

Pharmacotherapeutics

- PT is the application of Pharmacological information together with the knowledge of the disease for its prevention, mitigation or cure.
- PT is a branch of Pharmacology, which is defined as "the study of the therapeutic uses and effects of drugs".
- PT is concerned with the selection of the of the most appropriate drug, the adm. of the drug ^{body does to the drug} and ^{drug does to the body} duration of treatment.
- PT correlates ^{body does to the drug} pharmacokinetics and ^{drug does to the body} pharmacodynamics with the microbiologic or biochemical Aspects of Disease. ADME

Scope:

- ① To ↑ knowledge and upgrade the skills which are needed for safe use and medicines distribution by pharmacists and nurses in hospitals to patients
- ② It develops the basic concept of person working in different diagnostic laboratories and in pathology labs.
- ③ PT study enhances the understanding of pharmacist working in retail shop for disease eradication and medicines prescribed.

Objectives of PT: Following are the primary job of ^{physiology} _{PT} →

- (1) A study of ^{physiology} _{PT} → ~~Patho~~ of specific disease states, as well as the rationale for drug therapy.
- (2) Management of these disease through a therapeutic approach.
- (3) The importance of preparation of individualised therapeutic plans based on diagnosis.
- (4) Examine the process of developing individualised treatment plans in response to a diagnosis.
- (5) Discuss the controversies in drug therapy.
- (6) Set up - important patient - specific parameters for starting drug therapy and keeping track of it, such as alternatives, the time of course of clinical and laboratory indices of therapeutic response and side-effects.
- (7) There must be a list of patient - specific parameters that should be taken into account when starting and keeping track of drug therapy. Parameters include, the time course of clinical and laboratory indicators of therapeutic response and side effects.

Rational Use of Medicine

- The WHO has defined RUM as follows:-

The rational use of drugs requires that patients receive medicines appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time and at the lowest cost to them and the community.)'

- It is widely assumed that use of drugs by qualified doctors of modern medicine would be rational.
- However in, reality Rationality abounds in every aspect of drug use, medically inappropriate ineffective and economically inefficient use of drugs all over the world.

Irrationalities in Prescribing

- * Use of drug when none is needed e.g. antibiotics for viral fevers.
- * Compulsive prescription of vitamin / tonics
- * Use of drug not related to diagnosis e.g. chloroquine for any fever.

- * Selection for wrong drug :> Beta Blocker as Anti-hypertensive in asthmatic patient.
- * Incorrect route of adm.
- * Incorrect dose.
- * Incorrect duration of treatment of post surgical use of Antibiotics e.g. prolongation
- * Unnecessary use of drug combination e.g. Ibusuprofen + pcm
- * Unsafe use of drug e.g. corticosteroids for fever.

WHO ^{Supporter} Advocates 12 Rational use Key ^{Integrating} Interventions to promote more

- Incorporation of a multidisciplinary national organisation to coordinate policies on the use of medications.
- The application of clinical guidelines.
- The creation and use of a national essential medicine list are important tasks.
- Establishment of drug & Therapeutics committees in district and hospital
- Inclusion of problem-Based Pharmacotherapy training in undergraduate curricula.

Ensuring in-service medical education as a
minimum requirement
Supervision, audit and feedback.

Use of independent information on medicines
Public education about medicines.

Avoidance of perverse financial ^{4) TEST} Incentives

Use of appropriate and enforced regulation
Sufficient government expenditure to ensure
availability of medicines and staff.

Our Goal

- Ensure that medical professional & consumers are using medicines in therapeutic manner.
- Achieving therapeutically sound & cost effective use of medicine by health professionals.

Rational Use of Medicines Strategy and Monitoring

Building on Rational medicine use,
identifying and promoting effective strategies,
and ensuring that responsible medicine
promotion are all priorities.

RUM by health professionals

Collaboration on treatment guidelines, national essential medicines lists and formularies &

RUM by consumers

Providing assistance in the development of effective system of medical information and empowering consumers to make informed decision about their medical treatment priority.



