

Introduction: As part of the programme “Support to Traditional Health Practitioners for capacity building and strengthening” funded by Ministry of Tribal Affairs, Govt. of India, a District Level Training and Capacity building is to be conducted for Traditional Healers of the State. At least 15 (fifteen) TH has been selected per block for undergoing this Training programme. The training and capacity building programme is proposed to be conducted in collaboration with NEIAH, Ministry of AYUSH, Govt. of India, Shillong, Martin Luther Christian University, Shillong and Directorate of Health Services, Govt. of Meghalaya.

The objective of the training is to empower the Local Health Practitioners/ Traditional healers with knowledge pertaining to different health issues, the need for networking with other systems of medicines, and knowledge on how to promote their health care as Health Tourism, which would eventually promote the socio-economics of not only the LHPs but also other stakeholders at their areas of functioning.

Goal: Promoting Traditional System of Medicine and Cultural Heritage.

Objective:

- Skill enhancement for the LHPs/ TH on the basic knowledge about common and prevalent diseases and ailments.
- Capacity building on the necessity to maintain basic hygiene during treatment and preparation of herbal medicine.
- Capacity building on documentation of their practices (treatment /duration/outcomes of treatment/ patients feedback, etc)
- To encourage THs’ referrals to other Health systems when they are unable to treat illnesses (networking with other systems of medicines).
- Preparation of Herbaria, etc.

In order for the programme to be a success, it is essential and imperative to involve the traditional healers and other community members in the planning and implementation of the training programme. By getting their views and suggestions regarding the health priorities of the community, their views on what they would want to learn, and the kind of support they will need after training.

Thus, in consultation with the Traditional Health Practitioners, apart from the specified objectives above, the following were also suggested by them

- a. Specific training to be conducted for Producers/ cultivators of Medicinal plants.
- b. Inclusion of a session to train Traditional Healers to understand basic diagnostic reports.
- c. Training on communication skills.

The content of the training programmes for LHPs/ TH will be focused upon teaching competence and skills within the framework of primary health care.

Outcome: The following are the projected outcomes of the Training programme

- Empowerment of the Local Health Practitioners/ Traditional healers with knowledge pertaining to different health issues,
- Networking with other systems of medicines,
- Promotion of Traditional health care as Health Tourism.
- Acquirement of skills sets to serve the rural community better as primary health workers.
- Improved practices of Traditional medicine preparation, packaging and how to run their practices will enable them to improve on the quality of their practices
- Enable TH to make appropriate changes in their working environment and abandon potentially harmful practices and treatments.
- Hygienic methods of practices during treatment and preparation of herbal medicines
- Knowledge on basic communication skills.

Evaluation of Trainees:

The evaluation of trainees will include feedback on the effectiveness of the training methods used and the relevance of the training content to the trainees. The knowledge, attitudes and skills gained by the trainees will also be evaluated through the following tests.

Evaluation of trainees can be done immediately after the training or during the training after each session. The evaluations will be of two types:

1. Formal testing

Formal tests or examinations can be given for sessions such as Basic hand hygiene techniques and preparation of herbaria. This can be done through practical or oral tests.

(a) Practical tests

Trainees will be asked to demonstrate activities that they have learned. A checklist to record their understanding and ability to perform practical tasks will be prepared. Trainees will be given enough time to complete the test.

(b) Oral tests

Prepared questionnaire will be used to probe the trainee's knowledge of a subject by verbal questions and answers. (Special attention/ consideration will be paid to the ability of the trainee to give satisfactory answers as it may be affected by his or her ability to communicate or self-confidence).

2. Informal testing

This can be done during the class so that assessment of any difficulties trainees are experiencing can be noted.

Observations and evaluations will be discussed with trainees. This feedback helps them to see their progress and how they can improve.

Post- training monitoring to evaluate the changes incorporated by the TH in their practices can be taken up.

External experts will also be engaged for monitoring. Feedback by the trainees will also be done to assess the training and capacity building programme as per the format given in the Table below:

Sl. No.	Rate of benefit gained	Number (Percentage) (10-100%)
1.	Highly beneficial	
2.	Beneficial	
3.	Moderately beneficial	
4.	No comment	
5.	No benefit at all	

Training Content:

1. Basic Concept on Health and Diseases
2. Basic Concept on Communicable (with special reference to Tuberculosis) and Non-Communicable diseases
3. Basic hygienic practices during treatment and Herbal medicine preparation.
4. Processing and Storage of herbal medicine/ Preparation of pharmacopoeia related to common medicinal plants and herbs.
5. Importance of networking and collaboration with other health sectors
6. Methods for preparation of Herbaria

At least 15 (fifteen) Traditional Healers selected from each Block by the Traditional Healers during the Block level Awareness cum Health Camp and as per the selection criteria laid down will be trained and capacitated during the district level Training and capacity building.

TRAINING CALENDAR: TRAINING OF TRADITIONAL HEALTH PRACTITIONERS)			
TIME (HRS)	ACTIVITIES	OBJECTIVE	CONTENT
MODULE-1: CONCEPT OF HEALTH AND DISEASES (COMMUNICABLE AND NON-COMMUNICABLE DISEASES)			
DAY 1			
1.00	Concept of Health and Diseases	<ul style="list-style-type: none">Empowering Traditional Healers with knowledge pertaining to different health issues,	<ul style="list-style-type: none">TheoryInteraction & Discussion
	Types of communicable diseases, prevention and diagnosis with respect to primary health care taking Tuberculosis as an example.		
	Types of non-communicable diseases, prevention and diagnosis with respect to primary health care.		
MODULE-2: BASIC HAND HYGIENE TECHNIQUES DAY 1			
1.00	Hand hygiene	<ul style="list-style-type: none">Knowledge on minimising risk of infection	<ul style="list-style-type: none">TheoryVideoInteraction & Discussion
	Sterilisation of tools		
	Barrier technique		
MODULE-3: VALUE ADDITION OF HERBAL PRODUCTS DAY 1			
2.00	Packaging (quality packaging materials, labelling, listing names of ingredients with quantity, precautions for consumption and storage, manufacturing and expiry date, dose and direction of use. Batch no., etc.)	<ul style="list-style-type: none">To improve the capacity for preparation, packaging and labelling herbal medicines Enhancing marketability of Herbal products and knowledge on how to promote their health care as Health Tourism	<ul style="list-style-type: none">TheoryVideoInteraction & Discussion
	Processing techniques (enhancing appearance, taste, flavour and processing procedures to minimise contamination)		
MODULE 4: TRAINING ON COMMUNICATION SKILLS DAY 2			
2.00	<ul style="list-style-type: none">Listening skills (Patient’s interview)Explaining diagnosis, investigation and treatmentInvolving patient in decision makingCommunicating with relativesCommunicating with other health care professionalsSocial Graces and Telephone Etiquettes	Building strong relationship with patients	<ul style="list-style-type: none">TheoryDiscussion & Interaction.

