

SHORT REPORT

Effectiveness of the orientation training for laboratory technicians in leprosy skin smear and nasal smear techniques in central leprosy teaching and research institute, India

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Summary A total number of 155 Laboratory Technicians working for the Government of Tamil Nadu, India having an experience of 3 to 25 years in various Public Health Laboratories of the state were deputed to undergo 2 days' orientation training programme on skin smear and nasal smear techniques at the Central Leprosy Teaching and Research Institute, Chengalpattu in 2013–2014. The aim of the orientation training was to focus their attention on quality skin smear and nasal smear techniques reported by Laboratory Technicians working in various public health laboratories of the state. The training was conducted through live hands-on demonstration, practical performance of trainees and module reading. Pre- and post-assessment was carried out for every Laboratory Technician trainee. The effectiveness of this training was analysed and showed that there was strong evidence ($P = 0.004$) that the teaching intervention improves the knowledge of the trainees. On average the level of knowledge improved by approximately 10 points.

Keywords: Split Skin Smear, Orientation, Effectiveness, CLTRI

Introduction

Detection of *Mycobacterium leprae* by Wade's slit and scrape¹⁻⁴ skin smear re-examination was an important diagnostic tool in the multidrug therapy programme in leprosy. After the integration of the leprosy programme with the general health care system, the paramedical staff lacked relevant experience in smear taking, fixing, staining, grading and reporting. Especially the lab technicians working in public health laboratories are not able to maintain quality of work, including the safety aspects. WHO in its old 6th technical report in 1988, clearly mentioned the low standard of Bacteriological index (B.I.) and Morphological index (M.I.) reports, including positive/Negative in nasal smears, also WHO in 1980 introduced the operational classification of leprosy as paucibacillary and multibacillary on the basis of the number of skin lesions. Hence the reports of skin and nasal smear examination became least mandatory in leprosy as the disease. However, classification of leprosy only on the basis of skin lesions with over or under diagnosis and to treat the PB and MB cases leads to the risk of drug resistance, relapse, etc. Even though more sensitive methods were available, it is not the same scenario available in all health care set up. The sophisticated instruments were only available in the research institution and in reputed high multi specialty hospitals set up. Hence there becomes the need to train the lab technician working in public health laboratories for quality skin smear and nasal smear reports from simple techniques.

Materials and Methods

This is an analysis done to evaluate the effectiveness of the orientation training for laboratory technicians in leprosy, skin smear and nasal smear techniques in central leprosy teaching and research institute, Chengalpattu, Tamilnadu. Laboratory technicians working in Government of Tamil Nadu in various public health laboratories were deputed to undergo two day orientation training programme on skin smear and Nasal smear techniques (Table 1).

TRAINING ACTIVITIES

The training was conducted through live demonstration and practical performance by the best experienced staff of the Institute. The various areas the trainees focused on were: the

Table 1. Training schedule

Day	Timings	Activity
I	9.00 a.m. to 10.00 a.m.	Registration Introduction Preliminary Assessment
	10.00 a.m. to 1.00 p.m.	Techniques of Skin & Nasal smear collection, Staining, Grading & Reporting
	2.00 p.m. to 3.45 p.m.	Skin & Nasal Smear Module Reading
	4.00 p.m. to 5.30 p.m.	-Skin Smear Grading, Reporting and Cross checking
II	9.00 a.m. to 10.00 a.m.	Skin, Nasal smear collection staining & Reporting
	10.00 a.m. to 1.00 p.m.	Basics of Leprosy
	2.00 p.m. to 3.45 p.m.	Preparation of Ziehl Neelsen Stains
	4.00 p.m. to 5.30 p.m.	Final Assessment, Awarding Certificate & Course End

