Sample Assignment for:
CLINICAL DECISION MAKING
Case Studies in Pharmacology
Hyacinth C. Martin
Borough of Manhattan Community College
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Softcover, 2 Color

Difficult

SAMPLE ASSIGNMENT FOR A PHARMACOLOGY CASE STUDY

Prior to lab all students read the case study about Mr. Y and answer the questions. Divide the students into four groups to discuss differing aspects of Mr. Y’s case. One group will research the potential effects Mr. Y’s anxiety and depression may have on his current health status addressing both the psychosocial implications and the physiological impact anxiety and depression may have on a person’s health. The second group will research the benefits and potential adverse effects of pain management for the client. This should include the impact pain has on both physiological stress and psychosocial stress and how this can affect the healing process. Group 3 will research potential impact of Mr. Y’s family history of maternal diabetes mellitus and paternal PVD on his current diagnoses of peripheral vascular disease and osteomyelitis and what the nurse’s role is in collaborating with the health care provider to prescibe diagnostic testing to determine if Mr. Y has any indications of diabetes mellitus. What diagnostics would be appropriate to determine this? Group 4 will research the impact of Mr. Y’s decreased mobility on his overall health including skin integrity, psychosocial impact, nutrition, role performance, and so on. All groups will present their findings and address the nurse’s role in each of these.

Additional cases provide the opportunity to address a wide variety of pharmacological classifications and agents used as standards of care for a diversity of health alterations. The focus of the care studies is to stimulate critical thinking on the part of the reader. Understanding the nursing implications and why these are so important to the health and welfare of clients is a thread throughout the case studies as well as the depth of knowledge nurses must have related to pharmacological and adjunctive therapies.
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Reviewers

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Preface

Thomson Delmar Learning’s Case Study Series was created to encourage nurses to bridge the gap between content knowledge and clinical application. The products within the series represent the most innovative and comprehensive approach to nursing case studies ever developed. Each title has been authored by experienced nurse educators and clinicians who understand the complexity of nursing practice as well as the challenges of teaching and learning. All of the cases are based on real-life clinical scenarios and demand thought and “action” from the nurse. Each case brings the user into the clinical setting and invites her to utilize the nursing process while considering all of the variables that influence the client’s condition and the care to be provided. Each case also represents a unique set of variables to offer a breadth of learning experiences and to capture the reality of nursing practice. To gauge the progression of a user’s knowledge and critical thinking ability, the cases have been categorized by difficulty level. Every section begins with basic cases and proceeds to more advanced scenarios, thereby presenting opportunities for learning and practice for both students and professionals.

All of the cases have been expert reviewed to ensure that as many variables as possible are represented in a truly realistic manner and that each case reflects consistency with realities of modern nursing practice.

How to Use This Book

Every case begins with a table of variables that are encountered in practice, and that must be understood by the nurse in order to provide appropriate care to the client. Categories of variables include age, gender, setting, culture, ethnicity, cultural considerations, preexisting conditions, coexisting conditions, communication considerations, disability considerations, socioeconomic considerations, spiritual considerations, pharmacological considerations, psychosocial considerations, legal considerations, ethical considerations, alternative therapy, prioritization considerations, and delegation considerations. If a case involves a variable that is considered to have a significant impact on care, the specific variable is included in the table. This allows the user an “at-a-glance” view of the issues that will need to be considered to provide care to the client in the scenario. The table of variables is followed by a presentation of the case, including the history of the client, current condition, clinical setting, and professionals involved. A series of questions follows each case that ask the user to consider how she would handle the issues presented within the scenario.

Organization

Cases are grouped according to body system. Within each part, cases are organized by difficulty level from easy, to moderate, to difficult. This classification is somewhat subjective, but it is based upon a developed standard. In general, difficulty level has been determined by the number of variables that impact the case and the complexity of the client’s condition. Colored tabs are used to allow the user to distinguish the difficulty levels more easily. A comprehensive table of variables is also provided for reference, to allow the user to quickly select cases containing a particular variable of care.

While every effort has been made to group cases into the most applicable body system, the scope of many of the cases may include more than one body system. In such instances, the case will still only appear in the section for one of the body
Case Studies

Product Sampler

Preface

systems addressed. The cases are fictitious; however, they are based on actual problems and/or situations the nurse will encounter. Any resemblance to actual cases or individuals is coincidental.

“[This text’s] strength is the large variety of case studies – it seemed to be all inclusive. Another strength is the extensiveness built into each case study. You can almost see this person as they enter the ED because of the descriptions that are given.”

