Original Research

Health care service provision to leprosy patients in Western Province, Sri Lanka

Nadeeja Liyanage^{1*}, SM Arnold², MSD Wijesinghe³, DM Amarathunga⁴

¹ National Programme for Tuberculosis Control and Chest Disease, Ministry of Health, Sri Lanka; ² Director, Quarantine Unit, Ministry of Health, Sri Lanka; ³ Health Promotion Bureau, Ministry of Health, Sri Lanka; ⁴ District General Hospital, Gampaha, Sri Lanka

Correspondence: nadeejaro@gmail.com

<https://orcid.org/0000-0003-4591-0166>DOI: <https://doi.org/10.4038/jccpsl.v27i1.8371>

Received on 8 June 2021

Accepted on 20 December 2021

Abstract

Introduction: Both the curative and preventive sectors of the health system provide services to leprosy patients in Sri Lanka. Identification of the needs and gaps of service delivery would help to redesign the leprosy control activities in the country.

Objectives: To assess healthcare service provision to adult leprosy patients in Western Province

Methods: A descriptive cross-sectional study was conducted in 12 hospital dermatology clinics and 22 medical officer of health (MOH) offices in the Western Province. The sample was selected through a stratified random sampling method. A pretested checklist was used as the study instrument. Data were gathered by observations, interviewing hospital and MOH office staff.

Results: Overall service provision was satisfactory in all selected hospitals. All the hospitals' scores were above 75% indicating an overall satisfactory service provision in all categories of hospitals in the province. However, many deficiencies were identified in the service provision in individual hospitals in selected areas. In 2017, Colombo District had the highest number of leprosy cases (n=157). Case distribution in Western Province showed that Moratuwa (n=88), Negombo (n=31) and Beruwala (n=43) MOH areas had the highest number of cases in the Colombo, Gampaha and Kalutara Districts, respectively. Considering the maintenance of the registers and records of the 22 MOH offices surveyed, most (n=15; 68.2%) of the areas satisfactorily maintained their records. Contact tracing and health education were the main deficiencies identified.

Conclusions & Recommendations: Service provision was satisfactory in dermatology clinics. Unsatisfactory record-keeping in some MOH areas was found, while delay in case investigations, poor health education and contact tracing coverage were found in many MOH areas. MOH areas with poor performances should be closely monitored by the supervising officers to ensure the quality of service provision.

Keywords: *leprosy, service provision, Sri Lanka*

Introduction

Leprosy is a neglected tropical disease and approximately 2000 cases are reported annually in Sri Lanka (1). It is an illness with chronic morbidities such as vision impairment, limb disability, wounds, nerve involvement and complicated patients need rehabilitation. In Sri Lanka, leprosy cases are managed with MDT (multi-drug therapy) at dermatology clinics (DC) conducted in base hospitals (BH) under the purview of consultant dermatologists since 2001/2002. Leprosy has become a notifiable disease since 2013 and contact tracing was started in 2014 (1). The preventive sector provides contact tracing and health education to the family members via field health staff in the community or at the medical officer of health (MOH) office.

Health service provision is defined as “the way inputs such as money, staff, equipment and drugs are combined to allow the delivery of a series of interventions or health actions” (2-3). It is the most visible part of the health care system and it reflects what the health system does. Adequate financial support, skilled health care staff, adequate facilities and equipment, secured provision of essential drugs (and supplies), up to date evidence-based clinical guidelines and appropriate operational policies are the key inputs for the health care delivery (4-6).

The health care interventions and delivery should be affordable, high quality and effective to a large proportion of the population. Expanding access, coverage and quality of health services depend on the available resources, arrangement of the services and the way it is managed and on having adequate incentives to encourage health workers and patients (2, 7).

There are very few studies conducted on the evaluation of health care service provision in Sri Lanka. The lack of training for field health workers on leprosy screening, inadequate human resources and work overload are some reasons for poor field services in managing leprosy cases. In 2015, the highest percentage (38%) of leprosy patients was

reported from Western Province (WP) (1). Therefore, WP was selected to conduct this study. This study aimed to provide an insight into government health care service provision to adult leprosy patients in Western Province, Sri Lanka. The findings reveal the true picture of the gaps and needs of service delivery, which will facilitate future redesigning of the programme.