WHO advocates 12 key interventions to promote more rational use →

- (i) Incorporation of a multidisciplinary national organization to coordinate policies on the use of medications.
- (ii) The application of clinical guidelines.
- (iii) The creation & use of a national essential medicine list are two important tasks.
- (iv) A distinction b/w the use of drugs & the use of therapeutics in districts & hospital.
- (v) Undergraduate curriculum should include problem-based p'otherapy training.
- (vi) Continuing in-service medical education is required as a condition of license.
- (vii) Monitoring, auditing & Providing feedback
- (viii) Utilization of third- Party information on pharmaceuticals.
- (ix) Medicine education for the general public.
- (x) Keeping financial incentives that are counterproductive out of the picture.
- (xi) Regulation that is appropriate & enforced is employed.
- (xii) A sufficient amount of government-expenditure is required to ensure the availability of medicine & personnel.

Goal

- Ensure that health professionals & consumers are using medicines in a therapeutically appropriate & cost-effective manner.
- Health workers & the general public need to use medicines more effectively, if they want to lower the no. of people who get & die from communicable & non-communicable disease & keep drug costs down.
- In an ideal world, achieving therapeutically sound

& cost-effective use of medicines by health professionals & consumers should be possible at all levels of the health system & in both the public & private sectors.

Evidence-Based Medicine (EBM)

It is defined as the

- The word evidence-based are used to describe lots of things, Evidence-based medicine (EBM), Evidence-based practice, evidence-based policy & in a different part of society, evidence-based social work & evidence-based education.
- The underlying principals are the same. The concept is about making sure that when decisions are made they are made on the basis of the most up-to-date, solid, reliable, scientific evidence. In the case of medicine or health care, these are the decision about the care of individual patients.

Definition-

A systematic approach to medicine in which doctors & other health care professional use the best available scientific evidence from clinical research to help make decision about the care of individual patients. A physician's clinical experience & the patient's value & preference are also important in the process of using the evidence to make decision. The use of evidence-based medicine may help plan the best treatment & improve quality of care & patient outcomes.

Meta analysis
 Randomised control trials → More Reliable
 Cohort studies
 Case-series & case-reports
 Expert opinion

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The need for EBM → literature, improved health

→ Medical research is continually discovering improved treatment methods & therapies.

→ Research findings are often delayed in being implemented into clinical practice.

→ Clinicians must stay current with changing therapies.

→ Evidence-based practice has been shown to keep clinicians up-to-date, but it's not primarily about

the number of what trials are in use.

→ 5-step model of evidence-based medicine-

Step 1 → Defining a clinically relevant question - Doctor searches for information to find correct diagnosis.

Step 2 → Searching for the best evidence - Doctor searches for evidence to support the finding from Step 1.

Step 3 → Assessing the quality of the evidence - Doctor ensures that quality & reliability is high.

Step 4 → Acting on the evidence to form a clinical decision - Based on Step 1-3, Patient & doctor jointly make an informed treatment decision.

Step 5 → Evaluating the process - Doctor & patient assess if the intended outcome is achieved & adjust treatment decisions accordingly if needed.

• Levels of Evidence -

1. Expert opinions - This is evidence based on the opinion of a panel of experts.

2. Case-Series & Case Reports - Information collected without manipulation.

→ Case-series are descriptive studies following one small group of people.

→ They are additions or supplements of case reports.

→ A case-report is a detailed report of the symptom

signs, diagnosis, treatment & follow up of an individual patient.

3 Cohort studies - The modern definition of a cohort in clinical studies is a group of people with defined characteristics who are followed in order to determine health-related outcomes

→ The ^{young high B.P. & high B. cholesterol} Framingham heart study is an example of the use of a cohort study to answer an epidemiological question. The study found high blood pressure & high blood cholesterol to be major risk factors for cardiovascular disease.

