my visit to the bare site in Karigiri with Dr. Cochrane in 1948 and later in the same year my going with him to meet the then Chief Minister of Madras Presidency, Sri. O. P. Ramaswamy Reddy. We explained with blue prints the proposal and requested land. He readily agreed to give the government land, which was done in due time.’

Dr. Ida Scudder, the founder of CMC, laid the foundation stone for this sanatorium on September 6th 1952. Initially Dr. Cochrane was afraid that this distance of 20 Kms from CMC would discourage the constant consultation that was essential to research, and was the main reason for developing this whole project.

A number of professors from different medical departments of CMC contributed towards research and in-patient care at SLRS. The sanatorium’s first Director – Dr. Herbert Gass, Professor of Dermatology at CMC – stayed at the sanatorium and commuted to CMC. Dr. Charles Job, an Indian (who ranks as the number one researcher in 57 years of published leprosy literature in the world) succeeded Dr. Gass as its Director, and also stayed at Karigiri, though he was the Professor of Pathology at CMC. Dr. Gass wanted the sanatorium always to remain small so that it would allow every patient to be fully and carefully studied. He thought that if it grew large, and had many patients, doctors would become service oriented and not give themselves time to study each case, and keep good enough records to serve as the basis for research. He even told the architect to plan the sanatorium in such a way that would make it impossible to add new wards! Thus a Y-shaped ground plan of the first wards was designed to hinder any additions. The SLRS mission statement emphasised that it should also be a model of loving service to leprosy patients in the name and spirit of Jesus Christ.

In three years a sanatorium and staff quarters were built and in June 1955 it began functioning with 17 patients. Its bed strength rose to 180 towards the end of the sanatorium era in 1974. Patients were treated mostly free, and there were six private rooms for those who could afford it.

Mr. William Bailey, Secretary for India, to the Mission to Lepers (TML – Now TLM), in his 1955 annual report stated, ‘. . .the SLRS, one of their owned centres in India at Karigiri has started work. This is the first institution of its kind in India, with research as its
The present chief concern.11 TML, along with ALM, the state government and other international aid agencies funded its activities. CMC, ALM and TML gave directions on day to day activities of the sanatorium. Since a vast majority of leprosy patients came from the weaker section of society they were unable to pay towards their treatment, but they made a small contribution. The sale of items made by them also brought in some income,10 and the review showed the evolution of leprosy treatment during this phase.

SLRS started treatment with new antibiotics that had entered the scene and attempted orthopaedic and plastic surgical procedures on leprosy deformities, besides attempting to eradicate this disease from the villages around the sanatorium, which were endemic for leprosy at that time.12 It trained national and international health personnel. It was actually a modern medical facility for leprosy but still called a sanatorium for nearly 20 years until 1974. Table 1 depicts that patients were required to live there for longer periods, little less than two months during the sanatorium era and at the same time a little less than a fortnight during the era of the leprosy centre. The length of hospitalisation is one of the decisive factors between a sanatorium and an acute care hospital. However, one lacuna of this Table is not showing the measure of dispersion, which would have depicted the extended months of stay in a number of patients during the sanatorium era.

**Table 1.** Average length of stay per patient towards the end of Karigiri sanatorium era compared to most recent figures as Karigiri leprosy centre

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of admissions per year</th>
<th>Average length of stay per patient (In days)</th>
<th>Year</th>
<th>No. of admissions per year for leprosy</th>
<th>Average length of stay per leprosy patient (In days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>1204</td>
<td>53.6</td>
<td>2005</td>
<td>966</td>
<td>13</td>
</tr>
<tr>
<td>1972</td>
<td>1115</td>
<td>54.5</td>
<td>2006</td>
<td>904</td>
<td>13</td>
</tr>
<tr>
<td>1973</td>
<td>1081</td>
<td>56.3</td>
<td>2007</td>
<td>883</td>
<td>13</td>
</tr>
<tr>
<td>1974</td>
<td>1324</td>
<td>39.8</td>
<td>2008</td>
<td>903</td>
<td>14</td>
</tr>
</tbody>
</table>

**TREATMENT**

For many leprosy patients a sanatorium was not just a treatment place but also a home where they could hide, away from the stigma and associated suffering of this disease; SLRS was no exception to this.

The inpatients were divided into two sections with 90 patients admitted in each wing. The first group of patients who required intensive medical/surgical and nursing care was in the hospital block and the second group of patients with fewer treatment needs was housed in seven independent cottages. They were called the cottage patients and were waiting for their ulcers to heal, for minor surgeries, for artificial limbs or for special orthopaedic footwear. A few of them who had tuberculosis as well as leprosy, were treated for both conditions in a separate cottage. A sizeable number of the patients in these cottages were either being prepared for surgery in their hands, feet and face or had, post surgically, been shifted to the cottages for their daily physio/occupational therapy management. Patients were also admitted in these cottages to learn weaving – a common trade in this part of the country, and also
a most suitable occupation for the deformed leprosy patient; this was taught within the sanatorium. The articles made by them were sold locally and even exported after sterilisation to counter fears rather than to control an acute risk of infection.

