LEARNING FROM THE LITERATURE

DEVELOPING INTEGRATED MANAGEMENT STRATEGIES FOR NEGLECTED TROPICAL DISEASES THAT AFFECT THE SKIN IN SUB-SAHARAN AFRICA

COUNTDOWN
Calling time on Neglected Tropical Diseases

INTRODUCTION

This booklet presents a summary of a literature review on integrated management strategies for Neglected Tropical Diseases (NTDs) that affect the skin in Sub-Saharan Africa. This review was completed as a part of a pilot study aimed at developing an integrated management system for NTDs that affect the skin in Kaduna and Ogun States, Nigeria. This work has been completed as part of the COUNTDOWN consortium in partnership with the Nigerian Federal Ministry of Health, and Ogun and Kaduna State Ministries of Health.

Fig 1: *Study Sites: Ogun and Kaduna, Nigeria*

BACKGROUND

Many NTDs have significant skin manifestations, which can lead to chronic and lifelong disability, morbidity and stigma. Affected people often attend for treatment at health facilities at the latter stages of disease once symptoms become severe. Early case detection of NTDs that affect the skin is therefore important to minimise the negative health impacts that delays in diagnosis can cause. This study aims to address current knowledge gaps regarding how best to detect and refer skin NTD cases through the use of integrated approaches at community level. **When we refer to integrated approaches, we mean an approach that utilises existing health infrastructure such as community health cadres or primary health centres as well as focusing on multiple diseases simultaneously.**

Existing mechanisms for integrated management of skin NTDs within sub-Saharan Africa have been explored through a literature review. Findings from our literature review will inform action planning meetings with community and health system stakeholders from Ogun and Kaduna to co-design an intervention for improving case detection, referral and treatment of skin NTDs.

The summary of findings and recommendations from the literature review are presented in this booklet. The booklet is designed to serve as a guide to stakeholders (including the State and Local Government Area NTD programs, frontline health facility staff, community health volunteers and affected persons) for collaborative decision making on steps and actions that may be taken forward or adapted to create an integrated community-based case detection and referral system for NTDs affecting the skin. These decisions will be made based on the local context and feasibility, considering the timeline, budget, and resources available to the program in order to create a sustainable package, which may include newly designed training packages, integrated skin algorithms, and referral processes.

HOW THE LITERATURE REVIEW WAS CONDUCTED

We used the following databases to identify peer-reviewed literature: Medline, CINAHL, Global Health and Web of Science; articles in English were included. 2250 articles were retrieved of which, following multiple rounds of screening and summarising, 122 met the final inclusion criteria. We also identified 21 sources of grey literature using Google Search.

Search terms used were: "neglected tropical diseas*" OR NTD* OR "lymphatic filariasis" elephantias* OR leprosy OR "Hansen's disease" OR "Buruli ulcer" OR "Mycobacterium ulcerans" OR hydrocele OR lymphedema, OR Lymphoedema OR "hanging groin" AND "case detect*" OR diagno* OR skin OR detection OR algorithm OR integrat* OR screen* OR management AND "Africa" OR "Sub-Saharan" OR "Sub-Saharan Africa" OR "Subsaharan Africa" (see figure 2). We included skin NTDs which are endemic in the study sites: leprosy, lymphatic filariasis and Buruli ulcer.

Articles retrieved in the search were then screened for relevance as shown in figure 2. Screening was conducted by multiple members of the research team to enhance quality.

Literature which met the final inclusion criteria were then charted and summarised according to key themes identified. Key themes included: **Training**, **Screening**, **Clinical Diagnosis**, **Clinical Management**, and **Health Education**. A summary of each key theme is presented within the following sub-sections of this booklet.

*Note: *the asterisk is used to broaden a search by finding words that start with the same letters.*