MODULE 7: METHODS FOR PREPARATION OF HERBARIA AND PREPARATION OF PHARMACOPOEIA RELATED TO COMMON MEDICINAL PLANTS AND HERBS..

DAY 2

2.00	<ul style="list-style-type: none"> • Collection of plant samples • Drying of samples • Preparation of samples • Labelling (name of plant, date and place of collection) 	Capacity building to preserve the medicinal plant(s)/ parts for identification.	<ul style="list-style-type: none"> • Theory • Hands-On Demonstration • Discussion
2.00	<ul style="list-style-type: none"> • Documentation of Traditional practices (Treatment methods/ duration/ Outcome of treatment, Feedback from clients, etc) • Documentation of medicinal plants used. • Preparation procedures of formulations. • Dosage, etc 	Baseline information or data on the uses medicinal plants and traditional practices for development/ publication of a book(s) authored by the Traditional Healers.	
3.00	Evaluation of Trainees.		

I. CONCEPT OF HEALTH AND DISEASE:

Health: "Health is defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". (WHO)

Disease:

Boorse (1975, 1977) defined disease as a type of internal state which impairs health (i.e., reduces one or more functional ability below typical efficiency). Disease can be defined as a form of pathology or medical problem, defect, or impairment, while illness is a manifestation of such an impairment, defect/ pathology, or disability. Illness is a presentation of a medical condition in a way that limits the functional capability of an individual in the society.

Concept of health

There are four major concepts of health

1. Biomedical concept- This concept is based on the germ theory of disease, proposed by Robert Koch. The postulates of germ theory of disease states that-

- Microorganisms are responsible for the disease.
 - These microorganisms can be isolated from the diseased host and can be purely cultured in laboratory
 - The isolated organisms in pure culture when injected to healthy susceptible host can produce same disease
 - The microorganisms can be isolated from experimental host, both in smear and culture.
2. Ecological concept- This concept states about equilibrium between host (Human), infectious agents and the environment they share. So, health is dynamic equilibrium between human and their environment.
 3. Psychosocial concept- This concept states about social cultural and economic as well as psychological factors in defining health and disease.
 4. Holistic concept- This concept includes all biomedical, ecological and psychosocial concept in defining health and disease.

Conceptual issues (Three sectors model):

At any complex society one can identify three overlapping and inter-connected sector of healthcare: the popular sector, the folk sector and the professional sector.

The popular sector:

This is the lay, NON-Professional, NON-Specialist domain of society, where ill-health is first recognized and defined and health care activities are limited. It includes all the therapeutic option that people utilize without any payment and without consulting either folk healer or medical practitioners. Among these options are: self treatment or self medication advice or treatment given by a relative friend neighbor or workmate, healing and mutual care activities in a church, cult or self-help group or consultation with another lay person who has special experience of a particular disorder. In this sector the main area of health care is the family. Most ill health is recognized and then treated.

In this case, the main providers of health care are women, usually mothers or grandmothers who diagnose most common illness and treat them with the materials at hand .It has been estimated that about 70-90 percent of health care takes place within this sector, in both western and non western societies. The popular sector usually includes a set of beliefs about health is also maintained by the use of charms, amulets and religious medallion to ward off 'bad wok' including unexpected illness and to attract good luck and goods health. Most health care in this sector place between people already linked to one another by ties of kinship, friendship neighborhood or membership of work or religious organization.

The folk sector:

In this sector which is especially large in non western societies, certain individuals specialize in forms of healing which are either sacred or secular or a mixture of the two. These healers are not part of the official medical system and occupy an intermediate position between the popular and professional sectors. There is a wide variation in the types of folk healer found in any society from purely secular and technical experts like bone setters, midwives, tooth extractors or herbalists with much individual variation in style and outlook but sometimes they are organized into associations of healers, with rules of entry, codes of conduct and the sharing of information. The Traditional healers of Meghalaya falls under this category and it can be said that each and every individual healer have their own skill sets and techniques by which they administer medicines and provide treatment to the public.

The professional sector:

This comprises the organized, legally sanctioned healing professions, such as modern western scientific, medicine, also known as allopathic or biomedicine. It includes not only physicians of various types and specialties but also the recognized Para- medical professions such as nurses, mid-wives or physio-therapists. In most countries, scientific medicine is the basis of the professional sector. It is important to realize that western scientific medicine provides only a small proportion of health care in most countries of the world. Medical manpower is often a scarce resource, with most health care taking place in the popular and folk sectors. In most countries especially in the western world the practitioners of scientific medicine form the only group of healers whose positions are upheld by law.

II. TYPES OF DISEASES:

Broadly all the diseases are classified into TWO major groups

1. Infectious or communicable diseases:

These diseases are caused by pathogenic organisms and are transmitted from one organisms to another directly or indirectly. So these diseases are also known as communicable or transmissible diseases. Pathogenic microorganisms may be transmitted by food, water, aerosols (droplet) or bite of certain arthropods or other animals. They may also be transmitted by direct contact or by sharing contaminated objects with infected person. On the basis of mode of transmission, infectious diseases are sub grouped into following

- Water borne disease: cholera, typhoid
- Food borne disease: food poisoning,
- Air borne disease: influenza, TB,
- Diseases transmitted by direct contact: AIDS, hepatitis
- Arthropod borne disease: malaria, kala-azar
- Zoonotic disease: rabies.

To understand the spread of communicable disease an example can be given on the disease Tuberculosis.