**TRAINING**

In-service training for physicians, surgeons, nurses and physiotherapists from India and abroad began soon after the inception of the sanatorium. Regular training of leprosy field workers, equivalent to the bare-foot leprosy doctors, began in the early 1960s. They were employed by the government and by non-governmental institutions to screen the population at risk of leprosy and treat the confirmed cases.

Dr. Paul Brand, an orthopaedic surgeon from CMC, having recently demonstrated there that many leprosy deformities could be surgically corrected, wanted a centre for surgical research, as well as a place where a number of trainee surgeons could stay, on a long-term basis to learn how to prevent and correct deformities. A number of WHO fellows from different countries were sent to Karigiri for leprosy reconstructive surgical training.

**Box 1: A typical day of the cottage patients SLRS (1971)**

7:30 am – Breakfast.
8:00 am – Patients assembled to collect their daily medicines and for inspection of their hands and feet for fresh injuries by health personnel.
9:00 am–12:30 pm: Patients attended one of the following as per their prescription:

- Ulcer dressing/bed rest.
- To be present at the grand rounds for treatment reviews by consultants and the rehabilitation team.
- Ulcer surgery including partial removal of decayed bones mostly in the foot and occasionally in hands.
- Rehabilitation treatment in physio/occupational therapy units.
- Orthpaedic workshop for special footwear or artificial limb fittings.
- Vocational training in weaving or re-education in farming and cooking to avoid occupational and injuries in daily activities.
- School going patients attend tuitions by a fellow patient with teaching skills.

12:30–2:00 pm – Lunch and rest.
12:00–3:30 pm – Continuation of morning sessions.
3:30–4:30 pm – Re-education session on care of their eyes, hands and feet and other leprosy related topics.
4:30–6:30 pm – Free time.
6:30 pm – Dinner.
Subsequently the WHO’s conference on leprosy rehabilitation and a few other international consultations related to leprosy were held at SLRS.²

RESEARCH

As Moller, the physician-in-charge of Union Mission TB Sanatorium (UMTS) said in his 1915 address on the opening of UMTS, ‘a sanatorium in India affords many possibilities, not to be observed to such an extent in other medical institutions in India, for doing some research work, because in a sanatorium the patients are under daily observation for much longer period than they usually are in general hospitals in India’.¹⁴ SLRS proved that this statement is also applicable for the leprosy sanatoria. Details as follows:

The research during this period included studies on nerves,¹⁵–¹⁷ surgical correction of deformed limbs and face,¹⁸–²⁰ and other treatment modalities.²¹ The surgical and physiotherapy procedures devised by Brand in CMC were widely implemented and perfected in patients in SLRS.²² New techniques were developed in the application of Plaster of Paris bandages called walking plasters or Karigiri boots²³ to heal foot ulcers. In the mid 1960s Karigiri, in collaboration with the Madras Rubber Factory, came up with a special material called Micro Cellular Rubber, to protect insensitive leprosy feet from ulcers²⁴; now it is being used all over the world.²⁵ This technology was later found useful in managing foot problems due to diabetes.²⁶

In the latter part of 1940s Dr. Margaret Brand, an ophthalmologist, had her first encounter with the grim reality of blindness among leprosy patients in her work at CMC. In her autobiography²⁷ she stated that her interest in ocular leprosy was aroused, and when SLRS officially opened in June 1955, she began her study with 500 untreated leprosy patients to see what one might find in their eyes. She recognised the part played by the sensory loss in the eyes and its consequences by damaging the vision. Her knowledge in this area had been published as a booklet,²⁸ which is used worldwide by leprosy workers, and as a chapter in a popular leprosy textbook.²⁹

The establishment of the animal house, and the mouse footpad model studied the viability of the leprosy bacilli and its resistance to leprosy drugs.³⁰ The SLRS experimented with clofazimine and found that this drug had the effect to prevent, or reduce reaction and could be safely used with other anti-leprosy medicines.³¹–³³

A new leprosy journal called Karigiri Review came out with its first issue in 1966 but closed down in 1970 as its editor and two of its editorial committee members left SLRS. Its articles were based on the research done in the various units of SLRS and from its alumni working in India and abroad. The first issue itself was in such great demand in India and outside that a reprint became necessary; a total of 900 copies were circulated in this first issue.³⁴ During the sanatorium era, SLRS brought out 141 original scientific articles on various aspects of leprosy.²⁸ These were published in various national and international journals. In the first year of its inception, three of the SLRS original works had been published. Similarly, SLRS also produced a few textbooks³⁵–³⁶ and contributed chapters in the books edited by other medical authors.³⁷–⁴⁰