Methods

A descriptive cross-sectional study was carried out to assess the government healthcare service provision for adult leprosy patients in the year 2018. The study was conducted in leprosy clinics (LC), DC and MOH offices in WP. This province consists of Colombo, Gampaha and Kalutara Districts. To assess the service provision of curative services, routine clinics in teaching hospitals (TH), general hospitals (GH) and BH, and satellite clinics (special clinics) were selected. The MOH offices were selected to assess the service provision of preventive health services. Stratified random sampling method was used to select clinic centres. The TH, GH, BH and satellite clinics (special clinics) were selected as the strata and 50% of the clinics from each stratum were selected randomly. In selecting the MOH offices, three districts were considered as strata, from each of which 50% of the MOH offices were randomly selected. Accordingly, of the 45 MOH offices, 22 were selected (8 MOH offices from Gampaha, 7 from Colombo and 7 from Kalutara Districts).

Pre-tested checklists were used as the study instrument. A preliminary checklist was developed by referring to a validated instrument (8) identified through an extensive literature search. Following the development of a preliminary checklist, Modified Delphi Technique (9) was used with a group of experts to select the appropriate items related to follow-up care. According to Streiner and Normans' methods (10), equal scores were given to all items in the checklist. Therefore, in a clinic, if the facility is not applicable/not available – zero marks were given and if it was available, one mark was allocated. Clinic service provision checklist includes assessment of infrastructure, basic facilities, services available to

patients, equipment, human resources, availability of drugs and patient referrals. During the assessment of clinic service provision, clinic activities were observed, and necessary data were obtained from clinic attendance register and by interviewing the nursing officer (NO) in charge of the clinic, medical officers (MOs), chief medical laboratory technicians (MLT), chief physiotherapist and chief pharmacist. The total aggregated score was calculated to assess the clinic service provision. Cutoffs for total scores in the checklist were decided as follows; a total score equal or more than 75% - 'good'; 50 to 74% - 'average'; and equal or lower than 49 % - 'poor' service provision. Subsections of the checklist and maximum allocated scores that can be obtained by different hospital categories are presented in Table 1. Some leprosy service facilities such as blood investigation facility, diagnostic facilities (skin biopsy and slit skin smear test), issuing MDT drugs, availability of physiotherapy facilities are not available in divisional hospitals (DH) when compared to BHs and above. Considering those factors, maximum marks scored by the BH and above category was higher than the DH (maximum marks allocated to a BH and above was 111; and to a DH was 101) (Table 1). In order to compare the two hospital categories, when calculating the percentages, maximum possible score of particular hospital category was taken as the denominator while the aggregated marks scored by each hospital were taken as the numerator.

Checklist on the assessment of health care service provision to leprosy patients in an MOH office consisted of availability of maps, charts, relevant registers and records, human resources, attributed related to disease notification, the status of contact tracing and health education on notified leprosy cases in the area. Data were gathered through observations, interviewing the MOH and supervising public health inspectors (SPHI) in the MOH office.

Validity and reliability of the checklist were assessed prior to data collection. Judgmental validity included face, content and consensual validity (11). Internal consistency of the two checklists were as follows; clinic service provision checklist (0.86; 95% CI=0.61, 0.98; $p<0.001$), MOH checklist (0.78; 95%

CI=0.27, 0.97; $p<0.05$). The values were measured by using Kuder Richardson (KR) 20 which is used for scales with items that are measured dichotomously (12). The values indicate that both checklists had good reliability.

Results

A model leprosy clinic (A), TH (B), two BH (F & G) and DH (J) from Colombo District; TH (C), DGH (D), BH (H) and DH (K) from Gampaha District; and GH (E), BH (I) and DH (L) from Kalutara District were included to assess the service provision to leprosy patients.

Model leprosy clinic is the only clinic that is designed to provide services exclusively for leprosy patients. All the other clinics provide services to leprosy as well as other dermatological conditions. Data were collected from all 12 dermatology clinics, pharmacies, laboratories, physiotherapy units in the above hospitals. Names of the hospitals and MOHs were not displayed in order to maintain their anonymity. The following deficiencies in service provision were identified in the detailed analysis. Five out of the 12 dermatology clinics were situated upstairs. Those clinics were TH (B) and BH (F) in Colombo District; TH (C) and BH (H) in Gampaha District; and DH (L) in Kalutara District. Furthermore, two hospital clinics (BH (H) and DH (L)) did not have a working lift for patients (Table 2). Half of the hospitals were not having directional signs and properly visible name boards which is helpful to find the location of the clinic. A majority did not have trilingual name boards.

TH (B) from Colombo District provided services to a large number of patients. However, when considering infrastructure facilities, the clinic space and waiting areas were not adequate. At GH (D) in Gampaha District, waiting area was inadequate with poor ventilation and was in a corridor, which was blocked during clinic time. Appointment system was not implemented except for TH (C) in Gampaha District and BH (I) in Kalutara District. Other hospitals gave only a next clinic date but not the time. Therefore, all the patients must wait for a long time to get the

treatment. Appointment book was not maintained at TH (B) and BH (H) hospitals.

