Definition of Pharmacy

Pharmacy:

Derived form Greek word "pharmakon" means medicine or drug

Pharmacy:

Means the art and science of preparing and dispensing medications and the provision of drug – related information to the public.

Pharmacy involves:

- Interpretation of prescription orders
- Compounding
- Labeling
- Dispensing of drug and devices
- Patient monitoring

Drugs:

Is the material that has a pharmacological effect. This material may be

- Natural in origin (plant – animal – mineral)
- Synthetic (e.g. asprin)

Drug Classification:

* Prescribed drug: the drug dispensed only by prescription
* Non prescribed drug: OTC 'Over The Counter' drug that can be prescribed without prescription.

Name of the drug:

- ***Chemical name***: indicating its chemical structure e.g. (N – para – aminophenol)
- ***Generic name:*** the name given to the compound during early investigation
- ***Official name:*** its name in pharmacopeia
- e.g. B.P.1998: Paracetamol
- U.S.P XXII: Acetaminophen
- *Brand name*: its trade name in the market.

Abimol (Glaxo) , Pyral (Kahira) , Cetal (Epico)

Scope of Pharmacy

Education **Career**

1-Education:

All faculties of pharmacy in Egypt adopt 5 years program to get B.Sc. pharmacy.

The main courses of pharmacy education are:

- Pharmaceutics, biopharmaceutics and clinical pharmacy
- Pharmacognosy
- Organic chemistry
- Analytical chemistry
- Pharmaceutical chemistry
- Biochemistry
- Microbiology and public health
- Pharmacology & toxicology
- Complementary studies include: Mathematics, management, pharmacy law etc…

Types of education necessary for creating a pharmacist

- Basic science (chemistry, Biology, Physics)
- Technical Skills
- Drug information and scientific knowledge
- Economic knowledge
- Psychological and sociological understanding

Aims of Modern pharmaceutical education

- Provide scientific background
- Provide professional skills and knowledge
- Provide business training
- Provide broad general education

Under-graduated program and curriculums

1. **Pharmaceutics department** : Explained latter in lecture 2
2. **Pharmacognosy department**: pharmacognosy is the science deals with cultivation, collection transportation, quality control and preservation of plants
   - It includes phytochemistry a science deals with studding active ingredients of the plant and its clinical effectiveness
3. **Organic chemistry**: is the science deals with the chemical structure and nomenclature of chemical compounds
4. **Analytical chemistry**: the science deals with the analysis of analytical regents, raw materials and drug products
5. **Pharmaceutical chemistry**: is the science deals with the analysis and synthesis of raw materials, analytical reagents and final product

6. Biochemistry department: biochemistry is the science deals with the chemistry and the biological importance of chemical agents found in diet and the body

7. Microbiology and public health department:

- **Microbiology**: is the science deals with microscopic or ultramicroscopic structure, action of viable micro organisms as bacteria, virus, fungi and parasites, also deals with infections, sterilization anti-microbial and immunology
- **Public health**: is the science deals with all measures needed to protect the health of community

8. Pharmacology and Toxicology:

- **Pharmacology**: is the science deals with properties and effects of the drugs, interaction between the drug and the living system.
- **Toxicology:** is the science deals with poisoning effect of drugs and other agents

Post-graduated Education

* **Diploma degree in**:

1- Industrial pharmacy
2- Hospital pharmacy
3- Clinical Pharmacy
4- Quality Control
5- Cosmetics

→ Pharmaceutics department

6- Medicinal plants : Pharmacognosy dep.
7- Pharmacology: Pharmacology dep.
8- Biochemistry : Biochemistry dep
9- Microbiology and public health : Microbiology dep.
10- Organic synthesis : Organic and pharmaceutical chemistry dep.

*** Master degree: M.D. pharmaceutical science**

* **PhD degree: doctor of philosophy in pharmaceutical science**

2-Career

- **Pharmacy Profession**

A. Patient services

B. Drug Services

Direct Activities

- - Hospital Pharmacy
- - Clinical Pharmacy
- - Community Pharmacy
- - Bio chemical analysis
- - Microbiological analysis
- - Immunological analysis

Indirect activities

- Drug promotion
- Family planning program
- Dehydration treatment program
- National Screening
- Preventive Measures
- For epidemic diseases

B. Drug Services

- Innovating new Drugs:
- Screening for effect and safety
- Analysis
- Formulation
- In process quality control
- Production
- Final quality control
- Distribution

* Ensure of drug quality: Good manufacture practice GMP validation and quality assurance.

* The production: of all human dosage forms cosmetics, vaccines, blood products, blood replacements, certain pesticides and veterinary drugs.

