

## Assessment of Knowledge and Skills of Peripheral Health Workers for Screening and Detection of Early Nerve Damage in Leprosy: A Cross-Sectional Study

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**Abstract:Background:** Leprosy, a public health problem, and its elimination in terms of prevalence of less than one case per 10,000 population was achieved at global level in 2001 and by India in 2005 at the national level. In order to achieve elimination of leprosy in all districts of the country leprosy activities were integrated through general health care system. **Objectives:** The present study was conducted to assess the basic knowledge of health workers on leprosy, its control and their ability to screen leprosy and nerve function impairment using the simplified tool developed by National Leprosy Elimination Program. **Methods:** An observational cross-sectional study was carried in two randomly selected blocks of Purba Bardhaman district - Bhatar and Mongolkote between April and September 2015. **Results:** The study revealed that majority of health workers had satisfactory knowledge regarding various aspect of leprosy including implementation of leprosy elimination programme. However, the health workers performed poorly in most of the components related to skill. The sensory and voluntary muscle testing (ST/VMT) skills too showed poor performance. **Conclusions:** There is a need for regular comprehensive skill training of frontline health workers.

**Key-words:** Knowledge, leprosy, screening, skill, Sensory and Voluntary Muscle Test

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### I. Introduction

Leprosy is the oldest communicable disease known to humanity leading to disability and disfiguring complications. Though leprosy is very slowly developing disease with low pathogenicity and virulence and easily amenable to treatment and prevention, yet the progress for elimination of the disease is occurring at a slow pace. The major reasons for the slow progress in elimination is attributed to the social factors that include poor awareness regarding the disease, low socioeconomic conditions, lack of basic sanitation and hygiene, deeply rooted stigma and discrimination associated with the disease leading to social exclusion of victims.

The World Health Assembly in May 1991 adopted the resolution for global elimination of leprosy as public health problem by the year 2000, which has been defined as a prevalence of less than one case per 10,000 populations; the target of elimination of leprosy was achieved globally in 2000 in majority of countries by 2005. After achieving targets of "elimination" in terms of prevalence of the disease, now emphasis is being given on reduction of number of the new cases with grade 2 disabilities (G2D).<sup>1</sup> India too had achieved the milestone of leprosy elimination since December 2005 at national level, but at sub-national level, some high-endemic pockets are still reporting high prevalence of leprosy<sup>2</sup>.

The Global Leprosy Strategy 2016–2020 aims at early detection of leprosy and prompt treatment to prevent disability and reduce transmission of infection in the community. Considering these rationales, the Global Leprosy Strategy 2016–2020 has set the targets of Zero grade 2 disability (G2D) among paediatric leprosy cases and reduction of new leprosy cases with G2D to less than one case per million populations by 2020. This requires targeting case detection activities in high-endemic pockets and focusing on screening of contacts and their prompt treatment. The strategy has given emphasis to improve the awareness levels for identification of early signs of leprosy, access to leprosy services and improve skills of health-care staff in diagnosing leprosy.<sup>1</sup> Many countries including India has integrated basic leprosy services into general health services to increase accessibility of diagnosis and treatment of the disease at community level<sup>3</sup>. The primary health care services for leprosy is being carried out by peripheral level health workers, the efficiency of whom is dependent on the knowledge and skills of the workers. Previous studies have indicated that there is a need to improve knowledge and skills of general health services personnel and enhance quality of leprosy control activities to overcome the final hurdle for leprosy elimination<sup>4</sup>.

Nerve involvement is serious and nerve damage leads to progressive impairment and disability in leprosy. Disability in leprosy includes persons having both visible deformity and impairment of nerve functions (sensory and motor functions). The nerve damage ultimately causes functional disability and deformity which attract continuing stigma, a major obstacle for elimination of the disease. According to the national programme guideline, the multipurpose health workers (MPHW) are supposed to screen suspected leprosy cases at community and identify early nerve damage among the cases and refer them to the Medical officer for confirmation and management of the cases. Training of general health staff like medical officers, health workers, health supervisors and ASHAs, are conducted every year to develop adequate skill in diagnosis and management of leprosy cases. After a careful history taking from suspected leprosy cases about presenting complaints, symptoms, history of contact with leprosy cases, duration of any patch/ patches, a thorough inspection of the body surface should be done along with testing for loss of sensation in the suspected patches. Signs of nerve damage in the eyes, hands and feet by examining muscle strength and sensation (VMT and ST) to detect complications early are important steps to prevent further disabilities and deformity.

