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NURSING CARE PLANS

Guidelines for Individualizing
Client Care Across the Life Span

10TH EDITION

The bottom half of the cover features a large, abstract graphic composed of overlapping, wavy bands of various shades of blue and teal, creating a sense of movement and depth.

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KEY TO ESSENTIAL TERMINOLOGY

CLIENT ASSESSMENT DATABASE

Provides an overview of the more commonly occurring etiology and coexisting factors associated with a specific medical and/or surgical diagnosis or health condition as well as the signs and symptoms and corresponding diagnostic findings. The Database contains the information used to identify Nursing Diagnoses for planning client care.

NURSING PRIORITIES

Establishes a general ranking of needs and concerns on which the Nursing Diagnoses are ordered in constructing the plan of care. This ranking would be altered according to the individual client situation.

DISCHARGE GOALS

Identifies generalized statements that could be developed into short-term and intermediate goals to be achieved by the client before being “discharged” from nursing care. They may also provide guidance for creating long-term goals for the client to work on after discharge.

NURSING DIAGNOSIS

The general need or problem diagnosis is stated without the distinct cause and signs and symptoms, which would be added to create a client diagnostic statement when specific client information is available. For example, when a client displays increased tension, apprehension, quivering voice, and focus on self, the nursing diagnosis of Anxiety might be stated: severe Anxiety related to value conflict, threat to current status as evidenced by increase in tension, apprehensiveness; voice quivering, self-focused.

In addition, diagnoses identified within these guides for planning care as actual, risk, health promotion, or syndrome can be changed or deleted and new diagnoses added, depending entirely on the specific client situation or available information.

MAY BE RELATED TO/POSSIBLY EVIDENCED BY

These lists provide the usual or common reasons (etiology) why a particular need or problem may occur with probable signs and symptoms, which would be used to create the “related to” and “evidenced by” portions of the *client diagnostic statement* when the specific situation is known.

When a risk diagnosis is used, the identified risk factors serve as the “evidenced by” segment of the nursing diagnosis statement, and interventions are provided to prevent progression to a problem-focused diagnosis. Furthermore, health-promotion diagnoses (readiness for enhanced) do not contain related factors but do have defining characteristics for the “evidenced by” segment of the client diagnostic statement.

DESIRED OUTCOMES/EVALUATION

CRITERIA—CLIENT WILL

These give direction to client care as they identify what the client or nurse hopes to achieve. They are stated in general terms to permit the practitioner to modify or individualize them by adding timelines and specific client criteria so they become “measurable.” For example, “Client will appear relaxed and report anxiety is reduced to a manageable level within 24 hours.”

Nursing Outcomes Classification (NOC) labels are also included. The outcome label is selected from a standardized nursing language and serves as a general header for the outcome indicators that follow.

ACTIONS/INTERVENTIONS

Nursing Interventions Classification (NIC) labels are drawn from a third standardized nursing language and serve as a general header for the nursing actions that follow.

Nursing actions are divided into independent—those actions that the nurse performs autonomously—and collaborative—those actions that the nurse performs in conjunction with others, such as implementing physician orders. The interventions in this book are generally ranked from most to least common. When creating the individual plan of care, interventions would normally be ranked to reflect the client’s specific needs and situation. In addition, the division of independent and collaborative is arbitrary and is actually dependent on the individual nurse’s capabilities, agency protocols, and professional standards.

RATIONALE

Although not commonly appearing in client plans of care, rationale has been included here to provide a pathophysiological basis to assist the nurse in deciding about the relevance of a specific intervention for an individual client situation.