LEPROSY CONTROL

Some states and districts in India were hyper endemic for leprosy in 1960s, ranging between 25–40 per 1000 population.¹² Vellore was one such district. The SLRS adopted the
Gudiatham County (taluk) in Vellore district in October 1962 as its field area to control and eradicate leprosy. It covered an area of 510 sq miles with 305 villages with a population of 385,228. In 1967, after its initial period of 5 years of working in this area, it showed that one in 10 families had leprosy and the overall prevalence of leprosy was 29 per 1000 population. Twenty percent of the total number of leprosy patients suffered from the infectious type of the disease, and were the source for spreading this disease.41 At the end of the sanatorium era, in 1974, it showed a marginal decline of 26 per 1000 population. By then the SLRS public health unit had screened 71.59% (305,096 out of 426,204 populations – 1971 census) for leprosy and had 44 village clinics with 25 leprosy field workers. They did house-to-house and school surveys and a number of people self-reported due to the SLRS health education activities in the community. A careful examination of family members and other close contacts of leprosy patients were also made by them. This was among the earliest domiciliary treatment programmes for leprosy patients in the world in a given geographical area. Table 2 shows the outcome of its efforts by gradually decreasing the infectious type of leprosy (MB) and at the same time steadily increasing the detection of female and child cases which is essential for eradicating this disease.

### Table 2. Showing a gradual decreases of infectious type of leprosy (MB) and at the same time a steady increase in detecting of female and child cases

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of new cases detected</th>
<th>% of infectious type of leprosy</th>
<th>% of new female cases detected</th>
<th>% of new child cases detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1955</td>
<td>46</td>
<td>56.5 (26/46)</td>
<td>26.1 (12/46)</td>
<td>8.7 (4/46)</td>
</tr>
<tr>
<td>1956</td>
<td>44</td>
<td>61.4 (27/44)</td>
<td>29.5 (13/44)</td>
<td>6.8 (3/44)</td>
</tr>
<tr>
<td>1957</td>
<td>21</td>
<td>33.3 (7/21)</td>
<td>33.3 (7/21)</td>
<td>4.8 (1/21)</td>
</tr>
<tr>
<td>1958</td>
<td>31</td>
<td>64.5 (20/31)</td>
<td>25.8 (8/31)</td>
<td>6.5 (2/31)</td>
</tr>
<tr>
<td>1959</td>
<td>32</td>
<td>56.3 (18/32)</td>
<td>21.9 (7/32)</td>
<td>15.6 (5/32)</td>
</tr>
<tr>
<td>1960</td>
<td>52</td>
<td>53.8 (28/52)</td>
<td>26.9 (14/52)</td>
<td>19.2 (10/52)</td>
</tr>
<tr>
<td>1961</td>
<td>54</td>
<td>33.3 (18/54)</td>
<td>20.4 (11/54)</td>
<td>13.0 (7/54)</td>
</tr>
<tr>
<td>1962</td>
<td>221</td>
<td>22.6 (50/221)</td>
<td>38.5 (85/221)</td>
<td>19.5 (43/221)</td>
</tr>
<tr>
<td>1963</td>
<td>827</td>
<td>21.9 (181/827)</td>
<td>41.7 (345/827)</td>
<td>25.5 (211/827)</td>
</tr>
<tr>
<td>1964</td>
<td>729</td>
<td>24.4 (178/729)</td>
<td>39.9 (291/729)</td>
<td>27.6 (201/729)</td>
</tr>
<tr>
<td>1965</td>
<td>1779</td>
<td>23.2 (413/1779)</td>
<td>42.2 (750/1779)</td>
<td>27.7 (493/1779)</td>
</tr>
<tr>
<td>1966</td>
<td>2041</td>
<td>21.8 (444/2041)</td>
<td>43.9 (897/2041)</td>
<td>29.2 (595/2041)</td>
</tr>
<tr>
<td>1967</td>
<td>2015</td>
<td>20.8 (411/1933)</td>
<td>42.4 (633/1493)</td>
<td>30.9 (461/1493)</td>
</tr>
<tr>
<td>1968</td>
<td>660</td>
<td>16.4 (108/660)</td>
<td>44.7 (295/660)</td>
<td>33.2 (219/660)</td>
</tr>
<tr>
<td>1969</td>
<td>594</td>
<td>22.9 (136/594)</td>
<td>41.6 (247/594)</td>
<td>34.3 (204/594)</td>
</tr>
<tr>
<td>1970</td>
<td>890</td>
<td>16.2 (144/890)</td>
<td>45.5 (405/890)</td>
<td>42.4 (377/890)</td>
</tr>
<tr>
<td>1971</td>
<td>880</td>
<td>16.5 (145/880)</td>
<td>45.0 (396/880)</td>
<td>39.7 (349/880)</td>
</tr>
<tr>
<td>1972</td>
<td>773</td>
<td>13.5 (104/773)</td>
<td>42.3 (327/773)</td>
<td>33.9 (262/773)</td>
</tr>
<tr>
<td>1973</td>
<td>864</td>
<td>11.5 (99/864)</td>
<td>41.8 (361/864)</td>
<td>43.8 (378/864)</td>
</tr>
<tr>
<td>1974</td>
<td>861</td>
<td>14.3 (123/861)</td>
<td>43.8 (377/861)</td>
<td>41.9 (361/861)</td>
</tr>
</tbody>
</table>