The present study was conducted with the objective to assess the basic knowledge of health workers on leprosy and its control and their ability in screening for leprosy and nerve function impairment using the simplified tool developed by National Leprosy Eradication Programme (NLEP).

## **II. Materials and Methods**

An observational cross-sectional study was carried in two randomly selected blocks of Purba Bardhaman district, Bhatar and Mongolkote, between April and September 2015 after obtaining ethical clearance from Ethics Committee of Burdwan Medical College. The study population comprised of all the health workers including health supervisors working in the two blocks, the primary inclusion criteria being their availability during the data collection period. The total numbers of study participants in Bhatar and Mongolkote block were 67 and 62 respectively which constituted more than 90% of study subjects in the two blocks.

A predesigned and pretested tool to assess knowledge of health workers on leprosy, case sheet to record the examination findings of the health workers including the sensory and disability assessment tools (ST/VMT) developed by NLEP and a checklist were used to assess the skill of health workers in screening for leprosy including nerve function impairment. The data was collected by self-administered questionnaire and observational checklist.

The worker (MPHW) was given a 'leprosy suspect' or a 'case' to examine with instructions to examine the case systematically and evaluate nerve functions, assess the disability grade and classify the case; the HWs were instructed to fill up the sensory and motor disability assessment sheet. A trained investigator observed the history taking and examination procedure and recording of the findings on the case sheet provided. The investigators used a checklist to assess the skills of the workers.

The collected data was entered in MS Excel sheet and analyzed using SPSS software version 19.

**Knowledge Score:** Knowledge was assessed by 88 items covering basic knowledge on leprosy like causative agent, mode of transmission, signs and symptoms, lepra reactions, classification and disability grading including management and programme related questions. Each correct response was given score one (1) and wrong or no response was given zero (0). Those who responded 70% or more items correctly was categorized as 'well informed', those who responded between 30- 69% items correctly was categorized as 'moderately informed' and those who responded less than 30 % of items correctly or not attempted were categorized 'poorly informed'. The score was classified in different categories based on the response of number of items in percentage scale.

Skill components included counting correctly the number of skin patches, sensory testing (ST), Voluntary muscle testing (VMT), number of nerves involved and assessing disability grade.

**Sensory testing (ST):** Persons with hypo-pigmented or reddish patches on skin should have been examined for sensation over the patch. Definite loss of sensation in a skin lesion was assessed by touching the skin lightly with the tip of a ball point pen without producing a dimple on the skin and asking the subject to indicate the point of touch with the index finger, first with the eyes open and then with closed eyes. Similarly sensations were tested on palm and sole of both hands and feet on specified points using a ballpoint pen. A minimum of four points on each hand and foot were tested and response was recorded on sensory assessment sheet. Vision test was carried out by finger counting method from a distance of 6 meters<sup>[5]</sup>.

**Voluntary Muscle Testing (VMT):** Motor function of nerve was assessed by examining the key muscles as recommended in NLEP operational guideline. The tests used were eyelid closure gap, little finger out test, thumb-up and foot up test. Muscle strength was recorded as S (strong), W (weak) or P (paralyzed).

Disabilities were assessed and graded as 0, 1 or 2. Grade 0 means no disability found. Grade 1 means loss of sensation in hand and/or feet or having anaesthetic ulcer. Visible damage or disability was recorded as Grade 2 disability. The eye, hand and feet (EHF) score was the sum of all individual disability grades for the

two eyes, two hands and two feet. The workers were observed while performing different tests on the patient using a checklist

**Skill assessment scoring method:** Skill of workers were assessed by performance on 35 items in a checklist which included history taking, the counting the number of skin patches, sensory testing (ST), Voluntary muscle testing (VMT), number of nerves involved, case classification, assessing disability grade and case management skill; each correct response was given score one (1) and wrong or no response was given zero (0). Those who performed 70% or more items of skill assessment correctly were categorized as 'well skilled'; those who performed correctly between 30- 69% items were categorized as 'moderately skilled' and those who performed less than 30% items correctly or not attempted were categorized as 'poorly skilled'. The data was analyzed using descriptive statistics (mean and proportions).