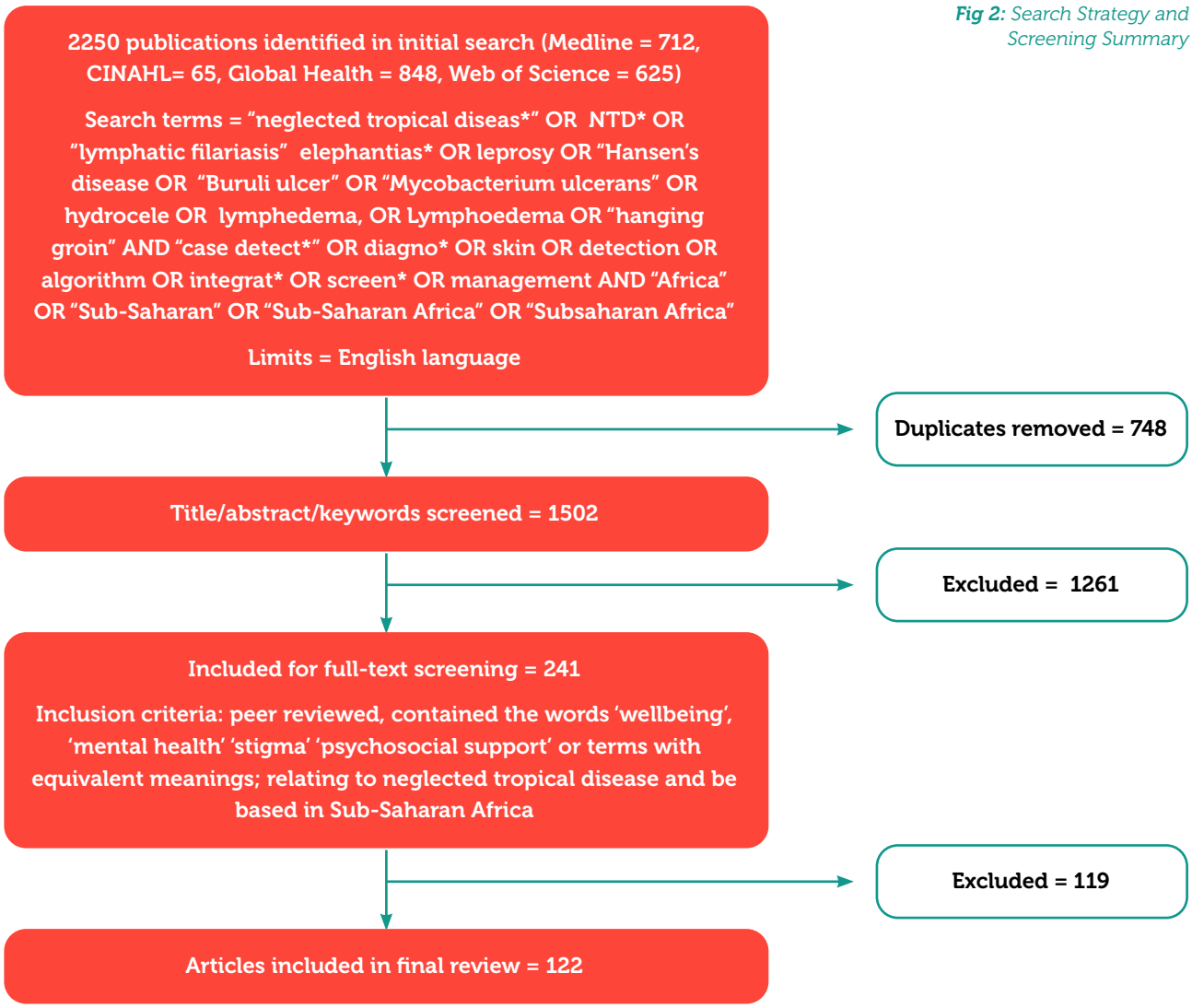


Fig 2: *Search Strategy and Screening Summary*

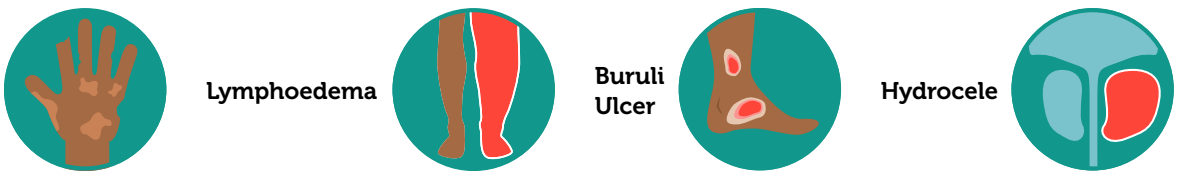
HOW TO USE THE BOOKLET

Following the detailed literature review, we have summarised findings in an accessible format. Findings are presented in the following sections:

- **Training:** Page 4
- **Screening:** Page 8
- **Health Education:** Page 9
- **Clinical Diagnosis:** Page 11
- **Clinical Management:** Page 13

Country settings are detailed within the summaries, with references to the relevant literature, which you can find in the References section at the end of this document. We hope you will find the information in this booklet helpful in learning from the literature on what has been done in management strategies for skin NTDs across sub-Saharan Africa and how these learnings can be taken forward or adapted for use in the collaborative design of integrated management strategies of NTDs in Ogun and Kaduna.

NTD Key:



TRAINING

PERSONS INVOLVED

Across all literature reviewed, multiple actors were identified who could be trained to support with screening and diagnosis of patients, as follows:

- **Community-based surveillance volunteers** (CBSV) nominated by opinion leaders in their community on basis of interest, being proactive, literate, and knowledgeable, including those who assist in MDA. (Mathieu, E., et al. 2013, Togo; Wanji, et. al, 2016, Cameroon).