Clinic Leprosy (CL) Register was not available in DHs except in DH (J). It was not updated since 'patient diagnosis' had not been carried out in this centre. There was inadequate space found in the clinic premises for the medical officers in TH (B & C), GH (D) and two BH (G & I). Adequate space was found in one GH (E) in Kalutara District and all DHs, facilitating the maintenance of privacy during a consultation. None of the hospitals had toilets for patients with disabilities.

A separate place for patient counselling was available at the model clinic (A), one TH (C) and one DH (J). Health education material related to leprosy was available in all hospitals. When compared to other hospitals, most DHs did not have a laboratory or if existing, it was equipped with poor facilities. In DH (J) in Colombo District, laboratory facility was not available, and the blood samples collected for haemoglobin, SGOT/SGPT, serum creatinine and full blood sugar were sent to the nearest BH for analysis. Due to the above issue, patients had to wait for one day to obtain the reports. Full blood count (FBC) was the only blood test carried out in the DH in Gampaha District (K). Although facilities were available for liver function tests and serum creatinine, there was only one MLT available. Therefore, the two tests were not performed. DH (L) in Kalutara District, SGPT/SGOT was not done, and blood samples were sent to BH in the same district for analysis. G6PD is a blood investigation carried out to see whether the leprosy patient is having G6PD deficiency. This facility was only available at two clinics in Colombo District (A & B) and one clinic in Kalutara District (I). Slit skin smear (SSS) and skin biopsy facilities were not available in one BH (G) of Colombo District, which sent samples to another BH in the same district to conduct the above tests.

MDT was not issued in the DHs due to unavailability of proper laboratory facilities, which is needed to monitor the potential side effects. MDT, thalidomide, azathioprine and ofloxacin (latter three drugs are used to manage leprosy reactions) were not available in the DHs. A separate pharmacy counter was

allocated for the clinics at model clinic, two TH and two GH (A-E). Pharmacies were not air-conditioned in BH (H) in Gampaha District and all three DHs.

MCR shoes and splints (gutter and forearm splints) were not available in GH (D) at Gampaha District and one BH (G) in Colombo District. Although physiotherapy facilities are not established in DHs in general, there is a physiotherapy unit at DH (J) in Colombo District, but it was not functioning due to the non-availability of a physiotherapist. Wound care and contact screening facilities were available in all the hospitals.

The highest percentage of scores was achieved by model clinic (A) and GH (E) in Kalutara District and the BH (I) in Kalutara District scored the lowest (Table 3). Scores of all the hospitals were above 75% indicating an overall satisfactory service provision in all categories of hospitals in the WP.

Leprosy service provision at MOH offices in the WP was carried out among 22 MOH offices. Leprosy data of the year 2017 were collected since it was the latest available annual data at the time of data collection. According to the selected MOH areas in the WP in 2017 (Table 4), within Colombo District, the highest number of cases were found in Colombo MOH Area 1 (C-MOH 1) (88), C-MOH 2 (38) and C-MOH 3 (14) areas. Untraceable cases were high in the C-MOH 2 (10), which was nearly 20% of the total cases. In C-MOH 5 and C-MOH 7, 100% of the cases were investigated within the first seven days. The C-MOH (n=88; 27.5%) had the highest number of leprosy cases in WP. Within that MOH, the highest number of cases was reported in a few PHI areas. Despite reporting the highest number of cases in one PHI area, health education and contact screening status was less than 50%.

In Gampaha District, the highest number of leprosy cases was found in the Gampaha MOH 1 (G-MOH 1) (31), G-MOH 2 (13) and G-MOH 3 (12) Areas. Although leprosy was within the top five communicable diseases in the G-MOH 1 Area, leprosy was not included in the maps and charts. G-MOH 3 showed the highest percentage (92%) of case investigations carried out within the first seven days.

Case investigation after 14 days was 61% in the G-MOH 2 and 60% G-MOH 4 Areas. In G-MOH 1, the highest number of cases was found mainly in three PHI areas.

The Kalutara MOH Area 1 (K-MOH 1) (43), K-MOH 2 (25) and K-MOH 3 (6) had the highest number of cases in Kalutara District. Health education and contact tracing were 100% in C-MOH 4 & C-MOH 7 Areas in Colombo; G-MOH 4 & G-MOH 7 Areas in Gampaha; K-MOH 4, K-MOH 5 and K-MOH 6 areas in Kalutara District (Table 5).