- Tuberculosis is an infectious disease that usually affects the lungs. Compared with other diseases caused by a single infectious agent, tuberculosis is the second biggest killer, globally. In 2015, 1.8 million people died from the disease, with 10.4 million falling ill.
- TB is spread from person to person through the air. When people with lung TB cough, sneeze or spit, they propel the TB germs into the air. A person needs to inhale only a few of these germs to become infected.
- About one-third of the world's population has latent TB, which means people have been infected by TB bacteria but are not (yet) ill with disease and cannot transmit the disease.
- People infected with TB bacteria have a lifetime risk of falling ill with TB of 10%. However persons with compromised immune systems, such as people living with HIV, malnutrition or diabetes, or people who use tobacco, have a much higher risk of falling ill.
- When a person develops active TB (disease), the symptoms (cough, fever, night sweats, weight loss etc.) may be mild for many months. This can lead to delays in seeking care, and results in transmission of the bacteria to others. People ill with TB can infect up to 10-15 other people through close contact over the course of a year. Without proper treatment up to two thirds of people ill with TB will die.

Bio-medical doctors make a distinction between two kinds of tuberculosis infection: **latent and active.**

Latent TB - the bacteria remain in the body in an inactive state. They cause no symptoms and are not contagious, but they can become active.

Active TB - the bacteria do cause symptoms and can be transmitted to others.

About one-third of the world's population is believed to have latent TB. There is a 10 percent chance of latent TB becoming active, but this risk is much higher in people who have compromised immune systems, i.e., people living with HIV or malnutrition, or people who smoke.

- TB affects all age groups and all parts of the world. However, the disease mostly affects young adults and people living in developing countries.
- In bio-medical treatment, active, drug-sensitive TB disease is treated with a standard 6-month course of 4 antimicrobial drugs that are provided with information, supervision and support to the patient by a health worker or trained volunteer. The vast majority of TB cases can be cured when medicines are provided and taken properly

Diagnosis of tuberculosis

In bio-medical science, TB is most commonly diagnosed via a skin test involving an injection in the forearm.



To check for TB, a doctor will use a stethoscope to listen to the lungs and check for swelling in the lymph nodes. They will also ask about symptoms and medical history as well as assessing the individual's risk of exposure to TB.

The most common diagnostic test for TB is a skin test where a small injection of PPD tuberculin, an extract of the TB bacterium, is made just below the inside forearm.

The injection site should be checked after 2-3 days, and, if a hard, red bump has swollen up to a specific size, then it is likely that TB is present.

Unfortunately, the skin test is not 100 percent accurate and has been known to give incorrect positive and negative readings.

However, there are other tests that are available to diagnose TB. Blood tests, chest X-rays, and sputum tests can all be used to test for the presence of TB bacteria and may be used alongside a skin test.

MDR-TB is more difficult to diagnose than regular TB. It is also difficult to diagnose regular TB in children.

Treatments for tuberculosis

From bio-medical fraternity, majority of TB cases can be cured when the right medication is available and administered correctly. The precise type and length of antibiotic treatment depend on a person's age, overall health, potential resistance to drugs, whether the TB is latent or active, and the location of infection (i.e., the lungs, brain, kidneys).

People with latent TB may need just one kind of TB antibiotics, whereas people with active TB will often require a prescription of multiple drugs.

Antibiotics are usually required to be taken for a relatively long time. The standard length of time for a course of TB antibiotics is about 6 months.

It is important for any course of treatment to be completed fully, even if the TB symptoms have gone away. Any bacteria that have survived the treatment could become resistant to the medication that has been prescribed and could lead to developing MDR-TB in the future.

Directly observed therapy (DOT) may be recommended. This involves a healthcare worker administering the TB medication to ensure that the course of treatment is completed.

NOTE: Views on treatment of TB by traditional medicine can be sought from the trainees (Traditional Healers).

What causes tuberculosis?

- ✓ The *Mycobacterium tuberculosis* bacterium causes TB. It is spread through the air when a person with TB (whose lungs are affected) coughs, sneezes, spits, laughs, or talks.
- ✓ TB is contagious, but it is not easy to catch. The chances of catching TB from someone you live or work with are much higher than from a stranger.
- ✓ Most people with active TB who have received appropriate treatment for at least 2 weeks are no longer contagious.



Prevention of tuberculosis

- ✓ If a patient has active TB, a face mask can help lower the risk of the disease spreading to other people.
- ✓ A few general measures can be taken to prevent the spread of active TB.
- ✓ Avoiding other people by not going to school or work, or sleeping in the same room as someone, will help to minimize the risk of germs from reaching anyone else.
- ✓ Wearing a mask, covering the mouth, and ventilating rooms can also limit the spread of bacteria.

In Bio-medical system, BCG injections are given to children to vaccinate them against tuberculosis. However, it should be noted that BCG does not fully protect against all TB but it offers protection against complications that may arise in a TB infection.

***The most important thing to do is to finish entire courses of medication when they are prescribed.

2. Non Infectious or Non communicable disease:

Social diseases, deficiency diseases, degenerative diseases, genetic or congenital diseases and mental diseases are non-transmissible as no infectious agents are involved rather various factors are responsible for occurrence of diseases. For any non-communicable diseases, a number of factors are responsible known as web of diseases. Non-communicable disease can be identified as follows:

- Diseases that **CANNOT** spread from one person to another
- Diseases that are not caused by pathogens
- Can affect any system in the body (circulatory, nervous, respiratory)
- Can be treated but not usually cured.

Causes of Non communicable disease:

1. Hereditary: passed from parent to child
2. Environmental: Where you work or live
3. Lifestyle: poor health habits-smoking, drinking of alcohol, poor diet, lack of exercise and emotional stress.

Common Non communicable diseases:

- ✓ Rheumatism
- ✓ Cancer
- ✓ Cardio-vascular disease
- Heart Attack
- Stroke

III. BASIC HAND HYGIENE TECHNIQUES DURING HEALTHCARE TREATMENT

Hand hygiene is the primary measure to reduce infections. A simple action, perhaps, but the lack of compliance among health-care providers is problematic worldwide. The WHO First Global Patient Safety Challenge, “Clean Care is Safer Care”, is focusing part of its attention on improving hand hygiene standards and practices in health care along with implementing successful interventions.