reception of patients, preliminary registration of patient's demographic information in the respective registers and certain information in the smear glass slide. This was followed by live demonstration on smear preparation from WHO approved sites (or any other additional sites or smear request by the clinician). The first part of the training started with the reception of patients by the technician with their requisition form, comforting the patient prior to their skin smear followed by registration in the laboratory register with a serial number, hospital number, and laboratory number. Then the cleaned new glass slide was labeled with the laboratory number on top, the patient's name and date of collection on the bottom of the slide by using a diamond tipped glass marker. Following this Wade's slit and scrape technique was demonstrated. The sites for smears (both ear lobes, both arms, both thighs) were identified and the smears were prepared with aseptic precautions. Then the sites of the smears were compressed with a tincture of benzoin. Fixation of the slides by gentle heat was demonstrated. The slides were then stained by the Ziehl Neelsen method and the procedure was emphasised to the trainee in each and every step. Live demonstrations on nasal smear collection, making the smear, fixing, staining, reporting and recording was also demonstrated as per the standard procedure to the trainee. The manual preparation of primary stain of 1% carbolfuchsin, counter stain of 1% methylene blue, decolourising agents like 3% acid, alcohol 5% and 25% sulfuric acid was undertaken by the trainee. Reading and reporting of the stained slides through a microscope by the Ridley Logarithmic scale (1+ to 6+) was also demonstrated to the trainee. Cross examination of the preserved positive/negative reported slides (10 slides/trainee) of skin and nasal smears was given to evaluate their performance in reporting and for reproducibility. At the end of the training, the trainees were evaluated with the same set of questions as those in the preliminary assessment, with questions focused on basic knowledge of skin smears, the technical aspect of SSS method reporting and recording. Fifteen questions were prepared for the preliminary and final assessment of the trainees (Annex I). The scores were categorised into three ranges with 0–5 as a low range, 5–10 as average and 10–15 showing a good working knowledge.

STATISTICAL ANALYSIS

Datas were analysed using SPSS 20. Normal distribution of marks scored by trainees were projected both in number and percentage. The 't' test was used for statistical analysis between pre- and post-test score comparisons.

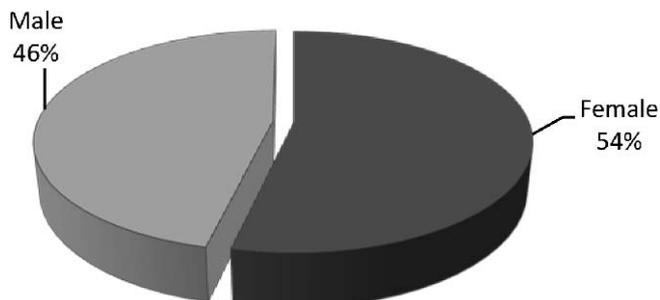


Figure 1. Gender distribution among trainees.

Table 2. Distribution of marks scored by trainees

Marks	Pre (%)	Post (%)
0–5	126 (81)	2 (1)
5–10	29 (19)	30 (19)
10–15	0	123 (79)
	155	155

Results

The total number of technicians who participated in the training was 155. The male to female distribution was 72 (46.5%) and 83 (53.5%) respectively (Figure 1).

These trainees had from 3–25 years of experience in various public health associated laboratories under the government of Tamilnadu. They were deputed for a 2-day orientation training from 30 various districts of Tamilnadu - 100 technicians were from north Tamilnadu and 55 from south Tamilnadu.

Table 2 and Figure 2 show that none of the trainees scored marks between 10–15; 29 scored between 5–10 and 126 secured less than 5.

The mean scores, in their pre-test assessment was 2.54 ± 2.18 (Table 3).

After the orientation training the final assessment scores were 11.2 ± 2.41 (Table 3) which showed a marked increase in the effectiveness of orientation training with 123 trainees who scored marks between 10–15, 30 between 5–10 and only two secured less than five (Table 2, Figure 2).

From these scores the effectiveness of the training was analysed and it showed that there was strong evidence ($P = 0.004$) that a teaching and training intervention improves the knowledge of the trainees. On average the level of knowledge improved by approximately 10 points.

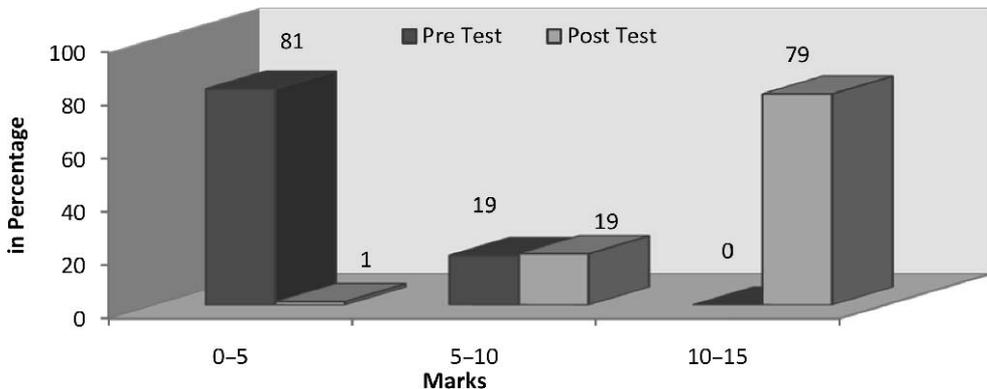


Figure 2. Distribution in percentage of scores between the Pre and Post test.