Fields of Professional Practice

1-Clinical Pharmacy:

- **Clinical pharmacist has the following responsibilities:**
- Selection of dugs
- prevention of drug interaction
- prevention of teratogenicity
- Calculation of proper doses
- Intravenous admixture dispensing (for cytotoxics)

2-Regulatory Control and drug management

- working in central administration of pharmaceutical affairs and administrative services

3-Industrial Pharmacy:

Pharmacists in industry can hold positions in:

Research and development

Manufacture and production

Quality control and quality assurance

Management

4-Hospital Pharmacy

Pharmacist Working in:

- Private and government owned hospitals
- Health maintenance organization, clinics
- Drug information centers

The pharmacists in any hospital have the following activities:

- Dispense medications
- Advise professionals and patients on drug use
- A member in policy –making committee (PMC) responsible for drug selection use of antibiotics, hospital infection

5-Military Pharmacy:

Pharmacist may serve in the armed forces as

- Commissioned officer
- Non- commissioned officer

They have the following responsibilities:

- Manufacture of generic products
- Distribute drugs to military hospitals
- Dispense drugs to army personal

6-Drug Promotion

- Pharmacist in drug promotion career responsible for medical representation to pharmacists, physicians, hospitals. They are called medical representatives (Med. Rep.)

7-Family Planning:

Pharmacist in family planning should inform and educate public about:

Importance of child care

Methods of contraception

National control of diarrhea diseases project

Pharmacists working in this project are responsible for giving advice about diarrhea and dehydration advice and recommend oral rehydration therapy

8-Academic Activities:

-Education

-Research

Ethics of Pharmacy

Code of Ethics

القســـم

اقسم بالله العظيم ان اكون امينا و حريصا علي الشرف و البر و الصلاح فى مزاوله مهنه الصيدله و لااطلب اجرا يزيد علي عملي ولا فشى سرا ولا استغل مهنتي فى افساد الخصال الحميده او ارتكاب الاثام و لا اعطي سما البته ولا ادل عليه ولا اشير به.و ان اكون موقرا للذين علموني معترفا بفضلهم مسديا لاولادهم ما في وسعي من معروف و احسان و الله علي ما اقول شهيد

This code states the principles fundamental roles and responsibilities of pharmacists

The principles are:

pharmacists respect relationship between the patient and pharmacist and this occurs by:

- **Pharmacist has to maintain knowledge**
- **Pharmacist asks for the consultation of colleagues.**

Pharmacist respect autonomy and dignity of each patient.

Autonomy: The pharmacist promotes the rights of self determination by encouraging patient to participate in decisions about their health.

Dignity: The pharmacist respects personal and cultural differences among patients.

Organizations

- Pharmacist must maintain & develop good pharmaceutical practice by working with national and international organizations.

- **International organizations:**
  - *World Health Organization (W.H.O):* It is responsible for health care all over the world.
  - *Food and Drug Administration (F.D.A.):* It is responsible for the quality of food and drug in U.S.A
  - *United Nation Division of Narcotic Drugs (UNND))* responsible for the regulations concerning the use and abuse of narcotic drugs.

Role of international organizations:

1-Development of protocols and methodologies

2-Development of materials and magazines

3-Exchange of in formations and experiences

4-Researches for evaluations of medications

National organizations:

1. Syndicate of pharmacist's نقابه الصيادله:

– Responsible for the profession of pharmacy and welfare of pharmacists in Egypt.

2. Egyptian pharmaceutical Society الجمعيه الصيدليه المصريه:

it's activities are educational:

- Issues a scientific Journal in pharmaceutical sciences.
- Hold conference every two years for pharmacists.
- Responsible for Continuing educations

3. Egyptian Society of Hospital Pharmacists: concerned with all aspects of hospital and clinical pharmacists.

4. National Pharmacopoeia Committee: Responsible for reviewing and updating the Egyptian pharmacopoeia.

Information Resources in Pharmacy

Types: primary literature , Secondary literature , Special information

Resources : library , internet

1. Primary literature: as **scientific journals** in which researches are published in the following manner:

- Abstract or summary
- Introduction
- Description of methodology used and results
- Discussion of results
- List of references

Examples of Scientific Journals:

- Journal of pharmaceutical sciences
- International Journal of Pharmaceutics
- Pharmaceutical Research
- Journal of pharmacy and pharmacology
- Journal of drug development and Industrial pharmacy

2. Secondary Literature:

- **Review Article**: special book collection called annual review
- **Text books:** e.g. Remington: The science and practice of pharmacy

Special Information's: Pharmacopeias, Formulary, Drug Compendia

3. Special Information's

Pharmacopeias, Formulary, Drug Compendia

A. Pharmacopoeias:

Includes special standards for: Purity – Strength – analysis of the drugs.