Screening of leprosy contacts at MOH Offices, in C-MOH 2, G-MOH 1, G-MOH 4, G-MOH 7, K-MOH 3

was carried out in all the working days. In C-MOH 1, C-MOH 5, C-MOH 6, C-MOH 7, G-MOH 2, K-MOH 1, K-MOH 4, K-MOH 5, K-MOH 6, K-MOH 7 Areas, contact screening was carried out for households once a week. In K-MOH 2, it was carried out once a month. None of the MOH offices displayed a notice, stating that leprosy contact screening was carried out at the MOH Office.

Considering the maintenance of the registers and records of the 22 MOH offices surveyed, most (n=15; 68.2%) of the areas satisfactorily maintained their records. Currently, applicable circulars on leprosy were available in all the MOH offices. There were seven MOH areas with poor record-keeping (Table 5).

Table 1: Sub-sections and maximum allocated scores in assessment of health care service provision in the leprosy clinic

Sub-sections	Item No.	Maximum allocated score (BH & above)	Maximum allocated score (DH)
1. Accessibility and Access	Section B Item s 1-4	13	13
2. Infrastructure (ventilation, power supply, lighting, equipment, stationary)	Section B Item s 5, 6, F, G	20	17
3. Registration (appointment system, seating and waiting facility)	Section B Item s 7-10	5	5
4. Registration (appointment system, seating and waiting facility)	Section B Item s 11-14	4	4
5. Cleanliness, laundry and waste management	Section s C and D	13	13
6. Sanitary facilities for patients and staff (toilets, drinking water, hand washing)	Section B Item s 15, 16, E	13	13
7. Health education and counselling	Section H	2	2
8. Clinic process (lab services, issuing drugs)	Section I, J, K, N, O	32	26
9. Human resources (availability and training programmes)	Section L, M	9	8
Total marks		111	101

BH-Base hospital, DH-Divisional hospital

Table 2: Distribution by accessibility and directional signs to leprosy clinics in the Western Province

Description	A	B	C	D	E	F	G	H	I*	J	K	L
Clinic building												
Permanent Building	1	1	1	1	1	1	1	1	1	1	1	1
Accessibility												
Easily reachable	1	1	1	1	1	1	1	1	1	1	1	1
Vehicle access	1	1	1	1	1	1	1	1	1	1	1	1
Disable access	1	1	1	1	1	1	1	0	0	1	1	0
Wheelchairs & trolleys	1	1	1	1	1	1	1	1	1	1	1	1
Working lift	NA	1	1	NA	NA	1	NA	0	0	NA	NA	0
Entrance	1	0	1	0	1	1	1	1	1	1	1	1
Signs & labelling												
Directional signs	1	0	1	1	1	1	0	1	0	0	0	0
Name board												
Present	1	1	1	1	1	1	0	1	0	0	0	0
In all 3 languages	0	1	0	0	1	0	0	0	0	0	0	0
Visibility	1	1	1	1	1	1	0	0	0	0	0	0
Rooms with signs	1	1	1	1	1	1	0	1	0	0	0	1
Toilets with signs	0	1	0	0	1	1	1	1	0	0	0	1
Maximum possible score												
	12	13	13	12	12	13	12	13	13	12	12	13
Total score												
	10	11	11	9	12	12	7	9	5	6	6	7

A-Model clinic in Colombo District, B- TH in Colombo District, C- TH in Gampaha District, D-DGH in Gampaha District, E-GH in Kalutara District, F-BH-1 in Colombo District, G-, BH-2 in Colombo District, H- BH in Gampaha District, I-BH- in Kalutara District, J-DH in Colombo District, K-DH in Gampaha District , L-DH in Kalutara District NA-Not applicable, Clinics situated in ground floor, I*-clinic is conducted in the ground floor as well as in upstairs and the upstairs building doesn't not have a working lift.

Table 3: Distribution of the total aggregated score of Dermatology clinics in the Western Province

	A	B	C	D	E	F	G	H	I	J	K	L
Score	101	96	99	86	101	98	86	93	84	78	83	82
Maximum possible score	110	110	110	110	110	110	110	110	111	100	100	100
	*	**	**	*	*	**	*	**	***	*	*	**
%	91.8	87.2	90.0	78.1	91.8	89.0	78.1	84.5	75.6	78.0	83.0	82.0

A-Model clinic in Colombo district, B- TH in Colombo district, C- TH in Gampaha District, D-DGH in Gampaha District, E-GH in Kalutara District, F-BH in Colombo district, G- BH in Colombo district, H- BH in Gampaha District, I-BH- in Kalutara District, J-DH in Colombo District, K-DH in Gampaha District , L-DH in Kalutara District , * Working lift is not applicable in these clinics situated in ground floors** Drains are not applicable in these clinics situated in upstairs.*** clinic is conducted in the ground floor as well as in upstairs and the upstairs building doesn't not have a working lift.