NURSING DIAGNOSES ACCEPTED FOR USE AND RESEARCH FOR 2018–2020

Activity Intolerance [specify level]
 Activity Intolerance, risk for
 Activity Planning, ineffective
 Activity Planning, risk for ineffective
 Acute Substance Withdrawal Syndrome
 Acute Substance Withdrawal Syndrome, risk for
 Adaptive Capacity, decreased intracranial
 Adverse Reaction to Iodinated Contrast Media, risk for
 Airway Clearance, ineffective
 Allergy Reaction, risk for
 Anxiety
 Aspiration, risk for
 Attachment, risk for impaired
 Autonomic Dysreflexia
 Autonomic Dysreflexia, risk for
 Behavior, disorganized infant
 Behavior, risk for disorganized infant
 Behavior, readiness for enhanced organized infant
 Bleeding, risk for
 Blood Glucose Level, risk for unstable
 Blood Pressure, risk for unstable
 Body Image, disturbed
 Breast Milk Production, insufficient
 Breastfeeding, ineffective
 Breastfeeding, interrupted
 Breastfeeding, readiness for enhanced
 Breathing Pattern, ineffective
 Cardiac Output, decreased
 Cardiac Output, decreased, risk for
 Childbearing Process, ineffective
 Childbearing Process, readiness for enhanced
 Childbearing Process, risk for ineffective
 Chronic Pain Syndrome
 Comfort, impaired
 Comfort, readiness for enhanced
 Communication, impaired verbal
 Communication, readiness for enhanced
 Confusion, acute
 Confusion, risk for acute
 Confusion, chronic
 Constipation
 Constipation, chronic functional
 Constipation, perceived
 Constipation, risk for
 Constipation, risk for chronic functional
 Contamination
 Contamination, risk for
 Coping, compromised family
 Coping, defensive
 Coping, disabled family
 Coping, ineffective
 Coping, ineffective community
 Coping, readiness for enhanced
 Coping, readiness for enhanced community
 Coping, readiness for enhanced family
 Death Anxiety
 Decision-Making, readiness for enhanced
 Decisional Conflict
 Denial, ineffective
 Dentition, impaired
 Development, risk for delayed
 Diarrhea
 Disuse Syndrome, risk for

Diversional Activity Engagement, deficient
 Dry Eye, risk for
 Dry Mouth, risk for
 Eating Dynamics, ineffective adolescent
 Eating Dynamics, ineffective child
 Eating Dynamics, ineffective infant
 Electrolyte Imbalance, risk for
 Elimination, impaired urinary
 Emancipated Decision-Making, impaired
 Emancipated Decision-Making, readiness for enhanced
 Emancipated Decision-Making, risk for impaired
 Emotional Control, labile
 Energy Field, imbalanced
 Falls, risk for
 Family Processes, dysfunctional
 Family Processes, interrupted
 Family Processes, readiness for enhanced
 Fatigue
 Fear
 Feeding Pattern, ineffective infant
 Female Genital Mutilation, risk for
 Fluid Balance, readiness for enhanced
 [Fluid Volume, deficient hyper/hypotonic]
 Fluid Volume, deficient [isotonic]
 Fluid Volume, excess
 Fluid Volume, risk for deficient
 Fluid Volume, risk for imbalanced
 Frail Elderly Syndrome
 Frail Elderly Syndrome, risk for
 Gas Exchange, impaired
 Gastrointestinal Motility, dysfunctional
 Gastrointestinal Motility, risk for dysfunctional
 Grieving
 Grieving, complicated
 Grieving, risk for complicated
 [Growth, risk for disproportionate] (retired 2018)
 Health, deficient community
 Health Behavior, risk-prone
 Health Literacy, readiness for enhanced
 Health Maintenance, ineffective
 Health Management, ineffective
 Health Management, ineffective family
 Health Management, readiness for enhanced
 Home Maintenance, impaired
 Hope, readiness for enhanced
 Hopelessness
 Human Dignity, risk for compromised
 Hyperthermia
 Hyperbilirubinemia, neonatal
 Hyperbilirubinemia, risk for neonatal
 Hypothermia
 Hypothermia, risk for
 Hypothermia, risk for perioperative
 Immigration Transition, risk for complicated
 Impulse Control, ineffective
 Incontinence, bowel
 Incontinence, functional urinary
 Incontinence, overflow urinary
 Incontinence, reflex urinary
 Incontinence, risk for urge urinary
 Incontinence, stress urinary
 Incontinence, urge urinary
 Infection, risk for