- **Formal health providers** including: mobile teams composed of a doctor and two nurses, facility workers, community health volunteers, Buruli Ulcer (BU) team members, frontline health workers, nurse specialists in dermatology, nurses, environmental health officers, paramedics, medicine vendors and laboratory staff. (Ekeke, N., et al., 2017, Nigeria; Baretto, Zero Leprosy, 2017).

- **Informal health providers**: traditional healers were engaged in treating persons with longstanding ulcers and to also refer such cases for evaluation at the nearest hospital offering BU control services. (Meka, A. O., et al. 2016, Nigeria; Taal, A. T., et al., 2015, Nigeria; Ezenduka, C., et al., 2012, Nigeria).

- **Family and patients** were included in self-referral. Successfully treated former patients and 'patient champions' were also involved in screening. (Webb, B. J., et al., 2009, West Africa; Abass, etal, 2014, Ghana; Buyon, L., et al., 2018; Ackumey, et al, 2011, Ghana; Ahorlu, C. K., et al., 2013, Ghana; Koffi, A.P, et at, 2020, Côte d'Ivoire).

- **Village leaders** were also trained in the diagnosis of leprosy, availability and efficacy of MDT and the advantages of early detection. (Ebenso, B. E. 1999, Nigeria).

A wide range of actors who could conduct training were identified through the literature, including national program staff, specialized doctors, nurses and clinicians as well as NGO actors. This includes organising training for trainers, health workers and village volunteers on diagnosis, treatment and management of NTDs.

- **Experienced doctors, nurses, and health staff** with skills on wound care, management and detection can facilitate training of newly assigned health staff, community volunteers and caregivers. (Amoussouhoui, A. S., et al. 2018, Benin).

- **National, State and Local Government Staff**: The National Tuberculosis, Leprosy and BU Control Programme of Nigeria are recommended to undertake focused training and supervision of health care workers with the view to improving knowledge of the disease and translating this into good attitude and improved risk perception towards the disease and preventative measures, such as wearing protective clothing. (Ekeke, N., et al. 2017, Nigeria). Community-Based Surveillance Volunteers (CBSVs) were trained by the Buruli Ulcer (BU) as well as the national LF coordination team. (Abass, K. M., et al. 2015, Ghana; Mathieu, E., et al. 2013, Togo; Ezenduka, C., et al. 2012, Nigeria).

CONTENT

Content of training on diagnosis, management and referral includes the use of pictorial guides, algorithms, manuals and tests as well as physical demonstrations of patient examination and care.

- The WHO pictorial guide has been used to train health workers to identify, diagnose and refer patients with skin NTDs. (WHO, 2018). Training content should include guideline development featuring a simple algorithm on clinical assessment, treatment and referral needs, and a defined care package for people affected by skin NTDs.

- The ILEP (International Federation of Anti-Leprosy Associations) learning guide on how to treat and diagnose leprosy for community health workers, nurses, rehabilitation workers, general practitioners, especially health workers working at the first level of referral. (ILEP, 2019).

- Content of training should include simple integrated pictorial guides which can be developed to help health workers and village volunteers. Structured tele dermatology resources could provide a system of support during and after training for frontline health facility workers and community health volunteers. (WHO, 2018, Mitja et al, 2017; Algorithm Ministry of Health 2016, Ethopia; WHO, 2018; Taal, A. T., et al. 2015, Nigeria).

- Key information on training should include providing all five components of Morbidity Management and Disease Prevention (MMDP) to patients such as skin care, wound care, exercise (active or passive), protective footwear and counselling. (NTD NGO Network, 2018, International). The training of the health workers covered basic epidemiology, clinical diagnosis, differential diagnosis, complications, social consequences and treatment of diseases. (Bainson, 1994, Ghana).

- With increasing availability and accessibility to mobile phones and internet, tele dermatology is one way forward for establishing an adequate training, support and referral system. (Yotsu, R. R., et al. 2018, Côte d'Ivoire).

- The use of WhatsApp mobile technology in the form of text messaging, still photos and video calling can be an effective way of offering real time support and supervision of training during surgical service provision. (Akoko, L., et al. 2019).

- A teaching video can be developed and rolled out for healthcare workers on integrated morbidity management. Training content can also include training on other wide range of skin diseases, other than skin NTDs, in which diagnosis are difficult, and some can even be fatal, e.g. acute infections, drug eruptions, and cutaneous malignancies. (Yotsu, R. R., et al. 2018, Côte d'Ivoire).

- Frontline health facility workers and community volunteers were taught skills for recognizing early BU and leprosy cases. Volunteers were trained on how to perform physical examinations during surveillance rounds. Their understanding of leprosy and their capability to collect blood, perform the test, interpret the results, fill in the patient and contact cards for data collection and give the correct information to patients and contacts were all checked. (Barogui, Y. T., et al. 2014). Clinical staff were also trained on how to take clinical samples using Fine Needle Aspiration (FNA) and swab techniques for laboratory confirmation. They were also trained on how to generate and manage routine data for decision making. (Ahorlu, C. S. K., et al. 2018, Ghana).