—MARY BETH KIEFNER, RN, MS
Nursing Program Director/Nursing Faculty,
Illinois Central College

“The cases . . . reflect the complexity of nursing practice. They are an excellent way to refine critical thinking skills.”

—DARLA R. URA, MA, RN, APRN, BC
Clinical Associate Professor, Department of
Adult and Elder Health Nursing, School of
Nursing, Emory University

“This text does an excellent job of reflecting the complexity of nursing practice.”

—VICKI NEES, RNC, MSN, APRN-BC
Associate Professor,
Ivy Tech State College

“. . . the case studies are very comprehensive and allow the undergraduate student an opportunity to apply knowledge gained in the classroom to a potentially real clinical situation.”

—TAMELLA LIVENGOOD, APRN, BC, MSN, FNP
Nursing Faculty,
Northwestern Michigan College

“These cases and how you have approached them definitely stimulate the students to use critical-thinking skills. I thought the questions asked really pushed the students to think deeply and thoroughly.”

—JOANNE SOLCHANY, PhD, ARNP, RN, CS
Assistant Professor,
Family & Child Nursing,
University of Washington, Seattle

“The use of case studies is pedagogically sound and very appealing to students and instructors. I think that some instructors avoid them because of the challenge of case development. You have provided the material for them.”

—NANCY L. OLDENBURG, RN, MS, CPNP
Clinical Instructor,
Northern Illinois University
“[The author] has done an excellent job of assisting students to engage in critical thinking. I am very impressed with the cases, questions and content. I rarely ask that students buy more than one . . . book . . . but, in this instance, I can’t wait until this book is published.”

—DEBORAH J. PERSELL, MSN, RN, CPNP
Assistant Professor,
Arkansas State University

“This is a groundbreaking book. . . . This book should be a required text for all undergraduate and graduate nursing programs and should be well-received by faculty.”

—JANE H. BARNSTEINER, PhD, RN, FAAN
Professor of Pediatric Nursing,
University of Pennsylvania School of Nursing

About the Author

Hyacinth C. Martin was first influenced by her elementary school teacher in choosing nursing as a career. However, the major influential persons in her choice of nursing as a career were nurses who wore white uniforms, white shoes, including nursing hats, and who seemed to have generated the highest respect from those they came in contact with. Hyacinth’s nursing career includes staff nurse experiences on medical-surgical units, head nurse/nurse manager for medical-surgical units and critical-care units, administrative nursing supervisor, community nursing, and administrative nursing supervisor in long-term care agencies. Her academic experiences include teaching theory and clinical in a Licensed Practical Nursing program, a Baccalaureate Degree Program and at present in an Associate Degree program. In 1999, Hyacinth was a guest speaker on WMBC-TV (Channel 63, Newton, NJ), discussing issues pertaining to multiculturalism, with a focus on multicultural marriage and its effects on the family.

Publications include two articles for a nursing journal, one manuscript for Continuing Medical Education Resource, and part of a chapter on the endocrine system, published by Thomson Delmar Learning. She has also reviewed a chapter in Pharmacology for Nursing Care, Richard A. Lehne (5th ed.), and revised PowerPoint for Pharmacology for Nursing Care (6th ed.) and an instructor’s manual. She was a contributor for Gerontological Nursing Textbook (2006), P. A. Tabloski.

Her contributions to education include recent presentations: “Pulmonary Tuberculosis: Controlling the Transmission of the Disease,” at PACE University Conference; “Civic Society, Environmental Responsibility, & Sustainable Development in the United States & Brazil,” presented at the Manhattan Veteran’s Hospital Medical Center Conference, New York; and “The Effective Use of Unfractionated and Fractionated Heparin Therapy to Patients at Risk for Thrombus Formation” and “Nurse’s Nurturing Nurses,” presented at Lincoln Hospital Medical Center, New York.

Achievements

Hyacinth Martin was recognized in Who’s Who Among American Teachers for four successive years. A current recipient of a PSC-CUNY Grant for research on Gender and Career Choice in Nursing, she is a full-time tenured professor in the nursing program at Borough of Manhattan Community College/The City University of New York. Her passion in teaching is to assist in the success of students who enroll in the nursing program at Borough of Manhattan Community College.
Hyacinth’s other contributions (along with her husband’s) to the welfare of others include adopting a basic school in one of the West Indian islands, and sponsoring a nursing student in Davao City, Philippines. Hyacinth earned a BSN degree and a Master’s Degree in Career Guidance and Counseling from Lehman College, a Master’s Degree in Nursing Administration from Columbia University, and a Master’s Degree in Urban Education/Theology from NYACK College, New York. She is currently pursuing a doctoral degree in theology.