Injury, risk for
 Injury, risk for corneal
 Injury, risk for urinary tract
 Insomnia
 Knowledge, deficient
 Knowledge, readiness for enhanced
 Latex Allergy Reaction
 Latex Allergy Reaction, risk for
 Lifestyle, sedentary
 Liver Function, risk for impaired
 Loneliness, risk for
 Maternal-Fetal Dyad, risk for disturbed
 Memory, impaired
 Mobility, impaired bed
 Mobility, impaired physical
 Mobility, impaired wheelchair
 Mood Regulation, impaired
 Moral Distress
 Mucous Membrane Integrity, impaired oral
 Mucous Membrane Integrity, risk for impaired oral
 Nausea
 Neonatal Abstinence Syndrome
 Neurovascular Dysfunction, risk for peripheral
 Nutrition: less than body requirements, imbalanced
 Nutrition, readiness for enhanced
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 Overweight
 Overweight, risk for
 Pain, acute
 Pain, chronic
 Pain, labor
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 Parenting, risk for impaired
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 Personal Identity, disturbed
 Personal Identity, risk for disturbed
 Physical Trauma, risk for
 Poisoning, risk for
 Post-Trauma Syndrome
 Post-Trauma Syndrome, risk for
 Power, readiness for enhanced
 Powerlessness
 Powerlessness, risk for
 Pressure Ulcer, risk for
 Protection, ineffective
 Rape-Trauma Syndrome
 Relationship, ineffective
 Relationship, readiness for enhanced
 Relationship, risk for ineffective
 Religiosity, impaired
 Religiosity, readiness for enhanced
 Religiosity, risk for impaired
 Relocation Stress Syndrome
 Relocation Stress Syndrome, risk for
 Resilience, impaired
 Resilience, readiness for enhanced
 Resilience, risk for impaired
 Retention, urinary
 Role Conflict, parental
 Role Performance, ineffective

Role Strain, caregiver
 Role Strain, risk for caregiver
 Self-Care, readiness for enhanced
 Self-Care deficit, Bathing
 Self-Care deficit, Dressing
 Self-Care deficit, Feeding
 Self-Care deficit, Toileting
 Self-Concept, readiness for enhanced
 Self-Esteem, chronic low
 Self-Esteem, risk for chronic low
 Self-Esteem, risk for situational low
 Self-Esteem, situational low
 Self-Mutilation
 Self-Mutilation, risk for
 Self-Neglect
 [Sensory Perception, disturbed (specify: visual, auditory, kinesthetic, gustatory, tactile, olfactory)] (retired 2012)
 Sexual Dysfunction
 Sexuality Pattern, ineffective
 Shock, risk for
 Sitting, impaired
 Skin Integrity, impaired
 Skin Integrity, risk for impaired
 Sleep, readiness for enhanced
 Sleep Deprivation
 Sleep Pattern, disturbed
 Social Interaction, impaired
 Social Isolation
 Sorrow, chronic
 Spiritual Distress
 Spiritual Distress, risk for
 Spiritual Well-Being, readiness for enhanced
 Standing, impaired
 Stress Overload
 Substance Withdrawal Syndrome, acute
 Substance Withdrawal Syndrome, risk for acute
 Sudden infant Death, risk for
 Suffocation, risk for
 Suicide, risk for
 Surgical Recovery, delayed
 Surgical Recovery, risk for delayed
 Surgical Site Infection, risk for
 Swallowing, impaired
 Thermal Injury, risk for
 Thermoregulation, ineffective
 Thermoregulation, risk for ineffective
 Thromboembolism, risk for venous
 Tissue Integrity, impaired
 Tissue Integrity, risk for impaired
 Tissue Perfusion, ineffective peripheral
 Tissue Perfusion, risk for decreased cardiac
 Tissue Perfusion, risk for ineffective cerebral
 Tissue Perfusion, risk for ineffective peripheral
 Transfer Ability, impaired
 Trauma, risk for vascular
 Unilateral Neglect
 Ventilation, impaired spontaneous
 Ventilatory Weaning Response, dysfunctional
 Violence, risk for other-directed
 Violence, risk for self-directed
 Walking, impaired
 Wandering [specify sporadic or continual]
 [] author recommendations

Herdman, TH, and Kamitsuru, S (eds): *Nursing Diagnoses—Definitions and Classification 2018–2020*. Copyright © 2018, 1994–2018 NANDA International. Used by arrangement with Thieme. In order to make safe and effective judgments using NANDA-I nursing diagnoses, it is essential that nurses refer to the definitions and defining characteristics of the diagnoses listed in this work.