†Child = <= 15 years. Parentheses depicts the numbers from which the percentages were derived. A few cases, registered before 1962, were resident of Gudiatham Taluk and voluntarily attended the sanatorium for treatment. The large number of cases from 1965–1967 is the result of using intensive survey methods during this period.

Gudiatham County (taluk) in Vellore district in October 1962 as its field area to control and eradicate leprosy. It covered an area of 510 sq miles with 305 villages with a population of 385,228. In 1967, after its initial period of 5 years of working in this area, it showed that one in 10 families had leprosy and the overall prevalence of leprosy was 29 per 1000 population. Twenty percent of the total number of leprosy patients suffered from the infectious type of the disease, and were the source for spreading this disease. At the end of the sanatorium era, in 1974, it showed a marginal decline of 26 per 1000 population. By then the SLRS public health unit had screened 71.59% (305,096 out of 426,204 populations – 1971 census) for leprosy and had 44 village clinics with 25 leprosy field workers. They did house-to-house and school surveys and a number of people self-reported due to the SLRS health education activities in the community. A careful examination of family members and other close contacts of leprosy patients were also made by them. This was among the earliest domiciliary treatment programmes for leprosy patients in the world in a given geographical area. Table 2 shows the outcome of its efforts by gradually decreasing the infectious type of leprosy (MB) and at the same time steadily increasing the detection of female and child cases which is essential for eradicating this disease.

**START OF A NEW ERA**

The most important event of the post-sanatorium era was the trial of Multi-Drug Therapy (MDT) for the first time in the world at SLRS. The success of this regimen paved the way for...
the use of MDT in all leprosy programmes throughout the world and is responsible for the near elimination over the next two decades. Figure 1 shows that doing domiciliary treatment for leprosy in a given geographical area in and around Karigiri for a period of 35 years (1962–1997) had resulted in a steady decline of the emergence of new cases.

In 1975 SLRS became SLRC – the ‘Sanatorium’ was now a ‘medical centre.’ It was also registered as a Society with a governing body and became an autonomous institution. The following year, 1976 the word ‘training’ was added and it came to be known as the Schieffelin Leprosy Research & Training Centre for the next 30 years reflecting the treatment, research and training activities that had existed since its inception. From September 1st, 2006 the word ‘Centre’ was replaced by ‘Institute’ – the reason being that a few medical PG courses and non-leprosy training programmes have been added to its existing education. It was renamed the Schieffelin Institute of Health – Research and Leprosy Centre. The annual report of 2006 mentions that it became necessary to add the word ‘Health’ because Karigiri has now integrated all leprosy activities into general health.

Discussion

There were leprosy sanatoria all around the country at the beginning of post-colonial India; a number of them run by missionaries, and a few by the states and central governments. Unlike TB sanatoria, where there were also sanatoria for the privileged ones with restricted entry for the wealthy, leprosy sanatoria were only for the underprivileged, and sanatoria such as SLRS had the facility of private rooms for those who could afford it. The narration of the

![Figure 1. New case Detection from 1955 to 1997 in Karigiri’s adopted villages.](image-url)
SLRS in this review also illustrates the medical and social history of leprosy that existed between late 1940s through early 1970s.

The results showed that the SLRS at Karigiri was designed specifically for the demands of society at that time, as leprosy patients were not welcome in the CMC general hospital due to fear of infection. Besides patient care, this sanatorium’s research and training since its inception made history in those decades.

Even though India has eliminated leprosy as a public health problem, the new case detection rate was 10·51 per 100,000 population in 2006 with 139, 252 cases newly detected in 2007. This reflects that transmission has not sufficiently come down. Though Karigiri is no longer a sanatorium, the above fact highlights the need for such centres. Thankfully its priority is still leprosy, and it continues to be an internationally recognised referral centre for medical, surgical and rehabilitative works.

Acknowledgements

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References

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