Table 4: Distribution of the status of investigation of notified leprosy cases in selected MOH areas in the Western Province

MOH area	NN	NC	1-7 D N (%)	8-14 D N (%)	> 14 D N (%)	UT N	NND	Other MOH
Colombo district								
C-MOH -1	94	88	31 (35)	9 (10)	48 (55)	6	0	0
C-MOH -2	48	38	18 (47)	8 (21)	12 (32)	10	0	0
C-MOH -3	15	14	10 (71)	1 (7)	3 (22)	1	0	0
C-MOH -4	9	6	2 (33)	1 (17)	3 (50)	2	0	1
C-MOH -5	5	4	4 (100)	0 (0)	0 (0)	0	0	1
C-MOH -6	7	5	2 (40)	3 (60)	0 (0)	0	1	1
C-MOH -7	2	2	2 (100)	0 (0)	0 (0)	0	0	0
Total (district)	180	157	69 (44)	22 (14)	66 (42)	19	1	3
Gampaha district								
G-MOH -1	32	31	*	*	*	1	0	0
G-MOH -2	14	13	4(31)	1(8)	8(61)	1	0	0
G-MOH -3	12	12	11(92)	1(8)	0(0)	0	0	0
G-MOH -4	10	10	4(40)	0(0)	6(60)	0	0	0
G-MOH -5	8	7	4(57)	1(14)	2(29)	0	0	1
G-MOH -6	4	3	2(67)	1(33)	0(0)	1	0	0
G-MOH -7	4	4	2(50)	2(50)	0(0)	0	0	0
G-MOH -8	0	0	0(0)	0(0)	0(0)	0	0	0
Total (district)	84	80	27(33)	6(7)	16(20)	3	0	1
Kalutara district								
K-MOH -1	49	43	24(56)	7(16)	12(28)	1	5	0
K-MOH -2	27	25	15(60)	3(12)	7(28)	0	2	0
K-MOH -3	6	6	4(67)	1(17)	1(16)	0	0	0
K-MOH -4	4	4	4(100)	0(0)	0(0)	0	0	0
K-MOH -5	4	3	1(33)	2(67)	0(0)	1	0	0
K-MOH -6	2	2	1(50)	0(0)	1(50)	0	0	0
K-MOH -7	2	1	0(0)	0(0)	1(100)	1	0	0
Total (district)	94	84	49(59)	13(15)	22(26)	3	7	0
Total (WP)	358	321	145(45)	41(12)	104(32)	25	8	4

NN-Number notified, NC- Number confirmed, 1-7D-Investigated within 7 days, 8-14D- Investigated within 8-14days, >14D- Investigate after 14 days, UT-Untraceable, NND-Not a notifiable disease, C-MOH, MOH areas in the Colombo District, G-MOH, MOH areas in the Gampaha District, K-MOH, MOH areas in the Kalutara District, *Investigated dates are not mentioned in the Notification and ID Register, W. Province-Western Province

Table 5: Distribution of the status of contact tracing and health education at the field level by selected MOH areas in the Western Province

MOH area	No of cases	% of cases in WP	No of cases with family contacts tracing/ received health education	% of cases in MOH area
Colombo district				
C-MOH-1	88	27.5	50	56.8
C-MOH-2	38	11.9	25	65.7
C-MOH-3	14	4.4	6	42.8
C-MOH-4	6	1.8	6	100.0
C-MOH-5	5	1.5	4	80.0
C-MOH-6	4	1.2	3	75.0
C-MOH-7	2	0.6	2	100.0
Total (district)	157	48.9	96	61.1
Gampaha district				
G-MOH-1	31	9.7	*	*
G-MOH-2	13	4.3	7	53.8
G-MOH-3	12	3.8	11	91.6
G-MOH-4	10	3.2	10	100.0
G-MOH-5	7	2.2	*	*
G-MOH-6	4	1.3	4	100.0
G-MOH-7	3	0.4	*	*
G-MOH-8	0	0.0	0	0.0
Total (district)	80	24.9	32	40
Kalutara district				
K-MOH-1	43	13.4	*	*
K-MOH-2	25	7.8	20	80.0
K-MOH-3	6	1.9	4	66.6
K-MOH-4	4	1.2	4	100.0
K-MOH-5	3	0.9	3	100.0
K-MOH-6	2	0.6	2	100.0
K-MOH-7	1	0.3	0	0.0
Total (district)	84	26.2	33	39.2
Total (WP)	321	100.0	161	50.1

C-MOH, MOH areas in the Colombo district, G-MOH, MOH areas in the Gampaha District, K-MOH, MOH areas in the Kalutara District, * Leprosy Register was not updated, WP-Western Province