NURSING CARE PLANS

Guidelines for Individualizing Client Care Across the Life Span

10th EDITION

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To the nurses we are writing for, who daily face the challenge of caring for the acutely ill client and are looking for a practical way to organize and document this care. We believe that nursing diagnosis and these guides will help.

To NANDA-I and to the international nurses who are developing and using nursing diagnoses—here we come!

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INTRODUCTION

We are often asked how we came to write the Care Plan books. In the late 1970s, we were involved with some publishing efforts that did not come to fruition. In this work, we had included care plans, so ensuing discussions revolved around the need for a Care Plan book. We spent a year struggling to write care plans before we realized our major difficulty was the lack of standardized labels for client problems. At that time, we were given a list of nursing diagnoses from the Clearinghouse for Nursing Diagnosis, which became the North American Nursing Diagnosis Association (NANDA) and is now NANDA International (NANDA-I). This work answered our need by providing concise titles that could be used in various plans of care and followed across the spectrum of client care. We believed these nursing diagnosis labels would both define and focus nursing care.

Because we had long been involved in direct client care in our nursing careers, we knew there was a need for guidelines to assist nurses in planning care. As we began to write, our focus was the nurse in a small rural community who at 2 a.m. needed the answer to a burning question for her client and had few resources available. We believed the book would give definition and direction to the development and use of individualized nursing care. Thus, in the first edition, the theory of nursing process, diagnosis, and intervention was brought to the clinical setting for implementation by the nurse. We also anticipated that nursing students would appreciate having access to these guidelines as they struggled to learn how to provide nursing care. Therefore, we did not consider the book to be an end in itself but rather a vehicle for the continuing growth and development of the profession. Obviously, we struck a chord and met a need because the first edition was an immediate success.

In becoming involved with the original NANDA, we acknowledged that maintaining a strict adherence to its wording, while adding our own clearly identified recommendations, would help develop this neophyte standardized language and would promote the growth of nursing as a profession. We have continued our involvement with NANDA-I, promoting the use of the language by practicing nurses in the United States and around the world and encouraging them to participate in updating and refining the diagnoses. The wide use of our books within the student population has supported and fostered the acceptance of both the activity of diagnosing client problems or needs and the use of standardized language.

Nursing instructors initially expressed concern that students would simply copy the plans of care and thus limit their learning. However, as students used the plans to individualize care and to develop practice priorities and client care outcomes, the book met with more acceptance. Instructors began not only to recommend the book but also to adopt it as an adjunct text. Today, it remains a best-selling nursing

care plan book, recognized as an important adjunct for student learning.

In writing the second edition, we recognized the need for an assessment tool with a nursing focus instead of a medical focus. Not finding one that met our needs, we constructed our own. To facilitate problem identification, we categorized the nursing diagnosis labels and the information obtained in the client assessment database into a framework entitled “Diagnostic Divisions.” Our philosophy is to provide a way in which to gather information and to intervene beneficially, while thinking about the rationale for every action we take and the standardized language that best expresses it. When nurses do this, they are defining their practice and are able to identify it with a code and charge for it. By doing this, we promote client protection (quality of care issue) and provide for the definition and protection of nursing practice and the protection of the individual (legal implications). The latter is important because we live in a litigation-minded society and the nurse’s license and livelihood are at stake.

One of the most significant achievements in the health-care field over the past 25 or more years has been the emergence of the nurse as an active coordinator and initiator of client care. Although the transition from physician’s helpmate to healthcare professional has been painfully slow and is not yet complete, the importance of the nurse within the system can no longer be denied or ignored. Today’s nurse designs nursing care interventions that move the total client toward improved health and maximum independence.

Professional care standards and healthcare providers and consumers will continue to increase the expectations for nurses’ performance. Each day brings new challenges in client care and the struggle to understand the human responses to actual and potential health problems. To meet these challenges competently, the nurse must have up-to-date assessment skills and a working knowledge of pathophysiological concepts concerning the common diseases and conditions presented. We believe that this book is a tool, providing a means of attaining that competency.