Hand hygiene adherence serves multiple functions: gives basic infection control measures, prevents Health Care Associated Infections (HCAI) such as Hepatitis B, HIV and bacterial illnesses including tuberculosis to Health Care Workers (Health Care Workers).

Defective hand cleansing (e.g. use of an insufficient amount of product and/or an insufficient duration of hand hygiene action) leads to poor hand decontamination. Obviously, when HCWs fail to clean their hands during the sequence of care of a single patient and/or between patients’ contact, microbial transfer is likely to occur. Contaminated HCWs’ hands have been associated with endemic HCAIs and also with several HCAI outbreaks.

It has to be kept in mind, however, that hand hygiene performance is only one node in a causal tree leading to the two major infectious outcomes: HCAI and health care-associated colonization with multi-resistant microorganisms. As a process element in this causal chain, hand hygiene performance itself is influenced by many factors, not least the structural aspects related to the quality and availability of products such as alcohol based handrub at the point of care.

Transmission of health care-associated pathogens takes place through direct and indirect contact, droplets, air and a common vehicle. Transmission occurs mostly via large droplets, direct contact with infectious material or through contact with inanimate objects contaminated by infectious material. Performance of high-risk patient care procedures and inadequate infection control practices contribute to the risk. Transmission of other viral (e.g. human immunodeficiency virus (HIV), hepatitis B) and bacterial illnesses including tuberculosis to HCWs is also well known.

- i) Wash hands with soap and water when visibly dirty or visibly soiled with blood or other body fluids (IB) or after using the toilet
- ii) Washing with soap and water is the preferred means if exposure to potential spore-forming pathogens is strongly suspected or proven, hand
- iii) Use an alcohol-based handrub as the preferred means for routine hand antisepsis in all other clinical situations.
- iv) If alcohol-based handrub is not obtainable, wash hands with soap and water.
- v) Perform hand hygiene:

- a) before and after touching the patient
- b) before handling an invasive device for patient care, regardless of whether or not gloves are used
- c) after contact with body fluids or excretions, mucous membranes, non-intact skin, or wound dressings.
- d) if moving from a contaminated body site to another body site during care of the same patient
- e) after contact with inanimate surfaces and objects (including medical equipment) in the immediate vicinity of the patient
- f) after removing sterile or non-sterile gloves.
- vi) Before handling medication or preparing food perform hand hygiene using an alcohol-based hand rub or wash hands with either plain or antimicrobial soap and water.
- vii) Soap and alcohol-based hand rub should not be used concomitantly.

Hand hygiene is the simplest, most effective measure for infection control



Hand Hygiene Technique with Soap and Water

 Duration of the entire procedure: 40-60 seconds



Wet hands with water;



Apply enough soap to cover all hand surfaces;



Rub hands palm to palm;



Right palm over left dorsum with interlaced fingers and vice versa;



Palm to palm with fingers interlaced;



Backs of fingers to opposing palms with fingers interlocked;



Rotational rubbing of left thumb clasped in right palm and vice versa;



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



Rinse hands with water;



Dry hands thoroughly with a single use towel;



Use towel to turn off faucet;



Your hands are now safe.

Hand Hygiene Technique with Alcohol-Based Formulation



Duration of the entire procedure: 20-30 seconds

1a



Apply a palmful of the product in a cupped hand, covering all surfaces;

1b



2



Rub hands palm to palm

3



Right palm over left dorsum with interlaced fingers and vice versa;

4



Palm to palm with fingers interlaced;

5



Backs of finger to opposing palms with finger interlocked;

6



Rotational rubbing of left thumb clasped in right palm and vice versa;

7



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8



Once dry, your hands are safe.

III. BARRIER TECHNIQUES DURING HEALTHCARE TREATMENT.

1. Contact Precautions

- Clean, non-sterile **gloves** are usually adequate for routine care of the patients
- Use gloves before providing care to patient



2. Airborne Precautions

- Used to prevent or reduce the transmission of micro-organisms that are airborne in small droplet nuclei ($5\ \mu$ or smaller in size) or dust particles containing the infectious agent.



IV. PROCESSING TECHNIQUES

1. Collection of Medicinal plants and Herbs

Medicinal plant materials should be collected during the appropriate season or time period to ensure the best possible quality of both source materials and finished products. It is well known that the quantitative concentration of biologically active constituents varies with the stage of plant growth and development.

This also applies to non-targeted toxic or poisonous indigenous plant ingredients. The best time for collection (quality peak season or time of day) should be determined according to the quality and quantity of biologically active constituents rather than the total vegetative yield of the targeted medicinal plant parts.

2. Time of collection:

The period of growth or development at which medicinal activity is highest has to be carefully determined for many plants. For example, the proportion, of alkaloid in the leaves of *Stromonium* peaks at full bloom and especially if gathered in the morning, contains a higher proportion of alkaloids than those collected in the evening.



The Table below shows the best time period for collection of different plant parts.

Sl. No.	Plant Parts	Time of Collection
1.	Bulbs	Late autumn, long after the plant has flowered and fruited is usually best.
2.	Barks	Autumn (after leaf fall) or spring (before development of the leaves) is generally selected.
3.	Root and rhizomes	From annuals: Shortly before flowering from biennials during the autumn or winter following the first year growth. From Perennials During the autumn or winter following the first year growth.
4.	Leaves	Collection should be affected in dry weather whilst the plant is flowering. It is often preferable to collect the stems bearing the leaves, and then separate them; collection in the morning is important in some cases e.g, Solanaceous leaves.
5.	Flowers	Collection should be affected in dry weather and towards the middle of the day, after dew has dissipated
6.	Seeds and Fruits	Collection should be affected when fully, grown and ripe, or nearly ripe. Weather active dispersal of the seeds occurs on the completion or ripping; it is advantageous to collect slightly earlier, e.g. Cardamom and Strophanths

The following are the list of precautions that should be followed while collecting and storing of medicinal plants

