

hospital, based upon their drug utilization patterns. Hence scope of the clinical pharmacy is of almost appreciation in following areas:

1. Drug Information

The provision of drug information is the foundation of clinical pharmacy practice. The pharmacist must realize the importance of literature and utilize the information retrieval techniques to make data available in a rapid efficient manner. The drug information centers can be tremendous resource and which serves as data bank of important information. The drug information not only provided by verbal discussion but also provided via an intrahospital news letter, in-service education and community lectures.

2. Drug Utilization

The pharmacist has a professional obligation to monitor drug utilization. He should be ever mindful about (1) Drug abuse (2) Abnormal prescribing patterns (3) Drug – Drug interactions (4) Drug – food interactions (5) drug – laboratory test interactions.

3. Drug Distribution

The pharmacist must have complete understanding and appreciation of the various drug distribution systems are essential for communication with other health professionals and public regarding unit-dose packaging, unit-dose systems of distribution and control procedures.

4. Drug Evaluation and Selection

The pharmacist becomes a valuable resource person in the selection of drugs for various diseases states and he can provide unique services in evaluating the formulation of various dosage forms. Pharmacists with knowledge of Biopharmaceutics and the ability to apply this knowledge for the patients benefit can provide a unique service in drug evaluation and selection.

5. Pharmacy Education and Teaching

The pharmacists have fundamental knowledge and expertise that should be shared with all those involved in drug storage, preparation, prescribing and administration.

Table 2 summarizes the changes that occur with aging and the possible pharmacokinetic effect in the elderly patients.

Table 2. Factors Altering Drug Response in the Elderly

Age-Related Changes	Effect on Drug Therapy
Decrease gastric acidity, decreased gastric motility	Possible decrease or delayed absorption
Dry mouth and decreased saliva	Difficulty swallowing oral drugs
Decreased liver blood flow, decreased liver mass	Delayed and decreased metabolism of certain drugs, possible increased effect, leading to toxicity
Decreased lipid content of content of the skin	Possible decrease in absorption of transdermal drugs
Increased body fat, decreased body water	Possible increase in toxicity of water-soluble drugs, more prolonged effects of fat-soluble drugs
Decreased serum proteins	Possible increased effect and toxicity of highly protein-bound drugs
Decreased renal mass, blood flow, and glomerular filtration rate	Possible increased serum levels, leading to toxicity of drugs excreted by the kidney
Changes in sensitivity of certain drug receptors	Increase or decrease in drug effect

2.5 DRUG USAGE IN PREGNANCY AND LACTATION

Objectives

- To discuss the reasons for avoiding, or minimizing drug therapy during pregnancy and lactation.
- Describe the selected teratogenic drugs.
- Outline the guideline for drug therapy of pregnancy-associated signs and symptoms.

the therapeutic level. Toxic levels build up when a drug is administered in dosages that exceed the normal level or if the patient's kidneys are not functioning properly and cannot excrete the drug. Some toxic effects are immediately visible; others may not be seen for weeks or months. Some drugs, such as lithium or digoxin, have a narrow margin of safety, even when given in recommended dosages. It is important to monitor these drugs closely to avoid toxicity.

Drug toxicity can be reversible or irreversible, depending on the organs involved. Damage to the liver may be reversible because liver cells can regenerate. However, hearing loss due to damage to the eighth cranial nerve caused by toxic reaction to the anti-infective streptomycin may be permanent. Sometimes drug toxicity can be reversed by the administration of another drug that acts as an antidote. For example, in serious instances of digitalis toxicity, the drug Digibind may be given to counteract the effect of digoxin toxicity.

Nurses must carefully monitor the patient's blood levels of drugs to ensure that they remain within the therapeutic range. Any deviation should be reported to the primary health care provider. Because some drugs can cause toxic reactions even in recommended doses, the nurse should be aware of the signs and symptoms of toxicity of commonly prescribed drugs.

Pharmacogenetic Reactions

A **pharmacogenetic disorder** is a genetically determined abnormal response to normal doses of a drug. This abnormal response occurs because of inherited traits that cause abnormal metabolism of drugs. For example, individuals with glucose-6-phosphate dehydrogenase (G6PD) deficiency have abnormal reactions to a number of drugs. These patients exhibit varying degrees of hemolysis (destruction of red blood cells) if these drugs are administered. More than 100 million people are affected by this disorder. Examples of drugs that cause hemolysis in patients with a G6PD deficiency include aspirin, chloramphenicol, and the sulfonamides.

Most cases of hypertension have no known cause. When there is no known cause of hypertension, the term **essential hypertension** is used. Essential hypertension has been linked to certain risk factors, such as diet and lifestyle. Following are the risk factors which, associated with hypertension.

- Smoking
- Age (women older than 65 years and men older than 55 years of age)
- Obesity
- Diabetes
- Lack of physical activity
- Chronic alcohol consumption
- Family history of cardiovascular disease
- Sex (men and postmenopausal women)

In the United States, African-Americans are twice as likely as Caucasians to experience hypertension. After age 65 years, African-American women have the highest incidence of hypertension. Essential hypertension cannot be cured but can be controlled. Many individuals experience hypertension as they grow older, but hypertension is not a part of healthy aging. For many older individuals, the systolic pressure gives the most accurate diagnosis of hypertension.

Once essential hypertension develops, management of this disorder becomes a lifetime task. When a direct cause of the hypertension can be identified, the condition is described as **secondary hypertension**. Among the known causes of secondary hypertension, kidney disease ranks first, with tumors or other abnormalities of the adrenal glands following. In **malignant hypertension** the diastolic pressure usually exceeds 130 mm Hg. In secondary hypertension, taking care of the medical condition causing the hypertension results in the patient regaining a normal blood pressure.

Malignant hypertension is a dangerous condition that develops rapidly and requires immediate medical attention. Patients with malignant