Acknowledgments

I want to express my sincere thanks to Elizabeth Howe, Product Manager, for the professional manner in which she communicated with me both verbally and by e-mail. I also want to thank the entire editorial staff at Thomson Delmar Learning for guidance in writing this text. I wish to record my thanks to the accuracy reviewer, Bonita E. Broyles, RN, BSN, EdD. Your excellent guidance removed much of the stress that writing the text generated. A special thanks to Reverend Florentina Lapsey and Professor Louise Green for their constant prayers as I pursued the task of research and writing the text. I am grateful to Dr. David Ephraim for his encouragement and the many hours spent making sure computers and laptops were functioning, and lost content restored. Lastly, thank you, Professor Boyle-Egland for that special moment of support as the text was entering its final stage.

This book is dedicated to:

My granddaughter, Nardia – May you also become the author of many books.

My husband, Frederick, a retired registered nurse himself, in recognition of all that I owe him for his patience and understanding as he took on the responsibility of most of the household chores to enable me to accomplish this goal. It is my hope and prayer that this modest work will assist nursing students to better understand the content of medical-surgical nursing and, in so doing, help them to appreciate more of the incredible writings of nurse authors.

Hyacinth C. Martin
Comprehensive Table of Variables
## Comprehensive Table of Variables

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CASE STUDY 3

Osteomyelitis of Left Foot

GENDER
M

AGE
64

SETTING
Hospital

ETHNICITY/CULTURE
White American

PREEXISTING CONDITIONS
Status-post femoral-popliteal bypass

COEXISTING CONDITIONS
Peripheral vascular disease

LIFESTYLE
CPA

COMMUNICATION
English

DISABILITY
Decreased mobility

SOCIOECONOMIC STATUS
Middle

SPIRITUAL/RELIGIOUS
Lutheran

PHARMACOLOGIC
Ticarcillin disodium/clavulanate potassium (Timentin)

PSYCHOSOCIAL
Anxiety
Depression

LEGAL

ETHICAL

ALTERNATIVE THERAPY

PRIORITIZATION
Antibiotic therapy
Promote wound healing

DELEGATION
RN
Client education

THE MUSCULOSKELETAL AND REPRODUCTIVE SYSTEMS

Level of difficulty: Easy
Overview: This case involves assessment of the client’s present problems. The nurse must be knowledgeable about osteomyelitis and the need for immediate medical and nursing interventions to prevent systemic complications and chronic osteomyelitis. The case involves pain management and antibiotic administration with knowledge of unintended effects of analgesic and antibiotic medications, and interventions for these effects.
Client Profile

Mr. Y is a 64-year-old certified public accountant who was discharged from the hospital three weeks ago after amputation of the left great toe related to complete loss of circulation in his extremity. Mr. Y is married and has a 28-year-old daughter in college. His wife is an elementary school teacher. He and his family own a three-bedroom co-op in a newly developed neighborhood.

Case Study

Mr. Y’s past medical history includes hypertension and arterial insufficiency. He is status-post (S/P) femoral-popliteal bypass three weeks ago. His family history includes diabetes mellitus (mother) and hypertension and peripheral vascular disease (father). Mr. Y reports that both he and his wife have good health insurance and that he receives a salary while recuperating from surgery. However, he says he is concerned about the continuation of his salary, which is dependent on the length of time the infection will take to heal. Vital signs are:

- Blood pressure: 140/94
- Pulse: 94
- Respiration: 20
- Temperature: 101.4°F

The entire foot is tender and warm to touch. There is a moderate amount of mildly odorous drainage coming from the wound. The nursing history and physical examination is completed by the nurse, after which the health care provider reviews the data, asks the client about history of allergies, which the client denies. The health care provider continues the history and physical examination, and a specimen from the infected site is sent to the lab for analysis. The following diagnostic studies are ordered: radionuclide bone scan of the left foot, and a magnetic resonance imaging (MRI), blood culture and gram stain, culture and sensitivity of the wound, white blood cell (WBC) count with differential, and erythrocyte sedimentation rate (ESR). The bone scan reveals infection of the bone marrow, and the MRI identifies calcification of the bones of the foot and provides definitive diagnosis for osteomyelitis. The blood culture and gram stain are positive for P. aeruginosa and Staphylococcus aeruginosa. WBC with differential reveals:

- White blood cell (WBC) count: 13,000/mm³
- Neutrophils: 82%
- Eosinophils: 4%
- Basophils: 2%
- Lymphocytes: 43%
- Monocytes: 8%
- Erythrocyte sedimentation rate (ESR): elevated, 90%