- ✓ In general, the collected raw medicinal plant materials should not come into direct contact with the soil so as to minimize the microbial load. If underground parts (such as the roots) are used, any adhering soil should be removed from the plants as soon as they are collected.
- ✓ Collected material should be placed in clean baskets, mesh bags, other well aerated containers or drop cloths that are free from foreign matter, including plant remnants from previous collecting activities. After collection, the raw medicinal plant materials may be subjected to appropriate preliminary processing, including elimination of undesirable materials and contaminants, washing (to remove excess soil), sorting and cutting.
- ✓ The collected medicinal plant materials should be protected from insects, rodents, birds and other pests, and from livestock and domestic animals. If the collection site is located some distance from processing facilities, it may be necessary to air or sun-dry the raw medicinal plant materials prior to transport.
- ✓ Medicinal plants should be harvested under the best possible conditions, avoiding dew, rain or exceptionally high humidity. If harvesting occurs in wet conditions, the harvested material should be transported immediately to an indoor drying facility to expedite drying so as to prevent any possible deleterious effects due to increased moisture levels, which promote microbial fermentation and mould.
- ✓ Cutting devices, harvesters, and other machines should be kept clean and adjusted to reduce damage and contamination from soil and other materials. They should be stored in an uncontaminated, dry place or facility free from insects, rodents, birds and other pests, and inaccessible to livestock and domestic animals.
- ✓ The harvested raw medicinal plant materials should be transported promptly in clean, dry conditions they may be placed in clean baskets, dry sacks, trailers, hoppers or other well-aerated containers and carried to a central point for transport to the processing facility.
- ✓ If more than one medicinal plant part is to be collected, the different plant species or plant materials should be gathered separately and transported in separate containers. Cross-contamination should be avoided at all times.
- ✓ All containers used at harvest should be kept clean and free from contamination by previously harvested medicinal plants and other foreign matter. If plastic containers are used, particular attention should be paid to any possible retention of moisture that could lead to the growth of mould.
- ✓ When containers are not in use, they should be kept in dry conditions, in an area that is protected from insects, rodents, birds and other pests, and inaccessible to livestock and domestic animals. Any mechanical damage or compacting of the raw medicinal plant materials, as a consequence, for example, of overfilling or stacking of sacks or bags that may result in composting or otherwise diminish quality should be avoided.
- ✓ Decomposed medicinal plant materials should be identified and discarded during harvest, post-harvest inspections and processing, in order to avoid microbial contamination and loss of product quality.
- ✓ Mechanical damage and compacting of the harvested medicinal plant/herbal drug that would result in undesirable quality changes must be avoided. In this respect, attention must be paid to
 - (a) overfilling of the sacks,
 - (b) Stacking up of sacks.

3. Primary processing:

- ✓ Harvested or collected raw medicinal plant materials should be promptly unloaded and unpacked upon arrival at the processing facility.
- ✓ Prior to processing, the medicinal plant materials should be protected from rain, moisture and any other conditions that might cause deterioration.

- ✓ Medicinal plant materials should be exposed to direct sunlight only where there is a specific need for this mode of drying.
- ✓ Medicinal plant materials that are to be used in the fresh state should be harvested/collected and delivered as quickly as possible to the processing facility in order to prevent microbial fermentation and thermal degradation.
- ✓ The materials may be stored under refrigeration, in jars, in sandboxes, or using enzymatic and other appropriate conservation measures immediately following harvest/collection and during transit to the end-user.
- ✓ The use of preservatives should be avoided if used, they should conform to national and/or regional regulations for growers/collectors and end-users.
- ✓ All medicinal plant materials should be inspected during the primary-processing stages of production, and any substandard products or foreign matter should be eliminated mechanically or by hand.
- ✓ For example, dried medicinal plant materials should be inspected, sieved or winnowed to remove discolored, mouldy or damaged materials, as well as soil, stones and other foreign matter. Mechanical devices such as sieves should be regularly cleaned and maintained.
- ✓ All processed medicinal plant materials should be protected from contamination and decomposition as well as from insects, rodents, birds and other pests, and from livestock and domestic animals.

4. Drying:

When medicinal plant materials are prepared for use in dry form, the moisture content of the material should be kept as low as possible in order to reduce damage from mould and other microbial infestation.

Medicinal plants can be dried in a number of ways:

1. In the open air (shaded from direct sunlight);
2. Placed in thin layers on drying frames, wire-screened rooms or buildings.
3. By direct sunlight, if appropriate.
4. In drying rooms and solar dryers.
5. By indirect fire

When possible, temperature and humidity should be controlled to avoid damage to the active chemical constituents. The method and temperature used for drying may have a considerable impact on the quality of the resulting medicinal plant materials.

For example, shade drying is preferred to maintain or minimize loss of colour of leaves and flowers; and lower temperatures should be employed in the case of medicinal plant materials containing volatile substances. The drying conditions should be recorded. In the case of natural drying in the open air, medicinal plant materials should be spread out in thin layers on drying frames and stirred or turned frequently.

In order to secure adequate air circulation, the drying frames should be located at a sufficient height above the ground. Efforts should be made to achieve uniform drying of medicinal plant materials and so avoid mould formation.

Drying medicinal plant material directly on bare ground should be avoided. If a concrete or cement surface is used, medicinal plant materials should be laid on a tarpaulin or other appropriate cloth or sheeting. Insects, rodents, birds and other pests, and livestock and domestic animals should be kept away from drying sites.

For indoor drying, the duration of drying, drying temperature, humidity and other conditions should be determined on the basis of the plant part concerned (root, leaf, stem, bark, flower, etc.) and any volatile natural constituents, such as essential oils.

If indirect fire are used, contact between those materials, smoke and medicinal plant material should be avoided.

5. Specific Processing:

Some medicinal plant materials require specific processing to: improve the purity of the plant part being employed; reduce drying time; prevent damage from mould, other microorganisms and insects; detoxify indigenous toxic ingredients; and enhance therapeutic efficacy.

Common specific processing practices include pre selection, peeling the skins of roots and rhizomes, boiling in water, steaming, soaking, pickling, distillation, fumigation, roasting, natural fermentation, treatment with lime and chopping.