- Training content also covered general wound hygiene techniques; bandaging skills; recognition and prevention of common wound infections; and basic physical therapy as a means of disability prevention. (Amoussouhoui, A. S., et al. 2018, Benin).

- The creation of series of information, education, and communication (IEC) materials illustrating instructions for self-care practice are critical tools for local health workers and people affected by LF. (Aim Initiative, 2019, Ghana).

- Ensure that leprosy and BU is part of the training curriculum of the clinical nurses and the medical officers and of the community health-care workers; training and cooperation with university hospitals to ensure that training material is up to date and in line with the MoH. (WHO Operational Manual - Global Leprosy Strategy 2016–2020 International; Ackumey, M. M., et al. 2011, Ghana).

HEALTH WORKER MOTIVATION

- Health personal were provided with skills and resources (supplies, medication) for lymphoedema management. Some material support such umbrella, boots, registers and pens should be provided to motivate the community volunteers. Healthcare staff must be sensitized not to perpetuate stigma. (Wanji, et. al, 2016, Cameroon; Jullien, P., et al. 2011, Burkina Faso).

FACILITATION

Training can be facilitated in a number of ways, through a stepped and 'training of trainers' approach. There should be female staff for gender sensitive examinations. The support of community leaders ensures the sustainability of training programs.

- Training should ensure availability of trained human resources at peripheral and referral level, including adequate number of female staff and rooms with adequate privacy for proper examination / classification of patients. (WHO 2016 Operational Manual - Global Leprosy Strategy).

- A first step in implementing a program is the training of at least one staff member in each health facility via the existing de-centralized health structure. The national LF coordination team trained medical directors and LF focal points of targeted areas. After this, staff from each catchment area trained one nurse from each facility within their health district. In LF-endemic areas, training can be done for one community health worker (CHW) per village by the trained nurse. (Mathieu, E., et al. 2013, Togo).

- Two different trainings were conducted. The Programme manager and WHO consultant organised a day training workshop for members of a special team (trained leprosy control supervisors, some health staff at the State and LGA level and community health volunteers) and members of the supervisory and monitoring teams. WHO guidelines for training general health workers and volunteers was adopted, participants were also briefed on the disease and control measures. Another one day training workshop facilitated by the State leprosy control officer and some participants of the special team for general health workers and volunteers in the health centres and communities where the Leprosy Elimination Campaign (LEC) was carried-out was conducted on zonal bases. (Sofola, O. 1999, Nigeria).

- A stepped approach was also used in Benin where training was conducted in stages: i) Doctor updated on major research findings related to epidemiology and treatment of BU. ii) nurses and clinic attendants given less intensive orientation into advances in BU treatment and basic principles of wound care and wound hygiene. iii) existing health staff wound care practices were elicited, reviewed, and compared against best practices advocated by WHO. iv) practical clinical training was provided. v) trainees visited decentralized centers of a district and participated in active cases detection and outreach programs. vi) trainees were instructed on how to complete wound reporting and treatment monitoring data sheets. At the end of the training period, trainees were able to successfully demonstrate knowledge of the materials covered throughout the training with focus on BU diagnosis criteria, use of antibiotics and protocols for wound care. Experienced doctors, nurses, and health staff with skills on wound care, management and detection on BU can facilitate training of newly assigned health staff, community volunteers and caregivers. (Amoussouhoui, A. S., et al. 2018, Benin).

- During the training sessions, all necessary training materials should be distributed, and copies stored at the health offices and the facilities. It is important that during trainings, a patient (with lymphoedema) is invited so that the staff could be provided with real life simulations. This aided not only in demonstration and practice, but also made it possible for the trainees to hear about what having the disease meant as a patient. Basins, towels, and soap should be supplied for this practical session. (Mathieu, E., et al. 2013, Togo; Ziperstein, J., et al. 2014, Togo).

- A ''training of trainers'' approach was used where one member of the health staff personnel in lymphedema care at each dispensary in the 35 national health districts was trained, including the national LF coordination team, the district health staff, dispensary nurses, and finally village volunteers on how diagnose and train patients on how to care for a swollen leg. This was carried out by the trained dispensary nurse, using standard care techniques recommended by the World Health Organization (WHO). (Ziperstein, J., et al. 2014, Togo).

- The heads of sub-districts and village chiefs received briefing on diseases in order to obtain the support and involvement of community leaders. (Bainson, K. A. 1994, Ghana).

- Training was conducted for the health workers and volunteers at the local health facility or school building. Trainings should be zoned per health facility providing services to the communities they serve. (Wanji, et. al, 2016, Cameroon; Stanton, M. C., et al. 2015, Malawi and Ghana).