In the past, plans of care were viewed principally as learning tools for students and seemed to have little relevance after graduation. However, the need for a written format to communicate and document client care has been recognized in all care settings. In addition, healthcare policy, governmental regulations, and third-party payer requirements have created the need to validate many things, including appropriateness of care provided, staffing patterns, and monetary charges. Thus, although the student’s “case studies” are too cumbersome to be practical in the clinical setting, it has long been recognized that the client plan of care meets certain needs and therefore its appropriate use was validated.

The practicing nurse, as well as the nursing student, can welcome this text as a ready reference in clinical practice. It is designed for use in the acute care, community, and home-care settings. It is organized by systems for easy reference.

Chapter 1 reviews the use of the nursing process in formulating plans of care and the nurse's role in the delivery of that care. Nursing diagnoses, outcomes, and interventions are discussed to assist the nurse in understanding her or his role in the nursing process. In this book, we have also linked NANDA-I diagnoses with two other standardized nursing languages—Nursing Interventions Classification (NIC) and Nursing Outcomes Classification (NOC).

A nursing-based assessment tool and NANDA-I diagnosis labels organized in Diagnostic Divisions are provided to assist the nurse in employing critical thinking and identifying appropriate nursing diagnoses. A sample client situation with an individual database and a corresponding plan of care is included to further demonstrate how critical thinking is used to adapt nursing process theory to practice. Finally, several creative approaches for developing and documenting the planning of care are also included. Mind mapping is one technique or learning tool provided to assist you in achieving a holistic view of your client, enhance your critical thinking skills, and facilitate the creative process of planning client care.


Chapters 2 through 14 present plans of care that include information from multiple disciplines to assist the nurse in providing holistic care. In addition to the care plans in the textbook, you will also find Psychiatric and Maternal/Newborn care plans on *DavisPlus*. (To access these, use the *Plus* Code found in front of your book.)

Each plan includes a Client Assessment Database presented in a nursing format and associated Diagnostic Studies. After the database is collected, Nursing Priorities are sifted from the information to help focus and structure the care. Discharge Goals are created to identify what should be generally accomplished by the time of discharge from the care setting.

Nursing diagnosis labels are then chosen and combined with possible related factors designated by “may be related to,” and/or the signs and symptoms or defining characteristics as “possibly evidenced by,” to create Client Diagnostic

Statements that provide a clear picture of the client's needs. Next, Desired Client Outcomes are stated in measurable behavioral terms to evaluate both the client's progress and the effectiveness of care provided.

Corresponding actions/interventions are designed to promote resolution of the identified client needs. The nurse acting independently or collaboratively within the health team then uses a decision-making model to organize and prioritize nursing interventions. No attempt is made in this book to indicate whether independent or collaborative actions come first because this must be dictated by the individual situation. We do, however, believe that every collaborative action has a component that the nurse must identify and for which nursing has responsibility and accountability.

Rationales for the nursing actions, which are not required in the customary plan of care, are included to assist the nurse in deciding whether the interventions are appropriate for an individual client. Additional information is provided to further assist the nurse in identifying and planning for rehabilitation as the client progresses toward discharge and across all care settings. Continuing the life span, a plan of care for children (Pediatric Considerations) is included in Chapter 14, and Pediatric Pearls have been added to 14 plans of care common to this population. The Pediatric Pearls are noted by this icon . Finally, a bibliography is provided as a reference and to allow further research as desired.

This book is designed for students who will find the plans of care helpful as they learn and develop skills in applying the nursing process and using nursing diagnoses. It will complement their classroom work and support the critical thinking process. The book also provides a ready reference for the practicing nurse as a catalyst for thought in planning, evaluating, and documenting care.

As a final note, this book is not intended to be a procedure manual, and efforts have been made to avoid detailed descriptions of techniques or protocols that might be viewed as individual or regional in nature. Instead, the reader is referred to a procedure manual or text covering Standards of Care if detailed direction is desired.