### III. Results

The knowledge of health workers assessed by self-administered questionnaire on leprosy, its clinical presentation, classification and management varied from 63.8% being well informed and 36.2% being moderately informed. None of the worker was poorly informed.

The distribution of health workers according to 'skill score category' in relation to the performance of history taking, clinical examination, skills in using ST/VMT tools for early nerve damage detection, case classification, assessing disability grade and case management skill showed only 4.3% of health workers could perform the tasks satisfactorily.

**Table 1: Health workers' performance on selected skill components of leprosy screening (n=129)**

Selected skill components	Correct		Partially correct		Wrong/not done	
	No	%	No	%	No	%
<b>Skill for skin patch test</b>						
• Number of skin patch noted	10	7.8	NA	NA	119	92.2
• Elicited sensory loss in skin patch	19	14.7	90	69.8	20	15.5
<b>Recorded correct classification</b>	10	7.8	NA	NA	119	92.2
• Vision testing done	0	0.0	8	6.2	121	93.8
• Method for ST on sole /palm	4	3.1	40	31.0	85	65.9
• Used appropriate symbol for recording	12	9.3	0	0	117	90.7
<b>VMT performance</b>						
• Noted blinking	2	1.6	43	33.3	84	65.1
• Light lid closure test	6	4.7	57	44.2	66	51.1
• Little finger out test	3	2.3	67	51.9	59	45.7
• Thumb up test	4	3.1	49	38.0	76	58.9
• Wrist extension test	5	3.9	12	9.3	112	86.8
• Foot drop test	2	1.6	13	10.1	114	88.4
<b>Assessed disability grade</b>	16	12.4	NA	NA	113	87.6
<b>Calculated EHF</b>	0	0	NA	NA	129	100.0
<b>Identified MDT dose regimen</b>	88	68.2	NA	NA	41	31.8
<b>Recommended pulse dose as supervised</b>	66	51.2	NA	NA	63	48.8
<b>Counselled</b>	10	7.8	109	84.4	10	7.8

NA: Not applicable for these items

Further analysis of some selected component of skills revealed that only 12 (9.3%) of the workers could elicit different aspects of history taking related to skin patch like duration, symptoms of itching and pain, recurrence and history of contact. Only 10 (7.8%) workers correctly counted the number of skin patches and 19(14.7%) could elicit sensory deficit in the skin patch correctly. None of the workers followed the steps of vision testing correctly whereas only 8 (6.2%) were partially correct. Only 4 (3.1%) workers knew the method of sensory testing on palm and sole correctly and 12 (9.3%) workers used appropriate symbols for recording sensation. The different components of voluntary muscle testing (VMT) was done correctly by only 1.6% to 4.7% of the health workers. Only 1.3% and 4.7% workers correctly noted eyelid blinking and light lid closure respectively. Little finger out test, thumb test, wrist extension test and foot drop test was correctly performed by 2.3%, 3.1%, 3.9% and 1.6% of health workers respectively. A total of 12.4% health workers could identify the

disability grade correctly but none could correctly give the EHF score. Identification of the MDT regimen was correctly done by 68.2% workers and 51.2% of workers recommended pulse dose as supervised. All the correct steps of counselling were followed by only 7.8% workers (Table 1).