Pharmacopoeias are issued by governments or international agencies

The world's best known national pharmacopoeia:

United States Pharmacopeias/National Formulary (USP/NF) it is issued in 2 separate titles in one volume.

The U.S.P. contains monographs on drug and other substances while NF contains monographs on excepients used in pharmaceutical preparations

British pharmacopoeia (B.P): Authorized by the government of Great Britain.

Martindale, The Extra Pharmacopoeia: It is not a true pharmacopoeia but one of the preeminent drug information compendia. It contains information on drugs and medicines from around the world.

B. Formularies

- They are list of drugs approved for use by special hospital or government.
- FDA produces approved drug products with therapeutic equivalence evaluations, an annual publication that is popularly called the Orange Book.

C. Drug Compendia

- Are references containing information on therapeutic use of drugs, dosage, contraindications adverse effects and pharmacokinetics of drugs.
- e.g. - Physician's Desk Reference (PDR)
- - American Hospital Formulary Service (AHFS)
- - Hand Book of non prescription products.

The prescription

Prescription: is an order for a medicine(s) written by physician, dentist, veterinarian or other licensed health science practitioner legally entitled prescribe.

Prescription Parts:

1- name

2- Date

3- Superscription

4- Inscription

5- Subscription

6- Transcription

7- Signature

Prescription Type:

1- Simple 2- Compound 3- Narcotic

Prescription Handling:

1- Receiving 2- Check safety 3- Compounding

Prescription Parts:

1. Patient's name: age: address:
2. date:
3. R/:
4. Salicylamide 0.3gm
   Paracetamol 0.25gm
5. Fiat capsule , mitte X
6. Sign: one capsule to be taken three times daily
7. Prescriber's Signature

Dr:……

The name address and age of the patient

The date

The superscription: means direction to pharmacist, R/ is a symbol for the Latin word recipe= you take i.e. it directs the pharmacist to prepare the medicine.

The inscription, contains a list of ingredients and their quantities to be used in compounding the prescription

The subscription: means direction to pharmacist

Fiat: let them be made (dosage from)

Mitte: send (number, of doses to be prepared)

The transcription: means direction to patient

sign= write directions to the patient for the use of the prescription

The name of the prescriber, may be given as an official signature

Prescription types:

1. Simple prescription:

It is the prescription consisting only of the active ingredients (as the prescription mentioned before)

2. Compound prescription:

The prescription contains four portions:

1- Base

2- Adjuvant

3- Corrective

4- Vehicle

3. Narcotic prescription:

This prescription contains drugs with narcotic activity.

Example for compound prescription:

1. Patient: name……..age……..address…….
2. Date:
3. R/
4. Chloral hydrate 8 gm base
   Sodium bromide 10gm adjuvant
   Syrup of raspberry 22.5ml corrective
   Water to 60ml Vehicle
5. Fiat: mixture
6. Signa: 4 ml every 4 hours
7. Signature of prescriber Patient

Base: is the main active ingredient with the main therapeutic effect. (Chloral hydrate is hypnotic)

Adjuvant: it aids the base in its action (sodium bromide has a sedative action)

Corrective: serve as flavouring agent

Vehicle: water is added to dilute the active ingredient and to adjust the volume.

3-Narcotic Prescription

- - Narcotics are drugs with narcotic activity e.g. morphine
- - It must include:
- name of prescriber
- address of prescriber
- registry number of prescriber
- signature of prescriber

1. Patient'sname……..age…….address……
2. Date…….
3. R/
4. Codeine phosphate 20(twenty) mg
5. Fiat: Capsule, Mitte 16 (sixteen) Caps.
6. Signa: One Capsule Four times a day
7. Prescriber's name:
   Address:
   Registry no.:
   Signature: Dr……..

- It must be written in ink or typewriter.
- The quantities must be written in words and numbers.
- In pharmacy, it must include date on which it was filled, name, address and registry number of the pharmacy.
- It should be kept in separate file and not be refilled.

Handling the prescription:

Receiving , Check safety, Compounding .

1. receiving the prescription:

- The pharmacist estimates the length of time to dispense the prescription. Pharmacist prices it before dispensing especially when expensive.
- In order to identify the finished product, some pharmacies employ (prescription claim check). This check is divided into 3 parts, each part has the same number, one part is given to the patient, and the second is attached to the prescription order and the third is attached to the final container.
- The identification is made more frequently by patient's name and address.

II. Checking the prescription for safety:

The pharmacist should understand the prescription very well. The pharmacist must be sure that there is no dangerous overdose or incompatibilities, otherwise he should consult the physician who rote it.