→ Another example of a cohort study that has been ongoing for many years is the national child development study (NCDS), the most widely researched of the British birth cohort studies. By following you throughout your lives, researchers are able to understand.

- How our experiences as children affect how we turn out as adults.
- How different areas of our lives, such as health, wealth, family, education & employment are linked.
- How these aspects of life vary for people from different walks of life.

4 Randomised clinical trial (RCT) →

→ An RCT in clinical research typically compares a proposed new treatment against an existing standard of care, these are then termed the experimental & control treatments respectively.

→ A randomised clinical trial is one that uses randomisation when allocating people of differ-

group of the study. It is randomised.
 → This means that the treatment groups are chosen by chance using a formal system & each participant has an equal chance of being selected to each group.

5. Meta-analysis :-

Meta-analysis is a systematic, statistic based review of data that contrasts & combines results from different but related studies, in an attempt to identify patterns, disagreements & other relationship across multiple studies.

→ A meta analysis can support a stronger conclusion than any individual study, but may be flawed because of publication bias.

• Outcome Research :-

→ Outcome research studies the end results of medical care - the effect of the healthcare process on the health & well-being of patients.

→ Clinical outcome research seeks to monitor, understand & improve the impact of medical treatment on a specific patient or population.

→ It describes research that is concerned with the effectiveness of public health interventions & health services - the outcomes of those services.

→ Attention is frequently focused on the clinical endpoints most relevant to the patient or population. Such endpoints could be quality of life.

→ Outcome research may also focus on the effectiveness of healthcare delivery, with measures such as cost-effectiveness, health status & disease burden.

(the impact of the health problem).

→ The main focus of EBM is providing the best care to the patient according to clinical evidence & experience, the main focus of outcomes research is predefined end points.

→ Importance of EBM →

- EBM gives physicians a way to keep up with evidence-based protocols.
- EBM enables healthcare teams to make personalized decisions based on global evidence.
- EBM creates greater transparency & accountability.
- EBM improves quality of care & outcomes.

→ Limitations of EBM →

- Time consuming
- Requires access to medical literature.
- Requires some knowledge of statistics.
- Publication bias.

Essential Medicines list

Essential medicines are those that satisfy the priority healthcare needs of the population.

They are selected on the basis of disease prevalence, evidence on efficacy, safety & comparative cost-effectiveness.

Essential medicines are intended to be available in functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality & at a price the individual & the community can afford.

which medicines are regarded as essential remains the responsibility of states within a national framework.

Essential drugs are neither to be understood as only consisting of life-saving drugs nor as medicines for the treatment of rare disease.

The concept of essential drugs includes all the drugs needed for most commonly encountered diseases including life-saving conditions.

- Impact of Essential medicines → A limited range of carefully selected essential medicines leads to -
- Better health care
- Better drug management & health outcome (including procurement, storage, distribution & improvement of quality of prescribed medicines) → cost-effective use of health resources
- The WHO model list of essential medicines is a list of essential medicines created by the WHO which serves as a guide for the development of national & institutional essential medicine lists (EML).
- It is updated & revised every 2 years by the WHO Expert committee on selection & use of medicines.
- The list was first published in 1977.
- Since 2007, a separate list for the children up to 12 years is being brought out.
- Initially in 1977, the WHO EML had 204 molecules & the current is the 20th list (2017) which has 433 medicines, including 25 fixed dose drug combinations.



List of Essential medicine

Anaesthetics, preoperative medicines & medical gases

a. General anaesthetics & Oxygen

(i.) Inhalational medicines.