After the multidisciplinary team reviews the diagnostic studies, a diagnosis of osteomyelitis of the left foot is confirmed; the findings are discussed with the client; and plans for surgical debridement are decided upon by the team and Mr. Y. The debridement is done and the surgical plan is to implement high doses of parenteral antibiotics initially followed by oral antibiotics and serial bone scans. Specific orders are written for the surgical team to change the wound dressing during daily rounds.
The following are prescribed:

- Ticarcillin disodium/clavulanate potassium (Timentin) 3.1 g IV q4h
- 0.9% NaCl at 100 mL per hour
- Vitamin A (Aquasol A) 15,000 IU daily
- Vitamin C (ascorbic acid) 500 mg PO two times per day
- ESR, hemoglobin, WBC, albumin levels

Questions

1. Discuss the pathophysiology of osteomyelitis.
2. Discuss groups of persons in whom osteomyelitis is most difficult to manage.
3. Discuss indirect and direct osteomyelitis.
4. Discuss the organism that is the most common cause of osteomyelitis.
5. Discuss the psychosocial impact of the client’s amputation on his well-being and the risk that further surgery may be necessary.
6. Discuss common nursing diagnoses for clients with osteomyelitis.
7. What are the purposes for the prescribed orders?
8. What are the most common adverse reactions, drug-to-drug, drug-to-food/herbal interactions for the prescribed medications?
9. Discuss discharge instructions for the client with osteomyelitis.
Questions and Suggested Answers

1. **Discuss the pathophysiology of osteomyelitis.** Osteomyelitis is a pyogenic infection of the bone, bone marrow, and surrounding tissue. Aerobic gram-negative bacteria alone or mixed with gram-positive organisms are often found. The infecting organisms can invade by indirect or direct entry. After gaining entrance to the bone by way of the blood, the microorganisms then lodge in an area of bone in which circulation is slow. Chronic osteomyelitis is either a continuous, persistent problem (a result of inadequate acute treatment) or a process of exacerbations and remission.

2. **Discuss groups of persons in whom osteomyelitis is most difficult to manage.** Obesity is a serious health risk and has been associated with increased risk of mortality and morbidity. The mechanisms behind the obesity co-morbidities are not completely understood, but it is clear that the insulin resistance that is typical of truncal obesity is also associated with hypertriglyceridemia. Both the obesity and the hypertriglyceridemia interfere with tissue perfusion. If bone injury occurs and blood supply is impaired, over a period of time, infection of the bone will develop. Persons who are malnourished, or have a history of alcoholism or liver failure are the most difficult because of their immunocompromised status.

3. **Discuss indirect and direct osteomyelitis.** The *indirect entry* (hematogenous) of microorganisms in osteomyelitis most frequently affects growing bone in boys less than 12 years old, and is associated with their higher incidence of blunt trauma. Adults with vascular insufficiency disorders (e.g., diabetes mellitus) and genitourinary and respiratory infections are at higher risk for a primary infection to spread via the blood to the bone. The pelvis and vertebrae, which are vascular-rich sites of bone, are the most common sites of infection. *Direct entry* osteomyelitis can occur at any age when there is an open wound (e.g., penetrating wounds, fractures) and microorganisms gain entry to the body.

4. **Discuss the organism that is the most common cause of osteomyelitis.** The organism that is the most common cause of osteomyelitis is *Staphylococcus aureus*. It is a nonmotile gram-positive bacterium that is normally found on the skin and in the throat. However, life-threatening *staphylococcal* infections may arise within hospitals, and are frequently responsible for osteomyelitis and other infectious diseases. *Staphylococcus aureus* infections have become increasingly more difficult to treat due to the development of resistance to penicillin-related antibiotics. These bacteria are called *methicillin-resistant Staphylococcus aureus* (MRSA).

5. **Discuss the clinical manifestations of acute and chronic osteomyelitis.** *Acute osteomyelitis* refers to the initial infection or an infection of less than one month in duration. The systemic clinical manifestations include fever, night sweats, chills, restlessness, nausea, and malaise. Local manifestations include constant bone pain that is unrelieved by rest and worsens with activity. The clinical manifestations of chronic osteomyelitis include constant bone pain and swelling, tenderness, and warmth at the infection site.

6. **Discuss common nursing diagnoses for clients with osteomyelitis.**

   - Acute pain R/T inflammatory process secondary to infection – The nurse should prioritize care by focusing on the client’s complaint of pain, assessing location, and intensity of the pain with the use of a pain scale. Analgesics should be implemented on time as scheduled, and the client should be instructed to request pain medication before the pain becomes too severe. Elevation of the extremity will reduce swelling, if present, and promote comfort.