Table 6: Distribution of status of Register maintenance by selected MOH areas in the Western Province

MOH area	No of cases	%	Status of registers maintenance
Colombo district			
C-MOH-1	88	27.5	Satisfactory.
C-MOH-2	38	11.9	There was a discrepancy between number of confirmed cases recorded in the NR and ID Registers
C-MOH-3	14	4.4	Satisfactory.
C-MOH-4	6	1.8	Satisfactory.
C-MOH-5	5	1.5	Satisfactory.
C-MOH-6	4	1.2	Satisfactory.
C-MOH-7	2	0.6	Satisfactory
Total (district)	157	48.9	
Gampaha district			
G-MOH-1	31	9.7	Data were not compatible between NR and ID registers. Dates of investigation were not recorded. Some columns were not updated. ID Register: Dates of investigation and all the confirmed cases were not recorded. LC Register: This was not maintained for the year 2017.
G-MOH-2	13	4.3	NR: This is incomplete. Data entering started since 07 th Oct 2017 due to unavailability of SPHI.
G-MOH-3	12	3.8	Patient's names in the ID Register and LC Register were incompatible.
G-MOH-4	10	3.2	Satisfactory.
G-MOH-5	7	2.2	Discrepancy in case investigation dates in the NR and ID Register. LC Register was not maintained in 2017.
G-MOH-6	4	1.3	Satisfactory.
G-MOH-7	3	0.4	NR and ID Register entered in a single Register in 2017. LC Register was not maintained in 2017.
G-MOH-8	0	0.0	Leprosy cases not found.
Total (district)	80	24.9	
Kalutara district			
K-MOH-1	43	13.4	LC Register was not updated.
K-MOH-2	25	7.8	Satisfactory.
K-MOH-3	6	1.9	Satisfactory.
K-MOH-4	4	1.2	Satisfactory.

K-MOH-5	3	0.9	Satisfactory.
K-MOH-6	2	0.6	Satisfactory.
K-MOH-7	1	0.3	Satisfactory.
Total (district)	84	26.2	
Total (WP)	321	100.0	

Source: Notification Register (NR), Infectious Disease Registers (ID) and Leprosy Contact (LC) Register in the MOH Offices, C-MOH, MOH areas in the Colombo district, G-MOH, MOH areas in the Gampaha district, K-MOH, MOH areas in the Kalutara District, WP -Western Province

Discussion

All 12 hospitals scored an aggregate score of above 75 for the service provision checklist. Despite having certain gaps, the overall service provision for the leprosy patients who attended the clinics in WP was satisfactory. The delivery of health care services depends not only on individual providers but also on the availability of facilities at the work settings. Available facilities are different in TH, GH, BH and DH. Based on available facilities and services provided, BH & DH are considered as lower-level hospitals, while TH & GH are considered as higher-level hospitals. The TH & GH receive financial allocations from the Ministry of Health of the central government, and BH & DH from the provincial councils (13). Having national-level funding has shown to improve facilities in many centers compared to regional funding mechanisms (14). BH and above are having a consultant dermatologist to conduct clinics. A 'satellite clinic' (conducted in DHs) does not have a permanent consultant dermatologist but a visiting dermatologist from the nearest main hospital to conduct a clinic once a month.

Since leprosy is a disabling condition, clinics should have proper access for disabled patients. If a clinic is situated in upper floors, there should be an elevator facility. If proper attention is given, the hospital management can provide directional signs, name boards at a minimal cost. This is shown in many studies done in India (15). Model clinic (A), TH (C) and BH (I) issue an appointment number and the time for the next clinic visit which reduce the overcrowding as well as patient waiting time. Being a large tertiary care hospital with a large number of patient

attendance, TH (B) could easily implement this appointment system. In other hospitals, this was not a major issue since the number of patients attending the clinic was not large. The appointment systems are proven to be very efficient in leprosy patient management in India (16). Toilet facilities for disabled patients were not available in all the hospitals despite it being a government requirement to have toilet facilities for disabled patients. This gap should be addressed by the hospital administration. It is considered a basic human right of patients affected with leprosy disabilities (17).

Although there is a large number of leprosy patients living in MOH Area 1 in Colombo District, DH (J) does not have laboratory facilities to diagnose leprosy. As a result, patients have to travel to TH (B) or to a nearest BH to get treatment. Establishing basic laboratory facilities at leprosy treatment centres is very important. It is also important since the leprosy treatment should be started as early as possible to prevent poor patient compliance (18).