Halothane - Inhalation

Isoflurane - Inhalation

Nitrous oxide - Inhalation

Oxygen - Inhalation

(ii.) Injectable medicines

Ketamine - Inj. 50 mg/ml in 10 ml vial

Propofol - Inj. 10 mg/ml

b. Local anaesthetics

Bupivacaine - Inj. 0.25%, 0.5% hydrochloride

Inj. for spinal anaesthesia - 0.5% in

1:4 ml ampoule to be mixed with 7.5% glucose

Lidocaine - Inj. 1%, 2% in vials or 10 ml ampoules

water dilute to 9 ml with Inj. for spinal anaesthesia = 10 ml

Ephedrine - Inj. 30 mg/ml in 1 ml ampoule

c. Peroperative medication & sedation for short-term

procedure - Inj. 1 ml ampoule

Atropine - Inj. 1 mg in 1 ml ampoule

Morphine - Inj. 10 mg in 1 ml ampoule

d. Medical gases

Oxygen - Inhalation

e. Medicines for pain

a. Non-opioids & non-steroidal anti-inflammatory medicines (NSAIDs)

Acetylsalicylic acid - Suppository - 50 mg, 150 mg

Tablet 500 mg, 1000 mg

Ibuprofen - Oral liquid - 200 mg/5 ml

Tablet 200 mg, 400 mg, 600 mg

Paracetamol - Oral liquid - 120 mg/5 ml

Suppository - 100 mg, tablet 100-500 mg

b. Opioid analgesics -

Codeine - Tablet 30 mg

Morphine - Granules 20-200 mg

Inj - 10 mg in 1 ml ampoule.

c.3. ~~Anaesthetic & other medicines used in anaphylaxis~~ ^{such as peant, bee sting, life threatening allergic reaction}

Dexamethasone. Inj - 4 mg/ml

Epinephrine - Inj - 1 mg

Prednisolone - Oral liquid - 5 mg/ml

Tablet - 5 mg, 25 mg.

4. Antidotes & other substances used in poisonings -

a. Non-specific - charcoal, activated - Powder

b. Specific ^(Inj acute liver injury after paracetamol overdose)

Acetylcysteine - Inj - 200 mg/ml

Oral liquid - 10%.

Atropine - Inj - 1 mg in 1 ml ampoule ^{Negative agent}Calcium gluconate - Inj - 100 mg/ml in 10 ml ampoule ^{arsenic, gold, lead}

Dimercaprol - Inj in oil - 50 mg/ml.

5. Anticonvulsants/ Antiepileptics -

Diazepam - Sol - 5 mg/ml in 0.5 ml, 2 ml, 4 ml

Phenobarbital - Inj - 200 mg/ml

Tablet - 15-100 mg.

Phenytoin - Inj - 50 mg/ml, Tablet - 50 mg

6. Anti-infective medicines -

a. Anthelmintics -

b. Intestinal anthelmintics -

Albendazole - Tablet - 400 mg

Mebendazole - Tablet - 100 mg, 500 mg

Ivermectin - Tablet - 3 mg

Niclosamide - Tab. 500 mg



Standard treatment Guideline

Introduction - The STGs are prepared as a tool to assist & guide doctors, pharmacist, dispensers & other healthcare staff who prescribe at primary care facilities in providing quality care to patients. The guidelines list the preferred treatments for common health problems experienced by people in the health system.

The guidelines are designed to be used as a guide to treatment choices & as a reference book to help in the overall management of patients & the use at all levels within the health system both public & private.

→ Definition →

Standard treatment Guideline has been defined as a systematically developed statement designed to assist practitioners & patients in making decisions about appropriate healthcare for specific clinical circumstances.

→ Advantages -

i) For patients - i) Ease - mode of therapy

ii) Consistency among prescribers - reduced confusion & increased compliance - told

iii) Most effective treatments - best - monitored

(iii) It provides cost effective therapy.

2. For health care providers -

i) Providers can concentrate on correct diagnosis.

ii) Provide a standard - assessed quality of care.

iii) Provide a simple basis for monitoring & supervision.

Disadvantages → It is difficult, lengthy & time taking.

Need regular updation.

It loses credibility if not updated.

It should be brief & small enough to carry easily.

3. For supply Management

There should be sufficient quantities of drugs available for the most commonly treated problems.

Facilitates pre-Packaging of course of therapy prescribed items for common conditions.