Table 3. Comparison of mean sore between pre and post test

	Mean Score
Pre Test	2.54 ± 2.18
Post Test	11.2 ± 2.41

Discussion

The procedure, which is a relatively inexpensive diagnostic method, called Wade's slit and scrape, included skin and nasal smears and is one of the important tools used in the confirmation of leprosy.¹⁻⁴ The primary objective of the study was to evaluate the effectiveness of the orientation training programme of laboratory technicians. These laboratory technicians were posted in different 30 districts of Tamilnadu from various public health laboratories. The average experience in their government services varied from minimum of 3 years to a maximum of 25 years. None of the technicians had been exposed to specific training in leprosy or in skin and nasal smear techniques. Since there is scarcity of laboratory technicians and reduced manpower because of the respective state government policies, training targeting the general laboratory technician will definitely help in finding leprosy cases in the community, and will render their important supportive role. The relevant technical coordination, integration and training of laboratory technicians will be very helpful in achieving the goal of a world without leprosy by 2020.^{5,6} From the results of our study analysis, it was found that the pre-test score among the technicians was 2.54 ± 2.18 . The minimum scores obtained in the pre-test was because of their lack of knowledge and training in the field of leprosy. Even this score was in fact due to their general awareness regarding split skin smears and routinely having done Ziehl Neelsen techniques under RNTCP for diagnosing TB.

The internal quality control of skin and nasal smear techniques based on a collection of specimens (staining, reading and reporting) were given top priority in the training period. The module reading on the basics of leprosy, skin and nasal smears was carried out. Throughout the training many doubts were raised by the trainees on theoretical aspects, and technical issues were clarified. A good opportunity was given to them for skin and nasal smear collection directly from the patient, staining, grading and reporting by direct microscopy as a practical session. Procurement of logistics by the trainee of quality reagents, stains, glasswares from standard suppliers and companies was insisted upon. The importance of maintaining relevant records for reference and dispatching the results to the clinicians was also emphasised.

The post-training values were higher 11.2 ± 2.41 ranging between 9 and 15 which implies that the orientation programme had a great impact on the technical skills and knowledge of the general laboratory technician in the field of leprosy. However, the less experienced technicians (1%) with less than 5 years still scored less than 5 even after the 2-day orientation programme which emphasised their need of further training.

Acknowledgements

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Annex I

CENTRAL LEPROSY TEACHING AND RESEARCH INSTITUTE, CHENGALPATTU-603001

ORIENTATION TRAINING ON “LEPROSY SKIN SMEAR & NASAL SMEAR TECHNIQUE” FOR LABORATORY TECHNICIAN ASSESSMENT

Batch No:

Date:

Name of Technician:

Name of the Lab/Centre:

1. Did you perform Skin smear & Nasal smear technique in the past? Yes/No
2. What is the name of the laboratory technique used for diagnosis of leprosy?–**wade’s slit and scrape method**
3. What is WHO classification of leprosy?**Paucibacillary and Multibacillary**
4. The scalpel blade (surgical) we use for technique is No. 15 or 11–**15**
5. What is the size of glass slide we use for smear collection?–**75 mm × 25 mm × 8 mm**
6. Which antiseptic is used to seal the smear site?**Tincture Benzoin**
7. How many routine sites for skin smear collection and mention the sites?**6**
8. What is the name of the staining method for skin smear & what is the primary stain used?**ZiehlNeelson Method & 1% Carbofushcin**
9. What is the decolourising Agent used for staining for skin smear slide?**3% Acid Alcohol**
10. What is the counter stain we use for staining of skin smear slide?**1% Methylene Blue**
11. What are the names of methods to grade & report skin smear examination?**Ridley Joplings method**
12. What is BI & MI? **Bacteriological Index & Morphological Index**
13. To report the skin smear slide 3+ is **1–10 bacilli in average microscopic field.**
14. Nasal smear collected from leprosy patient is stained by **ziehlneelson** Stain.
15. How will you report on Nasal smear- **Positive/Negative**