Traditional method of production of medicines for internal use involve simple methods such as

- ✓ hot- or cold-water extraction,
- ✓ expression of juice after crushing,
- ✓ powdering of dried material,
- ✓ formulation of powder into pastes via such a vehicle as water, oil or honey, and even fermentation after adding a sugar source.
- Processing can be carried using modern tools and equipments which are low cost- more effective, stable, reproducible, controlled and in dosage forms that can easily be transported .

6. Processing of raw materials-

Roots, Barks- Drying, Grinding, Packaging, Storage.

Plant extracts are difficult to store, they are sensitive to moisture and prone to microbial contaminations. Hence the type of excipients to be used and the processing parameters have to be determined.

7. Storage:

- a. Storage facilities for medicinal material should be well aerated, dry and protected from light, and, when necessary, be supplied with air-conditioning and humidity control equipment as well as facilities to protect against rodents, insects and livestock.
- b. The floor should be tidy, without cracks and easy to clean. Medicinal material should be stored on shelves which keep the material a sufficient distance from the walls; measures should be taken to prevent the occurrence of pest infestation, mould formation, rotting or loss of oil; and inspections should be carried out at regular intervals.
- c. Continuous in-process quality control measures should be implemented to eliminate substandard materials, contaminants and foreign matter prior to and during the final stages of packaging. Processed medicinal plant materials should be packaged in clean, dry boxes, sacks, bags or other containers in accordance with standard operating procedures and national and/or regional regulations of the producer and the end-user countries.
- d. Materials used for packaging should be non-polluting, clean, dry and in undamaged condition and should conform to the quality requirements for the medicinal plant materials concerned. Fragile medicinal plant materials should be packaged in rigid containers.
- e. Dried medicinal plants/herbal drugs, including essential oils, should be stored in a dry, well-aerated building, in which daily temperature fluctuations are limited and good aeration is ensured
- f. Fresh medicinal plant materials should be stored at appropriate low temperatures, ideally at 2-8°C; frozen products should be stored at less than -20°C.
- g. Small quantity of crude drugs could be readily stored in air tight, moisture proof and light proof container such as tin, cans, covered metal tins or amber glass containers.
- h. Wooden boxes and paper bags should not be used for storage of crude drugs.



Drying of Herbs and Medicinal plants.



Sun Drying of Medicinal Plants



Drying Shade for Medicinal Plants



Interior with Drying Shelves and Separators



Gas stove/ smokeless chulha – Hygienic Source of Heat, Optimal for Herbal Medicine Processing.



Packing Herbal Medicine in Clean Environment - Requirement by Regulatory Body.



Development of the Packing of Herbal Medicine will be Gradual Process.

Source: Ms. Anke Weisheit, Mbarara University of Science and Technology (MUST), Uganda.



Development of the Packing of Herbal Medicine (Gradual Process).

8. Packaging and Labeling of Herbal Products:

Each herbal product should bear a label with the following details.

- Name of the drug
- Name of Traditional Healer(s)
- Parts used (root, stem, bark, leaf, flower, rhizome, etc)
- Contents with quantity used.
- Base/ Solvent used
- Date of packaging
- Best used before date
- Batch No.

Packaging materials should be clean and sterilized. Sterilisation can be performed by boiling the packaging material in water (121o C for 15-20 mins) or by steam sterilization (121o C for 15-20 mins) as shown in the figure below. The sterilized bottles should be dried and stored in a clean room.

V. DOCUMENTATION OF TRADITIONAL MEDICINAL PRACTICES

TK documentation is primarily a process in which TK is identified, collected, organized, registered or recorded in some way, as a means to dynamically maintain, manage, use, disseminate and/or protect TK according to specific goals. A simple photograph, an isolated record of TK or a written note are not documentation per se. The isolated acts of taking a photograph or jotting down a descriptive note need to be part of a comprehensive, thought through process in order to be regarded as “documentation”. TK documentation can be a useful tool as part of an overall strategy for the protection of TK.

Documentation may generate significant benefits, such as:

- monetary or in-kind benefits
- TK organized and systematized (preserved) for future generations
- collaboration and partnerships among a broad range of actors
- identification and broader social recognition of indigenous peoples and local communities in relation to specific TK
- capacity building and educational uses of databases or registers
- defensive intellectual property protection, i.e., scope to prevent the unjustifiable acquisition of intellectual property rights over TK
- positive intellectual property protection for TK or products related to it.

Documentation can be carried out by:

- **writing down medicinal preparations:** By writing down and documenting the Traditional medicinal knowledge relating to herbs, plant parts used, the disease(s) for which the medicinal plants are effective and the methods of preparation, the Traditional Knowledge holders are saving and preventing the loss of a rich heritage.

It is also important to document the progress of a treatment especially for diseases such as Cancer, diabetes, tumours, HIV/AIDS, paralysis, bone setting, etc. A Traditional Health Practitioner may also inventories and keeps record of patients treated by him and may request for a certificate from clients/patients certifying for the healing which he/she has received.

Community-led documentation initiatives: By recording and documenting their own cultural heritage, traditional holders can ensure they retain exclusive IP rights on the use of that content. They can also ensure that recording and documentation occur in a way that accords with their customary laws and practices and responds to their needs and expectations.

According to UNESCO Convention (2003), safeguarding intangible heritage is about the transferring of knowledge, skills, and meaning. Transferring of knowledge and skills need careful planning among the Traditional knowledge holders, otherwise it will create havoc with mis-information and half knowledge. Documentation of the traditional knowledge should benefit the community concerned and should help in maintaining the knowledge intact

- **Photography and videography:** Information communication technology is currently being used in many communities in the United States to preserve and document their traditions, languages (orally based), and songs (Srinivasan, 2006). Sri Lankan women in rural communities are using digital photography and video to preserve Ayurvedic medicinal recipes traditionally written on palm leaves (Mahindalpala, 2003) or orally passed from generation to generation. Participatory videography and photography is a useful tool to empower poor or marginalized people (Insight Share, 2007).