A. Dose

Methods for calculating the dose for child or infant can be based on:

1- Age

2- Weight

3- Body surface area

1-Based on age: for infants younger than 2 years

Fried's rule:

Infant dose = Age in month/150 x adult dose

For children 2 years and older:

Young's rule :

Child dose= age in years/ age in years + 12 x adult dose

2-Based on weight: Generally, heavy individuals can withstand larger dose, than a person with less weight.

The usual doses in considered for persons with 70 Kgm.

For weight in pounds

Child's dose= weight in pounds/150 X adult dose

* For weight in Kgm:

Child's dose= weight in Kg/70 X adult dose

- **Based on body surface area "B.S.A."**:

The average body surface area for adult is 1.7 m^2

Child's dose= B.S.A. in m^2 for child/ B.S.A. in m^2 of adult X adult dose

Or: Child's dose= B.S.A. in m^2 for child/ 1.7 X adult dose

B. Route of Administration

- No valid rule can be established for predicting the parental or the rectal dose of drug from the oral dose.
- Drugs which are absorbed completely from G.I.T will have equal parental and oral dose.
- Drugs which are poorly absorbed by the oral route will have smaller doses parentally than orally.

C. Pharmaceutical Dosage Form

1. The vehicle of prescription affects the safety and the therapeutic effect of the prescription.

e.g. polyethylene glycol ointment should contain ½ the concentration of benzoic acid and salicylic acid used in hydrocarbon base (vaslin) because they are more active in polyethylene glycol base.

2. The degree of subdivision of an active drug may affect therapeutic activity e.g. if polysorbate 80 is mixed with coal tar prior to incorporation of coal tar into the ointment base, a lower concentration of coal tar must be prescribed. As the subdivision of the coal tare results in more pronounced action on the skin.

D. Frequency of Administration

- Many potent drugs have cumulative action. If the frequency is too high, toxicity may occur even if the individual dose is safe e.g. digoxin.
- In case of overdose the pharmacist should consult the physician.
- In certain cases only the physician can know about the safety of the dose e.g.:
  - A nervous person needs higher dose of sedatives
  - In sever pain, large doses of narcotics are used.

III Compounding of the prescription:

1- Calculation

2- Storage Requirements

3- Container selection

4- Label

1) Calculation:

- Check any calculation for the quantity of medicine
- Example:

R/ chloral hydrate	9 gm	15 gm
Sod. Bromide	12 gm	20 gm
Syrup of raspberry	22.5 ml	37.5 gm
Water to	60 ml	to 100 ml

- Fiat: mixture
- Mitte: 100 ml
- Signa: 5 ml every 4 ho

Checking the storage Requirements:

- Many drugs are photosensitive (degraded in presence of light) therefore need amber containers.
- Some drugs should be protected from atmospheric gases as Oxygen which support micro organisms growth and Co_2 which shifts pH.

- Therefore many need tightly closed containers

3- Selecting the container:

- Any pharmaceutical formulation must have suitable container such as:
- - Amber glass bottles: all oral medicines
- - Eye dropper bottles: ear, nasal and eye drops.
- -Pots or collapsible tubes: ointment and creams.

4- Writing the label:

- Direction for the use of medicine should be clear and written before dispensary on a suitable size label.
- On the label the following should be written:
- The prescription number, date of dispensing, patient name, the prescriber's name and direction for use

- Quantity to be taken
- - Amount to be used
- Frequency of administration
- - Route of administration

Auxillary labels:

1. Shake the bottle (suspension and emulsions)
2. For external use only
3. Keep out of reach of children
4. Not be swallowed in large amount (gargle and mouth wash)
5. For rectal use only
6. For vaginal use only
7. For the eye
8. For the ear
9. Keep in a cool place
10. 10-Use as a gargle

N.B. White labels for oral rout and Red labels for external use preparations.

Veterinary Doses:

- The dose of 40 pounds dog = 150 pound man.
- If the dose of dog is taken as 1 the dose of the other animals as following:
- - Cats 0.5
- - Sheep and goat 3
- - Horses 16
- - Cattle 24
- The dose of any animal from birth up to a few weeks old = 1/20 of adult dose
- Half grown animal = 1/3 of adult dose.

System of Weights and Measures

- The international system of units is generally accepted for use in pharmacy.

