FACTORS AFFECTING MEDICATION ADMINISTRATION

When administering medications, certain factors must be considered to ensure that, as a health-care professional, you are following the seven rights. These factors include the following: nutrition and physical activity; age, gender, and culture; environment; pregnancy; and organ dysfunction.

Nutrition and Physical Activity Factors

Nutrition can affect how well a drug is absorbed. Some nutrients are needed for absorption, and some block absorption. For instance, administering tetracycline (an antibiotic) with calcium prevents the absorption of tetracycline. Most antibiotics work best when taken on an empty stomach. Food high in vitamin B_6 can impair the actions of drugs used to treat Parkinson's disease. Grapefruit juice inhibits the effectiveness of some drugs (fexofenadine), while potentiating or increasing the drug in the bloodstream (certain statins and blood pressure medications) if both are ingested at the same time. A patient who is dehydrated may have a medication blood level that is higher than normal. Consult your drug reference for any food interactions that the patient should be made aware of before a new medication is begun.

Exercise can influence metabolism and cause medications to be absorbed more quickly. Exercise also decreases the need for insulin and is used to control blood glucose concentrations in patients with diabetes. Chewing gum increases saliva, which enhances food breakdown and absorption.

Drug dosing is usually based on total body weight. Normal doses are based on an average adult body weight of 70 kg (about 150 lb). However, size and distribution of fat in the patient can change the way the drug is processed. If a drug that does not penetrate fatty tissues is used in obese patients, the dose may have to be higher than usual.

Similarly, underweight patients may need smaller amounts of drugs because of their lower body weight. Patients with amputated limbs also require lower doses because of lower body weight.

Age

In general, drug administration guidelines are based on the average adult patient. However, a health-care professional must consider two distinctive populations when administering medications: the elderly, or **geriatric,** population and the young, or **pediatric,** population.

Geriatric Patients

In patients older than 55 years of age, decreased absorption results from diminished gastrointestinal function and congestion of abdominal blood vessels. Distribution can also be altered by low plasma protein levels, particularly if the patient is malnourished. When plasma proteins are decreased, a larger amount of unbound drug increases the drug's action. Thus, elderly patients can have toxic drug levels, even at normal doses. The aging process also alters liver and kidney function and leads to accumulation of medications. Body composition changes as we age. Elderly patients have increased fatty tissue and decreased skeletal muscle and water. All these age-related changes slow drug absorption and distribution.

Because of these factors, doses may need to be adjusted for elderly patients and may vary greatly among older individuals. Of special concern are sedative-hypnotics, anticoagulants, nonsteroidal anti-inflammatory drugs (NSAIDs), **antihypertensives** (drugs that lower blood pressure), and **thrombolytics** (drugs that break up blood clots). These medications are most commonly associated with adverse drug events. For example, sedative-hypnotics may be used to calm a patient, but they can worsen agitation and exacerbate dementia.

Another concern for geriatric patients is **polypharmacy,** defined as taking medications for more than one problem. Multiple medications increase the risk for drug interactions and side effects. The health-care professional must spend more time educating elderly patients because their treatment regimens are often more complex, and it may take these patients more time to understand the specifics of each medication.