VI. NETWORKING WITH OTHER SYSTEMS OF HEALTHCARE

The need for collaboration between traditional and biomedical practitioners is needed so that the public gets access to holistic healthcare. Traditional healers should positively affect or support the public health delivery efforts by the bio-medical system. For instance, childhood vaccinations from preventable infectious diseases such as tuberculosis, diphtheria, pertussis, tetanus, measles, and polio should be encouraged by the Traditional healers. In cases of infant diarrhea, use of ORS should be encouraged and serious cases should be referred to CHCs/ PHCs. A Traditional healer should not hesitate or resort to last minute reference to biomedical treatment for cases which he/ she feels that cannot be treated by traditional medicine. In cases of diabetes, hypertension, fractures, etc., a Traditional healer can always advise his patients for biomedical tests and reference to assess the efficacy of the traditional **medicine**.

VII COMMUNICATION SKILLS:

Effective communication skills are extremely important in the healthcare field. This is because they help to build and maintain strong relationships between both healthcare professionals and patients. It also helps a patient/ person in a vulnerable situation to feel safe, secure and also respected. It allows the individual to express their needs and concerns. Communication is the simplest way to really get a sense of how a person is coping and what steps a healthcare worker needs to take to improve their health and well being. A good healthcare provider should take note of the following list during healthcare treatment, etc.

- Listening skills (Patient's interview): It is the building block on which a therapeutic relationship with a patient is constructed. By understanding a patient in a holistic manner, the healthcare provider can draw a total care plan which is best suited for that patient.
- Diagnosis, investigation and treatment should be explained clearly to the patient and relatives.
- Always involve a patient in decision making
- Always communicate with relatives
- In difficult or serious cases always communicate and consult with other health care providers.
- Always obtain consent for various procedures.
- Medications should be explained properly

Social Graces and Telephone Etiquettes:

1. **Offer a Friendly greeting:** You should always offer the callers an enthusiastic and friendly greeting. When answering the phone you should always thank the person for calling and ask the caller how you can help them. This will show that you truly care about their concerns or needs.
2. **Never put callers on hold:** You should never immediately put callers on hold. This only frustrates them, and while some people will wait, others will simply hang up. If you are extremely busy and you are forced to put them on hold, offer your greeting before nicely asking them if you can put their call on hold or to call you back in a specified time. In this way, they are more apt to call you back or stay on the line. Additionally, always make sure you apologize for the hold or for making them call you back.
3. **Repeat what the Caller says:** When you are talking to someone on the phone, after they have finished telling you the reason for their call, repeat their reason to them. This not only clarifies their reason for calling but it shows callers that you are, indeed, listening. While you are **listening to callers**, offer encouraging phrases such as **"I understand"** or **"I see"**.
4. Personalize the call: one of the best ways to make callers feel at ease is to personalize their phone calls. Always find out the caller's first name and use their name whenever it fits into the conversation.
5. End the Call in a pleasant manner: the way you end the call is just as important as the call, itself.
6. Always end the call in a pleasant and friendly manner. Keep in mind that your last impression, often makes a big difference in lasting relationships with customers/ patients. A great thing to say when ending a call is something like "Thank you.....(person's name). If you have any other concerns, do not hesitate to call me back"

VII. MANUAL FOR COLLECTION AND PRESSING OF PLANT SAMPLES

- Contents:
1. Introduction
 2. Equipments required for collection of samples
 3. Collection of plant samples
 4. Drying the specimens
 5. Mounting on herbarium sheet

1. INTRODUCTION:

A herbarium is a collection of dried plant specimen, specifically prepared for the purpose of identification and reference. In other words, they are the collection of plants that have been dried, pressed and mounted on sheets along with the associated data. The specimen consists of the whole plant (herbs) or plant parts (shrub and trees).



Fig 1: A herbarium specimen

Herbarium specimens are used for a variety of purposes such as:

- Identification of plants, algae, lichens and fungi
- Provide data/record for a species occurring at a particular time and place
- Provide data/record on the distribution, habit and habitat.

In order to prepare a herbarium specimen the following are required:

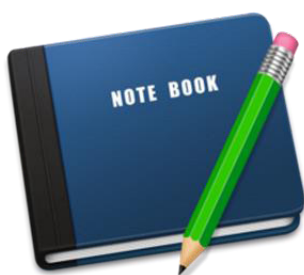
- Field visit and Collection of Specimens
- Drying and pressing
- Mounting on a Herbarium Sheet
- Labelling
- Preservation and Storage

2. EQUIPMENTS REQUIRED FOR COLLECTION AND DRYING OF PLANT SPECIMENS

For collection and drying of plant specimens there are several materials and equipments that are required which have been included in the following Table.

Table 1: Materials and equipments required for collection and drying of Plant specimens

Sl. no	Items
1.	Field notebook
2.	Newspapers
3.	Polythene bags
4.	Labelling tags (with threads)
5.	Measuring tape
6.	Camera
7.	Hand hoe digger and Secateurs
8.	Gloves
9.	GPS
10.	Hardboard/plywood



(a)



(b)



(c)



(d)



(e)



(f)

Fig 2: (a) Note book; (b) Labelling tags; (c) Measuring tape; (d) Gloves; (e) Hand-hoe digger (f) Secateurs



(a)



(b)



(c)



(d)

Fig 3: (a) GPS; (b) Camera; (c) Newspaper; (d) Polythene bags

3. COLLECTION OF PLANT SAMPLES

Plant specimen possesses the parts such as leaves, flowers and fruits. Plants samples should be collected in a proper manner so that it ensures a good herbarium collection. It is also important to follow certain procedures while collecting the plant specimens so that proper identification is ensured. Table 2 shows the necessary steps that should be taken care of and also the steps that should be avoided for collecting the plant specimens. While collecting the specimens, the information that has to be recorded includes the name of the plant (common name and local name), date of collection, place of collection, collector's name, fruit colour, flower colour, size, habit and form of the plant.