Units of mass (weights):

- The base unit for mass is the kilogram (kg), the units of mass commonly used in pharmacy are:

gram, milligram, microgram, nanogram

Units of Capacity (volume):

- The use of liter and milliliter are universal in pharmacy practice. One liter is defined in U.K. as one cubic decimeter. Liter, milliliter, microliter

Units of amount of substance:

- - The base unit for amount of substance is the mole (mol). Mol , Millimole, Micromole

- **Units of concentration:**
- Concentration may be expressed in two ways:
- Mass concentration: expressed as gm/l
- Amount of substance concentration: expressed as mol/l

* In pharmacy the drug concentration in solution is usually expressed as mass concentration (gm/l)

* The concentration of electrolytes in solution for parentals expressed as (mol/lit)

Units of length

- The meter (m) is the base unit

Name	Abbreviation	Equivalent
1 centimeter	Cm	10 mm
1 millimeter	Mm	1000 um
1micrometer	μm	1000 nm (nanometer)

Types of Calculations:

Working from a master formula:

- The master formula may list the ingredients for a total quantity greater than or less than the amount requires to be prepared. The formula must therefore be scaled down or scaled up.
- **Example:** calculate the amount of the ingredients for 150 ml and 900 ml from the master formula of opiate squill linctus:

opiate squill linctus Formula

Ingredients	Master formula	Scaled down	Scaled up
Squill Oxymel	**150 ml**	**50 ml**	**300 ml**
Camphorated opium tincture	**150 ml**	**50 ml**	**300 ml**
Total syrup	**150 ml**	**50 ml**	**300 ml**
Total Volume	**450ml**	**150ml**	**900ml**

Dealing with percentage concentrations:

- Many pharmaceutical preparations consist of solutions of solids in liquids, solutions of liquids in liquids or admixtures of liquids in solids with solids. The proportions of the different components of these systems are often expressed as "percentages" the term "percentages" in pharmaceutical calculations should be qualified to indicate whether the solution is weight in volume (W/V) weight in weight (W/W) or volume in volume (V/V).

Definitions

- "Percentage W/V indicates the number of grams of ingredient in 100 millilitres of product"
- The strength of a pharmaceutical solution of a solid in liquid is expressed as % W/V

Concentrations expressed as parts:

- The strength of some pharmaceutical solutions as expressed as "parts" of dissolved substance in "parts" of solution (e.g. 1/1000). In solutions of solids in liquid this means parts by weight (gm) in parts by volume (millliters) of final solution.
- In solutions of liquid in liquid, parts by volume (millliters) of dissolved liquids in parts by volume (millliters) of the final solutions.
- It is useful to convert "parts" into percentages e.g.
- 1 in 100 = 1%
- 1 in 200 = 0.5%
- 1 in 500 = 0.2%
- 1 in 800 = 0.125%
- 1 in 1000 = 0.1%

Route of Administration

(1) The Oral Route

- The oral route is used to obtain either systemic or local effects
- The drug formulated in either solid or liquid form is absorbed from gastro intestinal tract (G.I.T.)
- It is the commonly used route for drug administration

Advantages:

1- It is the simplest route of administration

2- Self administration of drugs can be carried out

3- It is the safest route of administration

Disadvantages:

1- The onset of action is relatively slow

2- Absorption from G.I.T. may be irregular

3- Certain drugs are destroyed by enzymes and other secretions found in G.I.T.

4- Drug solubility can be altered by presence of other substances in G.I.T. e.g. Calcium

5- Slow gastric emptying $\longrightarrow$ drug inactivation by prolonged contact with gastric juices specially in elderly peoples

6- It is unsuitable route in unconscious or vomiting patients

(2) The Buccal Route:

• A drug administered by this route is formulated as tablet

- The high vascularity of the tongue and bucchal cavity and the presence of saliva facilitates the dissolution of drug making this route highly effective

The tablets formulated for this route give quick onset of action

Advantages:

1-Relatively quick onset of action

2-Drugs absorbed directly into the systemic circulation avoiding the first pass effect

3-Drugs can be administered to unconscious patients

4-Antiemetic drug can be given by this route

(3) The sublingual route:

•For sublingual absorption, the area under the tongue is used. This gives a very fast onset of action but the duration is usually short.

(4) The Rectal Route:

•- For administration by this route, drugs are formulated as liquids (enemas) solid dosage forms (suppositories) and semisolids (creams – ointments)

•- This route is used for both systemic and local effects

- **Advantages:**

1- Can be used when the oral route is unsuitable e.g. vomiting, unconscious patient, elderly or mentally disturbed patients

2- Useful when the drug causes G.I.T. irritation

3- Can be used for local act

- **Disadvantage**
- 1- Absorption can be irregular ⟶ variable effect
- 2- Less convenient than oral route
- 3- Low patient acceptability

- **(5) The Vaginal Route:**

- For administration by this route, drugs are formulated as pessaries and oblong tablets (solid) or creams and ointments (semisolids) vaginal douches (liquid)