Field investigations of notified cases should be carried out within 14 days of notification. The incubation period of leprosy ranges from a few weeks to 30 years (19). There may be family contacts having leprosy without their knowledge. The majority of PHI areas in C-MOH 1 where case investigation was poor included PHIs' working under the 'local government authority'. Since the MOH does not have direct administrative authority over these PHIs, the majority do not carry out field activities related to leprosy in a satisfactory manner due to many reasons. In MOH areas where there is no 'local government' control, the PHIs have performed well with 100% case

investigations, 100% contact tracing and health education.

Maintenance of records was very poor in the Gampaha District. Supervision of higher officers was found to be effective in many field-based leprosy-controlled activities in India, Bangladesh and Uganda (20-22).

Since leprosy is not a highly prevalent disease in Sri Lanka (compared to many other communicable diseases), general practitioners (GP), medical officer-out patient department (MO-OPD) and even specialists do not get much exposure to leprosy patients. When compared to MOs working in the curative sector, MOHs and their staff working in the preventive health sector get lesser exposure to leprosy patients. Therefore, to provide preventive health services, the public health staff should be regularly exposed to in-service training and awareness programmes on leprosy prevention and management. However, this is not practically taking place in the majority of MOH Offices. Lack of knowledge and skills will result in a delay in the diagnosis of leprosy. The regular in-service training of leprosy has been useful to keep the public health staff up to date in developing countries like India, Bangladesh and Brazil (20-21, 23).

Conclusions & Recommendations

A satisfactory service provision was found in all hospital clinics in WP. Model Clinic (A) and GH (E) in Kalutara District achieved the highest scores for service provision while BH (I) in the same district had the lowest. DHs provided satisfactory services with available facilities. Of the surveyed 22 MOH offices, 7 offices had poor record keeping. In some MOH areas, long duration to carry out case investigations, low contact tracing and non-provision of health education for leprosy-affected families were noted. Clinics in the TH (B) and DGH (D) in Gampaha District should be shifted to a place with adequate clinic space and waiting area to prevent congestion. An appointment system should be introduced to hospitals with overcrowded clinics. Dedicating a

specific date and time (e.g., Saturday morning) for contact screening in all MOH offices and informing the service to the community through mass media, billboards displayed at MOH offices (and hospitals) will make the community aware of the regular services at the MOH office. Access to facilities for disabled patients such as an elevator to clinics, corridors with wheelchair access and toilets for disabled patients should be improved in the Sri Lankan hospitals.

Public Health Implications

Since leprosy is a communicable disease, treating patients as well as prevention of spreading the disease are of equal importance. There was a satisfactory service provision that was found in all hospital clinics in Western Province. Although majority of the preventive activities carried out in MOH offices were satisfactory, many needed proper supervision.

Author Declarations

Competing interest: The authors declare that they have no competing interests.

Ethics approval and consent to participate: Ethical approval was granted by the Ethics Review Committee of the Medical Research Institute, Colombo, Sri Lanka (Reference no:55/2017). Informed written consent was obtained from each participant prior to data collection.

Funding: Self-funded.

Acknowledgements: The authors would like to express gratitude to the experts who gave support to plan this study and health staff in the dermatology clinics and MOH offices, data collectors.

Author contributions: NRL developed the concept, carried out data collection and wrote the manuscript. MSDW contributed to the study design and data analysis. DMA contributed to the study design, data collection and interpretation of the data. Overall supervision of the study was by SMA. All authors read and approved the final manuscript.