DURATION

Throughout the literature, training duration varies from one day to 45 minutes depending on the level and number of participants trained. Longer training and refresher training for the 'formal health workforce' and community health workers was found to be particularly beneficial.

- Programme managers organised a one-day training workshop for members of trained leprosy control supervisors, some health staff at the State and Local Government Area (LGA) level and community health volunteers, including supervisory and monitoring teams. Training sessions for health workers and volunteers lasted for **2-3 hours** and were conducted in both English and local language. About **30mins - 1 hour** was allocated to providing information on recognizing LF related morbidity, severity, and management strategies. (Sofola, O. 1999, Nigeria; Stanton, M. C., et al. 2015, Malawi and Ghana).

- Community-Based Surveillance Volunteers (CBSVs) were trained by the Buruli Ulcer (BU) teams **once in a quarter**. (Abass, K. M., et al. 2015, Ghana). Refresher courses were conducted for nurses, CBSVs and environmental health officers on a **quarterly basis**. (Ackumey, M. M., et al. 2011, Ghana).

- Village leaders were also trained in the diagnosis of leprosy, availability and efficacy of multidrug therapy and the advantages of early detection, by guided discussions lasting about **45mins**. (Ebenso, B. E. 1999, Nigeria).

- A **2-day** training was conducted by 2 experienced dermatologists for skin disease recognition and therapy. (Taal, A. T., et al. 2015, Nigeria).

- Based on National Policy, programme staff are to be retrained at **3-year intervals**. (Udo, S., et al. 2013, Nigeria).

- A challenge that could arise is the attrition of trained staff due to re-assignment. Thus, it is recommended that new health staff will continually need to be trained in wound care. This can be done through short workshops followed by field apprenticeships with experienced health staff who have demonstrated good wound care skills. (Amoussouhoui, A. S., et al. 2018, Benin).

SCREENING

LOCATION

- Households, schools, church, mosques, and visits within the community, in rooms that are well-lit by day light and ensured respect for the patient's privacy. (Abass, etal, 2015, Ghana; Koffi, A.P, et al, 2020, Côte d'Ivoire; Stanton, M. C., et al., 2015, Ghana; WHO, 2018; Integrated control and management of neglected tropical skin diseases, 2017).

- Makeshift hut facilities established by the National Tuberculosis and Leprosy Control Programme as outreach screening. (Sofola, O.,1999, Nigeria).

- Alternative strategies include mobile teams visiting villages to screen all attendees at a central location, in which case detection is done by trained health workers detecting cases in their health centre catchment areas. (Integrated control and management of neglected tropical skin diseases, 2017).

METHODS

- WHO documentaries and pictorial guide were used during screening, case detection and referral subsequently, via collaboration with National Immunization program, awareness talks, community announcements and examinations. (Abass, etal, 2015, Ghana; Amofah, G., et al., 2002, Ghana; Koffi, A.P, et at, 2020, Côte d'Ivoire; Sofola, O., 1999, Nigeria; Stanton, M. C., et al., 2015, Ghana; Webb, B. J., et al. 2009, West Africa; WHO, 2018).

- Screening for Buruli ulcer was conducted through intensive surveillance and random home visits, night films and education campaigns. Samples were also collected for laboratory confirmation of Buruli ulcer. (Ackumey, et al., 2011, Ghana; Ahorlu, C. K., et al., 2013, Ghana).

- Documents designed by the WHO Global Buruli Ulcer Initiative and pictures of Buruli ulcer disease at different stages of development were shown to as many people as possible and asked whether anyone in the village had a similar condition. All persons with lesions that met the WHO standard case definition were interviewed with a simple questionnaire. (Amofah, G., et al., 2002, Ghana).

- After the education and awareness raising sessions, all persons with a skin lesion who presented voluntarily to the team were carefully examined in a well-lit area which respected their privacy. (Bainson, K. A., 1994, Ghana).

- For leprosy, people who share the same house and a kitchen with index cases are examined. Community surveys and defaulter tracing, after training, house-to-house survey of the community took place. (Ebenso, B. E., 1999, Nigeria).

RECORD AND DATA MANAGEMENT

- Data recorded in the monitoring system included patient contact details, age, gender, the anatomical location of the lymphoedema, occurrence of acute attacks and consultation date. (Jullien, P., et al., 2011, Burkina Faso; Bainson, K. A., 1994, Ghana).

- Standardized registration books at health post or kebele level is important to register all cases of lymphedema and hydrocele. This registration book should be kept in the health post under the custody of the health worker. However, the number of cases of lymphedema and hydrocele should be reported to the world health office. (Ministry of Health Ethiopia, 2016).

HEALTH EDUCATION

Across literature, a number of different methods were used for health education. This included social mobilization, IEC materials of posters, leaflets and video screenings.