4. For health policy Market

(i) Provide a method to control costs by using drug funds more efficiently.

(ii) Serve as a benchmark to assess & compare quality of care.

• Key features of the standard treatments include

1. Simplicity - The number of health problems is limited. For each health problem, a few key clinical diagnostic criteria are listed. Finally, drugs & dosage information is clear & concise.

2. Credibility - The treatments are initially developed for patients by the most eminent clinician. Revisions based on actual experience will further add to their credibility.

3. Same standard for all levels - The first choice of treatment of a patient's diagnosis & condition. Doctors & other health care providers can use the same standard treatment.

4. Drug supply based on standard treatment - The standard treatment guidelines must match with the supply of drug.



5. Pre-service training → Standard treatment manuals are introduced & distributed during pre-service training & their use become habit.
6. Regular updates → A change or alteration in the therapeutic preferences are incorporated & updated, the standards should be revised to reflect current recommendation.
7. Pocket manuals - The standard treatments are published as small, durable pocket manuals, which makes them convenient to carry & use.

Short question type Answers-

- Q1) Define the term p'cotherapeutics.
- Q2) What is the role of Evidence based medicine.
- Q3) What is the scope of p'cotherapeutics.
- Q4) What is essential medicine?
- Q5) What are the key features of a successful STG?

Long answer type questions-

- Q1) What are the objectives of p'cotherapeutics.
- Q2) Write a brief note on process of STG development.
- Q3) What are the major steps of EBM model. write in detail.
- Q4) Write a detail note on Rational use of medicine.

Multiple choice questions-

1. P'cotherapeutics is the application of p'cological information together with the knowledge of the disease for its - - - - - .
- (a) Prevention, mitigation or cure (b) only cure
 (c) none of these

2. P'cotherapeutics is an interdisciplinary field that explores many aspects of -
(a) Drug changing (c.) molecular
(b) Drug discovery ✓ (d.) None of the above
3. What is the objective of Pharmacotherapeutics?
(a) The therapeutics approach to management of these disease.
(b.) The controversies in drug therapy.
(c.) The importance of preparation of individualised therapeutic plans based on diagnosis.
(d.) All of the above. ✓
4. What makes Pharmacists unique in the health care team.
(a) Pharmacist advise patients on how take their medicine.
(b) Pharmacist are experts on communicating with patient & other health care professionals ✓
(c) Pharmacist have access to a vast amount of knowledge on medicines & the action of drug.
(d.) Pharmacist are experts on medicine formulation & use & can apply this to patient care.
5. Belonging to a profession brings a range of benefits but it also attracts a range of obligations. Which of the following is not an obligation associated with being a professional.
(a) To act in the best interests of patient.
(b) To apply a high degree of skill & knowledge to their work.
(c.) To be objective & non-judgemental.
(d.) To use specialized information & operate under a monopoly. ✓

6. The role of the pharmacy regulator is-

- To protect, promote & maintain the health, safety & well-being of member of the public. (✓)
- To raise the standing of the profession & to protect the interest of its member.
- To promote pharmacy & advance science, practice
- To protect the interest & right of members of the pharmacy Profession.

7. EBM is a systematic approach to identifying the most appropriate strategy for managing an individual patient. The approach based on-

- Advice gleaned from recently published literature
- Strategies effective in previous patient
- Analyses of relevant medical literature. (v.)
- Advice given by mentor & colleagues

8. Key features of a successful STG manual expert.

- Simplicity
- Credibility
- Natural policy (v.)
- Treatment standard for all level of health facility

9. Choose the correct full form of STG-

- Standard treatment guideline (v.)
- Standard treatment procedure
- Standard table guideline (d) None of the above

10. The first model list of ED was published in-
1960 1977 (v) 1982 1996

1. (Pharmacist) are expert on communicating with Patient & other health care (knowledge) of P'cotherapeutics is essential to practice medicine.

3. The economic impact of (P'centicals) is substantial especially in developing countries.

4. (Documents) describes the process of development of guideline