While collecting plant samples the following points should be kept in mind:

- The plant specimen should have a leaf, flower and/or fruit
- In case of underground plants, bulbs, tubers and rhizomes should be collected
- In case of trees and shrubs, twigs along with leaves should be collected
- In case of herbs, the plant has to be collected along with the stems, leaves and roots
- If twigs are not available or not accessible (very tall trees), then photographs of the tree showing the necessary plant parts can be taken
- Select twigs having a complete arrangement of the leaves on it.
- When collecting plant sample from trees or large shrub, distinctive features (height, width and details of the bark) of the tree/shrub should also be recorded.
- Use secateurs for cutting the stem/twig
- Every specimen (along with its duplicates) should be tagged

Table 2: The DOs and DONTs that should be followed while collecting plant samples

DOs	DONTs
Select healthy and vigorous plants.	Avoid damaged plants (insect –affected, broken and unhealthy ones).
The underground parts (roots, bulbs and rhizome) should be carefully dug up, and the soil removed with care.	Should not be uprooted forcefully
The twigs should be attached with leaves, fruits and/or flowers	Twigs with broken or damaged leaves should be avoided
Select twigs having a complete arrangement of the leaves on it.	Twigs showing partial arrangement of leaves should be avoided
Collect 2-3 specimens of a plant	Avoid collecting single plant specimen
Use secateurs for cutting the stem/twig to get a clean and smooth cut	Avoid manual pulling as it may damage the plant specimen
Tie a proper labelled tag in the specimen	Avoid labelling on the leaves or twigs
Attach tags securely to each specimen	Avoid tying too tight (as it may damage the sample) or too loose (as it may be get mixed up with others specimens)

4. DRYING THE SPECIMENS

The specimens, after collection, should be pressed and kept for drying; this is done in order to ensure that the specimens are completely devoid of water before being mounted on herbarium sheet. The important points that should be followed are:

- The collected specimens should be arranged properly before drying them.
- They should be placed in between folds of newspaper/blotting sheets and each specimen should be kept in separate newspaper.
- While placing the specimen in the newspaper care should be taken that both sides of the leaves are displayed.
- If only one large leaf or fern sample is available, it should be folded so that both the surfaces can be seen.
- If the leaf tip extends out of the newspaper, then they should be folded in 'N' or 'W'.
- The twig should not be separated from the leaves so that it displays the arrangement of the leaves on it.
- The excess leaves should be removed and care should be taken that the leaves should not cover the flowers, fruits or stem.
- Some flowers may be pressed open, some closed, while others split to show the internal structures.
- After all the specimens have been placed in the newspaper, they should be pressed between two pieces of hardboard/plywood which should be held tightly by a thread/rope.
- The newspaper should be changed every day during the first three or four days.

Table 3: The DOs and DONTs that should be followed while drying and pressing the plant specimens.

DOs	DONTs
Specimens stored in polythene bags (after collection) should be placed in the newspaper as soon as possible	Avoid keeping in the polythene bags for longer days as the specimen may get distorted.
Each specimen should be kept in separate newspaper.	Avoid keeping too many specimens in a single newspaper as it can create confusion
The newspaper should be changed daily during the first 3-4 days	Avoid keeping the specimen in the same newspaper
The specimens should be kept in such a way that it displays all the parts of the plant	Overlapping of the parts should be avoided and the leaves should not cover the other parts of the plant (flower, fruit or stem)
The leaves should be placed in a way that it displays both the surfaces (dorsal and ventral)	Avoid keeping only one side of the leaves on the newspaper.
The twig should be kept intact with the leaves so that it shows the arrangement of the leaves on it	Avoid selecting twigs without leaves



(a) Selection of plants



(b) Collecting the specimens using secateurs



(c) Labelling the specimens



(d) Attaching tags to the specimen



(e) Arranging and pressing the specimens



(f) Placing the Specimens in the Hardboard

Figure 4. Steps for Collection and Pressing of plant samples

5. MOUNTING ON HERBARIUM SHEET

After the plants specimens have completely dried up, they are then mounted on an Ivory sheet. The materials required for mounting a herbarium sheet includes an Ivory sheet (42 x 27 cms), Labelling sheet and Adhesive (fevicol or paper-tape).

Mounting is done by attaching the specimen to the herbarium sheet with the help of fevicol or paper-tape. The plant parts which are bulky such as fruits, seeds, cones, etc are stitched with a thread in the sheet while the flowers are kept in envelopes. Succulent plants (cactus) are first dipped in hot water and then dried properly after which they are stitched in the sheet. Similarly, if bulbs, rhizomes and tubers are collected, they should be cut into half and then dipped in hot water for few minutes; when they are dried, they are then pasted in the ivory sheet. After mounting is completed, a label is pasted on the lower right hand corner of the herbarium sheet. The label should have the following information printed on it:

1. Name of the plant and author (common name, genus and species name)
2. Family name
3. Local name
4. Place of collection
5. Altitude
6. Description of the habit of the plant
7. Name of collector
8. Date of collection

District..... Date	
1. Name of the Plant.....	
2. Family Name.....	
3. Local Name.....	
4. Place of Collection.....	5. Altitude.....
6. Description of the habit of the plant.....	
7. Name of collector.....	

Fig 5: Labelling format format of a herbarium sheet

Storage:

The plant specimens which have been dried, pressed and identified are placed in paper folds which are then transferred into the herbarium cupboards. Care should be taken that the place where the cupboard is kept should be completely dry. To protect the plant specimens from insects and pests, naphthalene balls are kept along the sides of the herbarium sheets inside the cupboards.

Reference:

1. Argent, G.C.G. (1976). The Wild Bananas of Papua New Guinea. *Notes from the Royal Botanic Garden Edinburgh* 35: 77–114.
2. Bailey, L.H. (1946). The Palm Herbarium. *Gentes Herb. Ithaca* 7 (fasc. 2): 153–180.
3. Fosberg, F.R. and Sachet, M. (1965). *Manual for Tropical Herbaria*. Regnum Vegetabile Vol 39.
4. Harris, W., Morton, J., and Holland, A.E. (eds) (2008). *Difficult to collect plants: a manual for Weed Spotters*. CRC for Australian Weed Management, Adelaide.
5. McCurrach, J.C. (1960). *Palms of the World*. Harper & Brothers, New York.
6. Queensland Herbarium (2016). Collection and preserving plant specimens, a manual. 2nd edition. Department of Science, Information Technology and Innovation, Brisbane.
7. Stone, B.C. (1983). A Guide to collecting Pandanaceae (Pandanus, Freycinetia and Sararanga). *Annals of the Missouri Botanic Gardens* 70: 137–45.