#### **IV. Discussion**

The study revealed that majority of workers had satisfactory knowledge (63.8% were well informed and 36.2% moderately informed) regarding leprosy and in implementing different components of NLEP. It is encouraging to know that none of health workers had scored below the critical level of knowledge (<30% score). However, there is scope of improvement in knowledge score following training. However, Mohiteet al<sup>6</sup> found that 88.3% multipurpose workers in Satara district of Maharashtra had good knowledge about leprosy and National Leprosy Eradication Program. Abejeet al<sup>7</sup> in a study in Ethiopia on performance of general health workers on leprosy showed the knowledge score of the respondents (health workers) was low for 519 (86.36 %), medium for 78 (13.0 %) and high for 4 (0.7 %). The level of knowledge was better among respondents working at district and zonal hospitals than those working at health centres and the difference was statistically significant. The findings of a study in Eerstehoek in South Africa by Ukpe<sup>8</sup> with regards to the health workers' knowledge of leprosy were that a majority of the HWs i.e.83%, presumed that they did not have sufficient knowledge of leprosy for leprosy work at the PHC clinics and public health posters and leaflets on leprosy were the major source of leprosy knowledge for the HWs. Studies in Nigeria by Awoefeso<sup>9</sup> found the knowledge of leprosy amongst nurses to be inadequate, and identified the need for suitable training programmes on leprosy for the HWs in order to ensure their effective utilisation in the new approach of leprosy work within the general healthcare services.

The various components of skill assessment in the health care workers revealed poor performance in the present study with only 14.7% being able to elicit sensory deficit in the skin patch correctly. The performance on ST/VMT skill showed that only 3.9% health workers were well skilled, 13.2% were moderately skilled and the rest 82.9% were poorly skilled. But the performance in Satara district was good amongst 84.42% of MPWs according to Mohiteet al.<sup>6</sup> Very good performance ranging from 82% to 94% amongst ANMs and other paramedical staffs was also reported by Dixit<sup>10</sup> in New Delhi due to training and retraining of health care workers.

In the present study the health workers performed poorly in most of the components related with skill. Only 9.3% elicited the history correctly and 7.8% recorded the correct classification of leprosy. A smaller proportion of workers i.e. 3.1% could correctly perform the sensory testing on the sole and palms and 1.6% to 4.7% could correctly perform the voluntary muscle testing of different muscles. Correct disability grading was assessed by 12.4% workers but 68.2% workers could correctly identify the MDT regimen. The various steps of counselling were performed correctly by 7.8% workers and 84.4% were partially correct. In the study in Ethiopia by Abeje et al<sup>17</sup> among 83 general health workers assessed for skills in the diagnosis of leprosy, only 15 (18.07 %) diagnosed leprosy correctly. On examining a skin patch of the suspect, 84 % of the health workers were unable to correctly perform sensation testing on the patch and sensory testing on the palm and soles. Health workers who could correctly perform voluntary muscle testing on the eyes, hands and feet were only 10 %, 9 % and 14 %, respectively. Eighty two percent of the health workers were unable to correctly classify leprosy cases during the actual clinical examination of leprosy suspects. Ninety one percent of them were unable to correctly grade the disability status of the patient and the majority of them (82 %) could not prescribe the correct treatment regimen. A study conducted in India showed that the field investigators could initially miss about 35% of cases of leprosy, mostly with early manifestations. After training and experience, the proportion of missed cases decreased to about 20%.<sup>11</sup>In the study by Ukpe<sup>8</sup> at primary care clinics in the Eerstehoek area of

GertSibande district in Mpumalanga Province, South Africa, though the majority of the HWs were knowledgeable on the signs and symptoms of leprosy, but basic clinical knowledge of leprosy, such as the causative organism of leprosy, the method of spread of leprosy, the classification of leprosy and the treatment of leprosy, was poor and only 17% of the 52 health workers had some involvement with leprosy care and control at the PHC clinics.

#### **V. Conclusion**

Although leprosy control activities have been integrated with general health services in India and most of the frontline health workers have adequate knowledge, the skill on screening for leprosy and detection of early nerve damage were found to be unsatisfactory. Different reasons for suboptimal performance were lack of training, lack of instructional guideline for filling up the assessment sheets, difficulty in understanding the English language in assessment form. This necessitates the development of an instructional guideline for effective use of existing tools (ST/VMT assessment form) under NLEP. There is a need for regular training to improve their skill and in order to provide quality care, supportive supervision is an essential element.

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