References

1. Leprosy A & Pai CAM. *Anti-Leprosy Campaign (ALC)*. Annual Report 2015; 6-14. Available from: <https://www.leprosyncampaign.health.gov.lk/index.php/en/gallery/annual-reports>.
2. WHO. *Monitoring the Building Blocks of Health Systems: a Handbook of Indicators and Their Measurements Strategies*. Geneva: World Health Organization, 2010. Available from: http://www.who.int/healthinfo/systems/WHO_MBHSS_2010_full_web.pdf
3. Syafinaz I, Haslinda N, Juni MH, Juni M, Muhamad D, Esahak A, et al. Health care provision and equity. *IJPHCS* 2016; 3(4). Available from: https://www.researchgate.net/publication/324328670_HEALTH_CARE_PROVISION_AND_EQUITY.
4. Institute for Health Metrics and Evaluation (IHME). *Health service provision in Zambia: assessing facility capacity, costs of care, and patient perspectives*. Seattle, WA: IHME; 2014. Available from: http://www.healthdata.org/sites/default/files/files/policy_report/2015/ABCE_Zambia_finalreport_Jan2015.pdf.
5. WHO. *Provision of personal and non-personal health services: proposal for monitoring*. Geneva: World Health Organization, 2002. Available from: <file:///E:/Leprosy%20literature%20review/lit%20review%20object%20two/service%20provision%20article%20new%20literature/WHO%20service%20provision%20definition%202002.pdf>.
6. International Labour Office. *Social health insurance: direct versus indirect provision of care*. Geneva: International Labour Office, 1997.
7. Cameron GS & Martin RS. The challenges of service provision. *Age and Ageing* 1997; 26(4): 30-42. Available from: https://watermark.silverchair.com/26-suppl_4_30.pdf?token=AQECAHi208BE49Ooan9kkhW_Ercy7Dm3ZL_9Cf3qfKAc485ysgAAAnMwggJvBgkqhkiG9w0BBwagggJgMIICXAIB.
8. Thenuwara NV. *Quality of care, quality of life and cost implications for patients with diabetes mellitus attending outpatient clinics at state hospitals of Western Province*. MD Thesis (Community Medicine). Colombo: Post Graduate Institute of Medicine, 2013.
9. Hsu CC & Sandford B. The Delphi Technique: making sense of consensus. *Pract Assess Res Evaluation* 2007; 12(10).
10. Streiner DL & Norman GR. *Health Measurement Scales: A Practical Guide to their Development and Use*. 3rd ed. Oxford: Oxford University Press, 2003.
11. Abramson JH & Abramson ZH. *Survey Methods in Community Medicine*. 5th ed. Edinburgh: Churchill Livingstone, 1999.
12. Services S. *Exam scores: how to interpret your statistical analysis reports*, 2004. Available from: <https://jcesom.marshall.edu/media/24101/Interpreting-Statistical-Information.pdf>.
13. Smith O. *Sri Lanka: Achieving pro-poor universal health coverage without health financing reforms*. Universal Health Coverage Study Series 38. Washington, DC: World Bank Group, 2018. Available from: <http://documents.worldbank.org/curated/en/138941516179080537/pdf/Sri-Lanka-Achieving-pro-poor-universal-health-coverage-without-health-financing-reforms.pdf>.
14. Tiwari A, Suryawanshi P, Raikwar A, Arif M, Richardus JH. Household expenditure on leprosy outpatient services in the Indian health system: A comparative study. *PLoS Negl Trop Dis* 2018; 12(1): e0006181. doi: 10.1371/journal.pntd.0006181.
15. Visschedijk J, Engelhard A, Lever P, Grossi MADF, Feenstra P. Leprosy control strategies and the integration of health services: an international perspective. *REVISÃO REVIEW* 2003; 19(6): 1567-1581.
16. Raju MS, Annamma S, John, Kuipers P. What stops people completing multi-drug therapy? Ranked perspectives of people with leprosy, their head of family and neighbours - across four Indian states. *Lepr Rev* 2015; 86: 6-20.
17. United Nations Office. The human right to water and sanitation reader. *UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC)*. United Nations Office to Support the International Decade for Action 'Water for Life', 2005-2015. Available from: https://www.un.org/waterforlifedecade/pdf/05_2011_human_right_to_water_reader_eng.pdf.
18. Renita L, Pulimood SA, Eapen EP, Muliylil J, John KR. Health care utilisation in Indian leprosy

- patients in the era of elimination. *Lepr Rev* 2010; 81(4): 299-305.
19. Andrea C, Silvia C. *Microbiology*. In: Editor Nunzi E, Massone C. *Leprosy: A Practical Guide*. Italia: Springer-Verlag, 2012.
  20. Muthuvel T, Govindarajulu S, Isaakidis P, Shewade HD, Rokade V, Singh R, et al. "I wasted 3 years, thinking it's not a problem": patient and health system delays in diagnosis of leprosy in India: a mixed-methods study. *PLoS Negl Trop Dis* 2017; 11(1): e0005192. doi:10.1371/ journal.pntd.0005192.
  21. Kabir H & Hossain S. Knowledge on leprosy and its management among primary healthcare providers in two districts of Bangladesh. *BMC Health Serv Res* 2019; 19: 787. doi: 10.1186/s12913-019-4525-z. Musoke
  22. D, Boynton P, Butler C, Musoke MB. Health seeking behavior and challenges in utilizing health facilities in Wakiso District, Uganda. *Afr Health Sci* 2014; 14(4): 1046-1055. doi: 10.4314/ahs.v14i4.36.
  23. Henry M, Galan N, Teasdale K, Prado R, Amar H, Rays MS, et al. Factors contributing to the delay in diagnosis and continued transmission of leprosy in Brazil – An explorative, quantitative, questionnaire based study. *PLoS Negl Trop Dis* 2016; 10(3): e0004542. doi:10.1371/journal.pntd.0004542.