- Social mobilization activities needed prior to the start of active case detection include mass media campaigns to address social impacts of diseases such as stigmatization. Letters were sent to community leaders and to community radio for social mobilization. "Town announcers" were also involved in announcing the event. Sensitization kits including a generator, a sound system, a video projector, and a projection screen were acquired for the implementation of sensitization activities. (Mitja et. Al, 2017; Koffi, A.P., et al. 2020, Côte d'Ivoire).

- Posters that are written in local languages and adapted to local cultural contexts should be displayed in hospitals and health facilities, schools, and town meeting places to expose the community to the idea that lymphedema is a disease and patients need to go to the health facility. During house-to house visits for MDAs and vaccination campaigns, CHWs can use photographs of lymphedema to sensitize the population. The CHWs can also be provided with laminated posters for community awareness campaign, which depicts lymphedema care and management techniques. (WHO Training Manual, 2003, Global; Bainson, K. A., 1994, Ghana).

- Film show - Buruli Ulcer related documentary films and pictures especially those depicting success stories of biomedical treatment were displayed between 7 -9 pm with questions asked and answered provided. (Ahorlu, C. K., et al. 2013, Ghana). Videos are at least as effective as traditional methods of patient education in increasing short-term knowledge and are particularly useful for those with limited literacy skills. (Evans, M. R., et al. 2003, Ghana).

- Outreach meetings organized by local volunteers and facilitated by volunteers and clinic staff trained in how to communicate information and field questions from the community were held. An image-rich PowerPoint presentation about BU was delivered by clinic staff and health volunteers equipped with generators, computers, LCD projectors and sound systems. An interactive question–answer format was adopted with new questions added as they arose during community meetings. Village chiefs, local healers, and former patients were invited to all outreach meetings. (Amoussouhoui, A. S., et al. 2018, Benin).

- Radio messages can be developed and transmitted through local radio channels in local languages focusing on early case detection. As soon as the program reaches national scale, national radio messages, newspaper articles and a short TV documentary can be used to further sensitize the population. (Mathieu, E., et al. 2013, Togo; Ebenso, B. E. 1999, Nigeria).

- Education campaigns on skin diseases and leprosy in selected villages targeting the population and key persons such as elders, teachers, religious leaders, and voluntary staff. Messages are delivered through leaflets and other communication media. (Ezenduka, C., et al. 2012, Nigeria).

- Communities, patients and their families received constant education on the home-based care strategy aimed at promoting, maintaining, monitoring. For example, the practice of "washing", a key component of lymphoedema management. (Julien, P., 2011, Burkino Faso).

- A variety of methods can be used to disseminate the message that "anyone with a 'big leg' should go to the health facility." Health officers can contact village chiefs and town announcers, employing them to increase public awareness of lymphedema care program. The current health system can use their regularly scheduled community health education sessions to spread information regarding lymphoedema care. (Mathieu, E., et al. 2013, Togo).

- Comics were aimed at children on health information on Buruli ulcer. (WHO, 2001).

- School health education programme coordinators and hospital staff conducted BU education and screening. Health staff, BU treatment and prevention programme staff and CBSVs jointly carried out health education. (Ackumey, M. M., et al. 2011, Ghana).

- District level health staffers that worked in rural areas were more likely to endorse village volunteers as the best method to carry out health education programmes while those in urban locales more often supported mass media. (Ziperstein, J., et al. 2014, Togo).

- Health officers can contact village chiefs and town announcers, employing them to increase public awareness of lymphedema care program. During house-to-house visits for MDAs and vaccination campaigns, CHWs use photographs of lymphedema to sensitize the population. (Mathieu, E., et al. 2013, Togo).

DURATION

- Health education awareness campaigns targeting high burden communities, health-care workers and the general public should be carried out at least **once per year**. (ILE, 2019).

- BU related documentary films and pictures especially those depicting success stories of biomedical treatment were displayed between 7-9 pm with questions asked and answers provided. (Ahorlu, C. K., et al. 2013, Ghana). CHWs provided public education on BU during **monthly** household visits especially preventive education and augmented with visual aids and public meetings. (Webb, B. J., et al. 2009, West Africa).

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CLINICAL DIAGNOSIS

Across all literature reviewed, multiple actors and individuals who could support with clinical diagnosis of patients at different health system levels, as follows:

- Healthcare professionals, Medical Officers, Doctors, Disease control officers and clinical staff, including a dermatologist familiar with the disease, nurses, and community health workers. (Amofah, G., et al., 2002, Ghana; Ahorlu, C. S. K., et al., 2018, Ghana; Adu, et al, 2015, Ghana; Ebenso, B. E., 1999, Nigeria; Jullien, P., et al, 2011; Koffi, A.P, et al 2020, Côte d'Ivoire; Taal, A. T., et al., 2015, Nigeria; Webb, B. J., et al. 2009, West Africa; Tiendrebéogo, A., et al., 1999, Mali).

- National and LGA level staff including LGA supervisors and a team from the national level. (Udo, S., et al. 2013, Nigeria).