- - These are inserted into the vagina
- - This route can be used for both local and systemic effect
- **Advantages:**
- 1- Drugs from the vagina are not subject to the first pass effect
- 2- The higher fluid content in the vagina ⟶ drugs dissolution is more efficient than by the rectal route

(6) The Inhalation Route:

- In this route drugs are inhaled through the nose or mouth to produce either local or systemic effect
- This route is used mainly to treat respiratory conditions there fore drugs here are delivered to the site of action ⟶ lungs
- Because of the large surface area ⟶ rapid drug absorption

Advantages

1- The drug dose required to produce a systemic effect is much smaller than for the oral route

2- Reduction in side effects

(7) The Topical Route:

- This route means that the skin is used as the site of administration
- This route is mainly used for local effects
- The formulations used include ointments, Creams and pastes (semisolids) lotions (liquids)
- Recently specialized dosage forms are developed when applied to the skin give systemic action by passing through skin layers to the blood these called transdermal dosage forms (patches)

(8) The Parenteral Route:

•- This is the term used to describe drugs given by injection

Injections administered by many routes, which are described as follows:

•* Intera venous Route: i.v.

•- Drugs injected directly into the systemic circulation

•- This produces a very fast onset of action

•* Intera muscular Route: i.m.

•- Drugs injected into the muscle layers

•- Used to produce a fairly fast onset of action specially when formulated in liquid forms

•- A slower or prolonged action well occur when the drug is presented as suspension or in oily form

***Subcutaneous Route: S.C.**

•- Drugs are injected into the subcutaneous layer of the skin

•- Easiest and least painful type of injection

•- Slower onset of action but prolonged e.g. insulin

Pharmaceutical Dosage forms I

- **Definition:**
- Dosage forms is the form in which a drug is administered to or used by a patient such as tablets, capsules, injections …..etc.

Dosage forms classification

1. **Liquid Dosage forms**
   1. Sterile D.F.
2. Solutions
3. Injections
4. Suspensions
5. Emulsions

2. **Solid Dosage form**

1-Tablets

2-capsules

3.Molded D.F.

1- Suppositories

2- Pessarie

4. Semisolid D.F.

1. Ointment
2. Cream
3. Paste
4. gel

1- Solutions

- A group of preparations in which molecules of solute (solid, liquid & gas) are dispersed among those of the liquid solvent.
- Solutions used for specific therapeutic effect either internal or external
- Solutions can be classified according to the vehicle to

1- Aqueous 2- Non aqueous

- **Advantages:**

1. Easy to be used by pediatrics and geriatrics
2. More quickly effective than tablets and capsules
3. Give uniform dose than suspension (non need shacking)

- **Disadvantages:**

1. Less stable than solid dosage forms (hydrolysis and oxidation)
2. Difficult to mask unpleasant taste and odour
3. Bulky to carry around

Examples of aquous solution preparations

1- Aromatic water

- **2- Syrups**

(Sweet and / or viscid solution) are concentrated solutions of sugar as sugar in water:

  - Simple syrup: sugar in purified water only
  - Flavored syrup: when flavor is added to the syrup

3- Douches:

Are aquous solutions directed against a part or into cavity of the body used as cleansing or antiseptic agents such as eyes, pharyngeal and vaginal douches

4- Enemas:

- Rectal injection employed to evacuate the bowel. They may possess anthelmentic, nutritive, sedative properties

5- Gragles:

- Aquous solution containing antiseptics, antibiotics or anesthetics used to treat pharynx and nasopharynx

6- Mouth wash:

- Aquous solutions containing antibiotics and flavoring agents to produce plaque, dental caries……etc.

7- Nasal solutions:

- Aquous solutions designed to be administered to the nasal passages in drops or sprays and used to reduce nasal decongestion

8- Otic Solutions:

- Aquous solutions used for topical administration in ear

Non-aquous solution:

- "Are solutions containing minor quantities of the toxic solvents such as benzene, acetone…..etc."
  - External products will contain methanol, isopropanol, PEG, ethers…ect.
  - Internal products will contain ethanol, glycol and oils
- Examples of Non aquous solvents

1- Elixirs

2.Spirits

3- Glycerines

الصيدله:

- مهنه الصيدله: هي مهنه علميه تختص بتحضير الادويه فهي (علم + فن + صناعه)
- **نشاه مهنه الصيدله:**
- ارتبطت مهنه الصديله بحضارات كثيره في عصور مختلفها منها:
- عصر الدوله القديمه (٣٤٠٠ق.م.) و قد وضع اكثر من اربعون مؤلفا في الطب و العلاج
- نهايه الدوله المتوسطه (١٧٨٨الي ١٥٨٠ ق.م.) و حتي بدايه الدوله الحديثه (١٥٨٠ الي ١٥٥٧ ق.م.) تلاشت كل معالم الحضاره المصريه و اختلطت بكثير من حضارات الشرق
- دخل الفرس بين عام ٥٢٥ حتي ٣٣٢ ق.م. و تم فتح الاسكندر الاكبر عام ٣٣٢ ق.م.
- دخلت مصر الامبراطوريه الرومانيه عام ٣٠ بعد الميلاد
- فتح مصر العرب عام ٤٦٠ بعد الميلاد
- **الجدير بالذكر ان الفراعنه قد عرفوا مهنه الصيدله من خلال نظريتان:**
- الاولي: وجود الكاهن محضر الاعشاب
- الثانيه: وجود الطبيب الذى يحضر التذكره الطبيه
- **كما كان لدي قدماء المصرين قسمان من المختصين بالعمل الصيدلي:**
- الموظفون المختصون وهم رؤساء المحضرون و هم يشرفون علي حفظ العقاقير
- الفنيون الذين يتولون جمع و قطف النباتات الطبيه

- **فوائد دراسه تاريخ الصيدله:**
- الكشف عن تاريخ علمي يفخر به الشرق عامه و مصر خاصه
- تبصير العالم بما كانت عليه مصر من رقي حضاري
- دراسه فوائد العقاقير المختلفه
- معرفه مدي تداخل علوم الصيدله مع العلوم الاخري كالسحر و الفلك و العقاقير الدينيه
- دراسه تاريخ الامراض و صناعه الدواء و مستحضرات التجميل
- **الصيدله عن قدماء المصرين و العرب**
- حملت لنا الاثار المصريه القديمه و اوراق البردي و مؤلفات الباحثين ما يثبت تفوق الانسان المصري في العلوم
- وضع ابو قراط في قسمه الشهير فقره عن الصيدلي قال فيها "عدم اعطاء دواء فيه خطر علي صحه الانسان"
- جاء في احد كتب تاريخ الطب في صفحه ١٧٤ ان العقاقير اليونانيه كتبت و يرجع كثير منها بلاشك الي الطب المصري القديم في الكتب المقدسه للاله توت و هي مكونه من ٢٢ برديه منها ٦ تختص بالطب

- **التدرج فى نشاه مهنه الصيدله:**
- تدرجت مهنه الصيدله من العشاب الي العطار ثم الي الصيدلي
- بداء العشابون يكتبون علومهم علي لوحات من الطين كما حدث في بابل و يكتبونها في مصر علي شرائح من البردي كما حدث في مصر ثم تطورت صناعه العشاب و نشات من هذه مهنه صناعه العطاره
- كلمه الصيدله (بالافرنجيه Pharmacy) اصلها هندي و نقلت عن الفرس علي هيئه جندل ثم جندن ثم حرفت الي صندل ثم الي صندن
- الصيدله بالعربيه معناها بيع العطر و الادويه
- العقار هو النبات الذى يعقر الابل في الصحراء و يسمها
- اقربازين: لفظ فارسى يعني فن تركيب الدواء
- في عصر النهضه ظهرت مصطلحات طبيه و صيدليه لازالت تستخدم حتي الان مثل:-
- العقار= Drug = Medicine
- دواء او سم = Medicamentus
- **الالهه العشابين فى مصر القديمه:**
- اوزوريس
- ايموحتب و رع
- عمل إيموحتب مهندسا و وزيرا و طبيبا للملك زوسر و لقب بالكاهن الاعظم