   - Impaired physical mobility R/T pain – The nurse should assist the client as needed to reduce the client’s frustration with impaired mobility, and to prevent injury. Assistive devices (e.g., long-handed shoehorn, socks helpers, pick-up stick) should be used to increase independence in activities of daily living.

   - Ineffective therapeutic regimen management R/T lack of knowledge regarding long-term management of osteomyelitis – The nurse must provide information and instruction regarding wound care, aseptic technique, and dressing disposal to reduce the risk of cross-contamination and encourage wound healing. The nurse should also review drug regimen including schedule, name, dosage, purpose, and side effects, because long-term antibiotic therapy is required.

The following are prescribed:

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- 0.9% NaCl at 100 mL per hour
- Vitamin A (Aquasol A) 15,000 IU daily
- Vitamin C (ascorbic acid) 500 mg PO two times per day
- ESR, hemoglobin, WBC, albumin levels
7. What are the purposes for the prescribed orders? *Ticarcillin disodium/clavulanate potassium* is an extended-spectrum penicillin and beta-lactamase inhibitor used to treat bone infections. It destroys the organisms, halting the infectious process by interfering with synthesis of mucopolypeptides essential to formation and integrity of bacterial cell wall, resulting in the death of organisms. Intravenous therapy is to aid with hydration status and as an adjunct to antibiotic therapy. *Vitamin A* is a fat-soluble vitamin supplement that enhances wound healing by providing collagen synthesis, and improving immune response. *Vitamin C* is a water-soluble vitamin supplement that enhances wound healing and capillary wall integrity by increasing collagen formation and protecting mechanisms of the immune system, which supports wound healing. The *ESR* helps to assess the client’s inflammatory status, and the infectious and necrotic process in relationship to antibiotic management. This is seen with elevation of the levels if the infectious process continues in the presence of the antibiotic therapy, or it decreases and returns to normal when the infectious process responds effectively to the antibiotic regimen. The *hemoglobin* reveals the blood’s oxygen-carrying capacity and helps determine the significance of oxygen to the involved tissues. An *elevated WBC count* indicates infection and helps with the management of wound care.

The *albumin levels* indicate the nutritional status of the client and the need for modification of treatment.

8. What are the most common adverse reactions, drug-to-drug, drug-to-food/herbal interactions for the prescribed medications? The most common adverse reactions of *ticarcillin disodium/clavulanate potassium* are diarrhea, risk of anaphylaxis, epigastric distress, nausea, vomiting, hypernatremia, hypokalemia, headache, rashes, and phlebitis at the infusion site, especially if infused too rapidly through a peripheral site. Drug-to-drug interactions may occur with the simultaneous use of oral contraceptives and ticarcillin disodium/clavulanate potassium and oral contraceptives, decreasing the effectiveness of the contraceptive agents. The concurrent use with probenecid decreases renal excretion and increases serum levels, and there is a synergistic effect when used with amikacin or gentamycin. As with other bacteriocidal antibiotics, its actions may be antagonized by bacteriostatic agents such as erythromycin, tetracyclines, and chloramphenicol. If used with beta-adrenergic blocking agents, the risk of allergic reactions increases. The risk of bleeding is increased if used concurrently with heparin, alteplase, anistreplase, nonsteroidal anti-inflammatory agents (NSAIDs), aspirin, dextran, dipryridamole, and plicamycin. The concurrent use with methotrexate decreases methotrexate elimination and increases the risk of serious toxicity. There are no clinically significant common adverse reactions of *vitamin A* established. There are no clinically significant drug-to-drug, drug-to-food/herbal interactions established. There are no clinically significant adverse reactions of *vitamin C* established. Drug-to-drug interactions may occur with the simultaneous use of oral anticoagulant, which may inhibit *ascorbic acid* uptake by leukocytes and tissues, and ascorbic acid may diminish the effects of disulfiram.

9. Discuss discharge instructions for the client with osteomyelitis. If the client is discharged to home with an unhealed wound that has approximated at the edges without odor or drainage, the client may be instructed in the use of a transparent film dressing, which provides a moist environment that promotes granulation tissue. The client should monitor the wound site for swelling or pain and report these findings to the primary health care provider. The client should complete antibiotics as prescribed, and keep scheduled appointments. The client should maintain weight, decrease the amount of salt used in the diet, exercise, and monitor blood pressure.

**References**


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