- For female patients, examination is often best carried out by female staff. (WHO, 2018). Local traditions of social behaviour have to be respected as it may be difficult to view intimate areas such as genitalia and breasts even where the presence of lesions may help with diagnosis of lymphedema. (WHO, 2018).

CLINICAL TECHNIQUES USED INCLUDED

- Skin NTDs are diagnosed using key skin signs and diagnostic charts in conjunction with the NTD distribution maps. In the WHO manual (*Recognizing neglected tropical diseases through changes in the skin*), the health worker is shown how to carry out a diagnosis. This is through an algorithm detailing symptom and the steps of clinical diagnosis and treatment and when to refer to a specialist. (WHO, 2018; Taal, A. T., et al., 2015, Nigeria; Yotsu, R. R., et al., 2015; Agbenorku P., 2014, Ghana; Mitjà, O, et al, 2017).

- Diagnosis of a case of leprosy and classification were carried out by clinical examination following the WHO guidelines. (Ebenso, B. E., 1999, Nigeria).

- For BU cases, swabs or fine needle aspiration were collected accordingly. (Koffi, A.P, et al, 2020, Côte d'Ivoire).

- Hydrocele is diagnosed by palpating the scrotum and testes and by documenting fluid accumulation. (Agbo, etal, 2011, Nigeria). Based on the presence of a non-tender, soft, fluid-filled mass bigger than the size of an orange. Hydrocele was distinguished from inguinal hernia (which changes when coughing or strained, showing an inguinal swelling at the internal ring. (Agbo, etal, 2011, Nigeria).

- Lymphedema- participants were asked to lift their clothing to expose their legs and swollen limbs were observed. (Agbo, etal, 2011, Nigeria).

- A leaflet describing signs of acute attacks that had been given to each patient during their training was used to identify acute attack when taking down each patient's history. (Jullien, P., et al. 2011, Burkina Faso; Stanton, M. C., et al., 2015, Ghana).

- BU lesions were classified according to the WHO categories: Category I (a single lesion with a diameter <5 cm); Category II (a single lesion with a diameter between 5 and 15 cm); Category III (a single lesion with a diameter >15 cm). Leprosy cases were classified as paucibacillary or multibacillary. Disabilities due to leprosy were classified according to WHO recommendations. (Bainson, K. A., 1994, Ghana; Vogel, M., et al., 2016, Cameroon; Alberts et al, 2011; Buntine et al, 2001).

WHO DISABILITY GRADING SYSTEM FOR LEPROSY

HANDS AND FEET:

- **Grade 0** - No anaesthesia, no visible deformity or damage.
- **Grade 1** - Anaesthesia present, but no visible deformity or damage.
- **Grade 2** - Visible deformity or damage present.

EYES:

- **Grade 0** - No eye problem due to leprosy; no evidence of visual loss.
- **Grade 1** - Eye problems due to leprosy present, but vision not severely affected as a result (vision: 6/60 or better; can count fingers at 6 metres).
- **Grade 2** - Severe visual impairment (vision worse than 6/60; inability to count fingers at 6 metres); also includes lagophthalmos, iridocyclitis and corneal opacities.

CLINICAL MANAGEMENT

Across all literature, clinical management was carried out by health system actors, including:

- Surgeons, health staff, health professionals, health facility staff, local health authorities, community health volunteers. (Ackumey, M. M., et al. 2011, Ghana; Ackumey, M. M., et al. 2011, Ghana; Alferink, M., et al. 2015, Ghana and Benin).

- Affected persons, relatives and care givers were involved, particularly in self-care practices. (Amofah, G., et al. 2002, Ghana; Ziperstein, J., et al. 2014, Togo).

Location of clinical management included:

- Health centres, teaching hospital, clinic, primary health care centres, specialized referral facility and homes. (Abass, K. M., et al. 2015, Ghana; Ackumey, M. M., et al. 2011, Ghana; Ahorlu, C. K., et al. 2013, Ghana; Koffi, A.P., Yao, et al. 2020, Côte d'Ivoire; Ziperstein, J., et al. 2014, Togo).

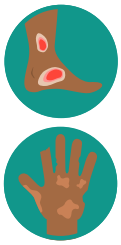
Treatment and medication were administered for all diseases using the standardised WHO guidelines and recommendations for doses of antibiotics and treatment (WHO 2018). Other forms of clinical management included: wound management, pain management, surgical interventions, physiotherapy and holistic forms of management such as counselling and support groups.

- An algorithm of side effects of medicines is included in Tanzanian national guidelines. (Ministry of Health Tanzania, 2003: 43).