نماذج لمشاهير العرب فى الصيدله و اهم مؤلفاتهم

١. الكندي: - في العصر العباسى

له كتاب: معرفه قوي الادويه و المفرده و هو يحتوي علي وصفات علاجيه

٢. العبادى: - في العصر العباسى

له كتاب العشر مقالات في العين و كتاب المسائل في الطب

٣. المجوسى: - في العصر العباسى

له كتاب الملكي (كامل الصناعه في الطب) و هو من جزئين و الجزء الثاني خاص بالصيدله

٤. أبو بكر الرازي:- في العصر العباسى

كتاب الحاوي و المنصوري سر الاسرار

يعتبر حجه الطب في اوروبا حتي القرن السابع عشر الميلادي

اول من استخدم امعاء القطط في الخيوط الجراحيه

قام بتحضير حمض الكبرتيك و الكحول

٥. الشيخ الرئيس ابن سينا: - في العصر العباسى

- له كتاب القانون في الطب – اساس تعليم الطب

٦.داوود الانطاكي: - في القرن العاشر هجري

- له كتاب تذكره اولي الالباب و الجامع العجب العجاب

- **النباتات الطبيه الفرعونيه**

١. عثر علي "المر" في توابيت الموتي عند القدماء المصرين مع ادوات التحنيط و لم يكن المر ينمو في مصر بل كانوا يحضرونه من الصومال و السعوديه
٢. عثر علي "الفجل" في مقابر الاسره ١٢ و قد استعمل زينه في التحنيط
٣. "الحنظل" استخدم كطارد للديدان و(الامراض العيون و الالتهاب كلبخه مع ماده النطرون و استعمل ايضا ضد افراز الدموع مع سلفات النحاس
٤. عثر علي حبات الخس مرسومه علي المقابر و ذكر كرمز للخصوبه و استعمل ايضا لقتل الديدان
٥. استعمل المصريون القدماء زيت الخروع كدهان للشعر و مسهل و كزيت للاضاءه
٦. استعمل البصل كمرهم لعلاج الالام و كانوا ياكلونه كثير و لكنه حرم علي الكهنه
٧. استعمل الثوم للنزلات المعويه و البرد و تقويه الاعصاب

٨. استعمل الترمس كمدر للبول و مع الحلبه للامراض الجلديه و لنعومه الجلد و قد استعمل المسحوق لطرد الديدان و الصداع
٩. -استعمل زيت الحلبه في برديه (اودين سميث) كدهان للوجه و استعمل بعد طحنه مع التين و البلح و الزبيب للكحه و قد استعمل ماء الحلبه كقطره مع ماء الورد كقطره للعين
١٠. - قد استعملت حبه البركه لانتفاخ البطن و الكبد و كان يخلط مع الحساء للصداع و قد استعمل بذر الكتان للقراع و كذلك لعلاج البهاق مع العسل
١١. -استخدم قدماء المصرين بذور الملوخيه في الحميات و امراض الكبد
٢١. -استخدم المصريون القدماء الكمون كمسهل و طارد للرياح و غيار الجروح
٣١. -استخدم قدماء المصريون الكسبره كطارد للديدان

المدارس الطبيه فى مصر القديمه (بيوت الحياه)

- تطورت المدارس الطبيه من مصر القديمه الي مصر الحديثه كالاتي:
- كان يوجد في مصر منذ اكثر من ٣٠٠٠ عام قبل الميلاد مدرسه للعشابين و من اهمها مدرسه منف
- ارتفع شان المدارس الطبيه و عرفت باسم بيت الحياه
- انتقلت الحضاره الطبيه العلميه الي مدينه الاسكندريه في عام ٣٠٠٠ ق.م. و قد انشئت مدرسه جامعه الاسكندريه علي يد بطليموس الاول و كانت مكتبه الاسكندريه اعظم مكتبه مرجعيه و برز علم التشريح و علم وظائف الاعضاء
- دخلت المسيحيه مصر و انتقلت الثقافه الطبيه و الصيدليه الي الاديره لعلاج المرضي

- **المدارس الطبيه فى مصر الحديثه**
- انشا كلوت بك عام ١٨٢٤ مستشفى في ابي زعبل تسع بين ٨٠٠ الي ١٠٠٠ مريض احضر لها حوالي ١٥٠ صيدلي و طبيبا و مساعدا معظمهم من ايطاليا و فرنسا
- انشاء كلوت بك في سنه ١٩٢٧ مدرسه طبيه للاطباء و الصيادله و الاطباء البيطرين بابي زعبل
- بني أحمد بن العيني القصر العيني و نقل اليه مدرسه الطب و المستشفي من ابي زعبل و انشا مدرسه الصيدله الحديثه و بلغ عدد الطلبه ١٤٠ طالب طب و ٥٠ طالب صيدله
- في عام ١٩٥٥ – ١٩٥٦ صدر مرسوم بجعل مدرسه الصيدله كليه مستقله ثم تم انشاء كليه الصيدله بجامعه الاسكندريه
- **مدرسه مساعدي الصيادله:**
- في عام ١٩١٢ تم منح ١٢٠ شخصا لا يحملون اى شهدات تصاريح مزاوله مهنه مساعد صيدلي لمسعده الصيادله و في عام ١٩١٤ – ١٩٢٥ تم فتح فرع خاص بالمدرسه الطبيه لتخريج مساعدي الصيادله و اغلقت المدرسه عام ١٩٢٥
- و في عام ١٩٥٥-١٩٥٦ اعيد افتتاحها و جعل شرط القبول بها شهاده الثانويه العامه و مده الدراسه سنتين ثم اقفلت مره اخري عام ١٩٦٤