WOUND DRESSING / TREATMENT

- WHO guidelines on BU and lymphedema describes wound care in a step by step manner - assessment of wound, preparation of the wound bed and dressing of the wound. Assessment is based on a classification system, classifying wounds by colour, and provides information on stage of healing and basic principle of care required. Preparation of wound bed involves washing of wound and surrounding area with water, cleansing the wound with normal saline solution and debridement. Having normal saline solution is ideal, if not, tap water fit for drinking or cooled boiled water can be used for this purpose. Finally, the type of dressing is determined by the exudate from the wound. (WHO 2012; Velding, K., et al. 2014, Ghana and Benin; Yotsu, R. R., et al. 2018, Cote d'ivoire; Oriol, M. et al. 2017, International).

- A simple algorithm utilizing inexpensive and easily obtainable products for wound management/lymphedema management was used. (Yotsu, R. R., et al. 2018, Cote d'ivoire; Basic Rehabilitation Practical Field Guide, 2008).



- Vaseline or shea butter was administered to BU and leprosy patients to prevent skin dryness. (Koffi, A.P., Yao, et al. 2020, Côte d'Ivoire).

- Good daily hygiene practice is important in lymphedema management. Clinical improvements have been reported in lymphedema patients involved in WASH programmes. (Jullien, P., et al. 2011, Burkina Faso; Yotsu, R. R., et al. 2018, Cote d'ivoire).

- Modern dressings such as hydrofoam dressing (HydroTac) for Buruli ulcer was suggested as more suitable for wound dressing than gauze though cheaper, it adheres to wound bed and disturbs dermal regeneration upon removal. (Velding, K., et al. 2016, Ghana; Yotsu, R. R., et al. 2018, International; Oriol, M. et al. 2017, International).

SURGERY

- Surgical procedures include excision, skin grafting, debridement, sequestrectomy, re-grafting, and constructive release. Surgical interventions may be required for hydrocele. Surgical excision and skin grafting may be used for treating Buruli ulcer. (Ackumey, M. M., et al. 2011, Ghana; Agbenorku P. 2014, Ghana; Adu, E. J. K. and E. Ampadu 2015, Ghana; Agbenorku, P., et al. 2012, Ghana; Amoussouhoui, A. S., et al. 2018, Benin; Ayelo, G. A., et al. 2018, Benin; Meka, A. O., et al. 2016, Nigeria; Stanton, M. C., et al. 2015, Malawi and Ghana).

- Nodules < 5 cm in diameter, attached to the skin but mobile at a deeper level over muscle, were excised under aseptic conditions in a makeshift village operating theatre, after obtaining consent. Patients with larger Buruli ulcer or oedematous lesions were referred to hospital. A nurse anaesthetist removed surgical stitches. (Evans, M. R., et al., 2003, Ghana).

PHYSIOTHERAPY INTERVENTIONS

- Physiotherapy interventions of BU disability prevention include - wound care, anti-deformity positioning, elevation, compression, massage, joint movement through exercise. (Agbenorku P. 2014, Ghana; Agbenorku, P., et al. 2012, Ghana; Amoussouhoui, A. S., et al. 2018, Benin; Meka, A. O., et al. 2016, Nigeria).

- Physiotherapy is carried out for those with contractures and limitation of movement. (Meka, A. O., et al. 2016, Nigeria).

COUNSELLING

- Counselling sessions were provided for BU and leprosy patients for prevention of impairment or disability. (Koffi, A.P., Yao, et al. 2020, Côte d'Ivoire).

- All five components of MMDP (Morbidity Management and Disease Prevention) were recommended to beneficiaries such as skin care, wound care, exercise (active or passive), protective footwear and counselling. (NTD NGO Network, 2018, International).
- Soap and towels used in the training should be provided to the patient as a start-up hygiene pack. The patient should also receive a patient booklet to document the patient's progress. (Mathieu, E., et al., 2013, Togo).

SELF-CARE GROUPS

- Formation self-care groups especially among leprosy patients encourage sharing of experiences. (Udo, S., et al. 2013, Nigeria).

- Basic hygiene kit made up of a bowl, soap and towel was given to those diagnosed with lymphedema. (Stanton, M. C., et al. 2015, Malawi and Ghana).

FOLLOW UP VISITS

- Follow-up visits with the aid of a treatment booklet were helpful for several reasons. First, leaflets provided to participants provided drawings on the front and back inside cover which helped remind affected persons of the care techniques. Second, patients appreciated being able to read the notes and see improvement in clinical status. Third, patients said that a filled-in booklet was a tangible piece of evidence that someone was visiting them and cared about their health, a fact appreciated by several patients. (Ziperstein, J., et al. 2014, Togo).

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NOTES

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ACKNOWLEDGEMENTS

This literature review was completed by the COUNTDOWN research team including Shahreen Chowdhury, Victor Dalumo, Luret Lar, Dupe Yahemba and Laura Dean. Many thanks to Alison Derbyshire for her guidance and help in literature search strategies, as well as to Adekunle David for his assistance in screening. Thank you to Welton Media for the development of this booklet.

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