As we always say when we sign a book, “Use and enjoy.”

MED, MFM, and ACM

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- Hypovolemia (Extracellular Fluid Volume Deficit)*
- Hyponatremia (Sodium Deficit)*
- Hyponatremia (Sodium Excess)*
- Hypokalemia (Potassium Deficit)*
- Hyperkalemia (Potassium Excess)*
- Hypocalcemia (Calcium Deficit)*
- Hypercalcemia (Calcium Excess)*
- Hypomagnesemia (Magnesium Deficit)*
- Hypermagnesemia (Magnesium Excess)*

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The Nursing Process: Planning Care Using Critical Thinking

DEFINING NURSING

Nursing encompasses autonomous and collaborative care of individuals of all ages, families, groups, and communities, sick or well, and in all settings. Nursing care is a key factor in achieving positive outcomes for the client with illness, as well as in the enhancement of client satisfaction in all phases of healthcare. The goals of nursing care include the prevention of illness, the provision of rehabilitation for compromising conditions, and the maximization of health. Where a return to health is not possible, nurses are also instrumental in helping the individual to achieve relief of pain and other discomforts, as well as to potentially experience a more peaceful death. So do these things define nursing?

Through the years, the “what” and “how” of the work of nursing have been explained by numerous nursing organizations in a number of publications to help define the work of nursing. Nursing interventions are based on needs identified by the client and the nurse during data collection. The 1980 *Nursing: A Social Policy Statement* by the American Nurses Association (ANA) defined nursing as the “diagnosis and treatment of human responses to actual and potential health problems,” providing a framework for understanding nursing’s relationship with society and nursing’s obligations to those receiving nursing care (Neuman, n.d.). In the 2003 *Nursing: A Social Policy Statement*, the ANA definition was expanded: “Nursing is the protection, promotion, and optimization of health and abilities, prevention of illness and injury, alleviation of suffering through the **diagnosis** and treatment of human response, and advocacy in the care of individuals, families, communities, and populations.” Human responses that are the phenomena of concern to nurses include “any observable need, concern, event, or fact of interest to nurses that may be the target of evidenced-based nursing practice” (ANA, 2010).

The nursing profession had already implemented (in the 1950s) a problem-solving process that “combines the most desirable elements of the art of nursing with the most relevant elements of systems theory, using the scientific method” (Shore, 1988). This “nursing process” evolved into five steps central to nursing actions and the delivery of high-quality, individualized client care in any setting. These are the following:

(1) Assessment (systematic collection of data relating to clients and their problems and needs), (2) diagnosis (analysis and interpretation of data), (3) planning (prioritizing needs, identifying goals, and choosing solutions), (4) implementation (putting the plan into action), and (5) evaluation (assessing the effectiveness of the plan and changing the plan as indicated by current needs).

The nursing process combines the skills of critical thinking with the skills of hands-on care and creates a method of active problem-solving that is both dynamic and cyclic. Although some view the nursing process as separate and progressive steps, the elements are actually interrelated. Taken together, they form a continuous circle of thought and action throughout the client’s contact with the healthcare system. Figure 1.1 demonstrates the way this cyclic process works.

CRITICAL THINKING

The ability to think critically is vital to the success of effectively using the nursing process. Critical thinking in general has been defined as the “intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered from or by observation, experience, reflection, reasoning, or communication, as a guide to belief and action” (Scriven & Paul, 1987). In nursing, critical thinking for clinical decision making has been defined as “the ability to think in a systematic and logical manner with openness to question and reflect on the reasoning process used to ensure safe nursing practice and quality care” (Heaslip, 1993, revised 2008). Nursing critical thinking requires a comprehensive knowledge base; use of one’s cognitive, psychomotor, and affective skills; established standards of care for best practice; and ongoing nursing research. The final product of this effort is effective nursing action, which is carried out and documented in the plan of care for a specific client.

WHERE DOES NURSING DIAGNOSIS FIT?

In 1991, the ANA *Standards of Clinical Nursing Practice* described the client care process and standards for professional performance, providing impetus and support for the development and use of **nursing diagnosis** in the practice setting. Nursing diagnoses are useful in providing a uniform

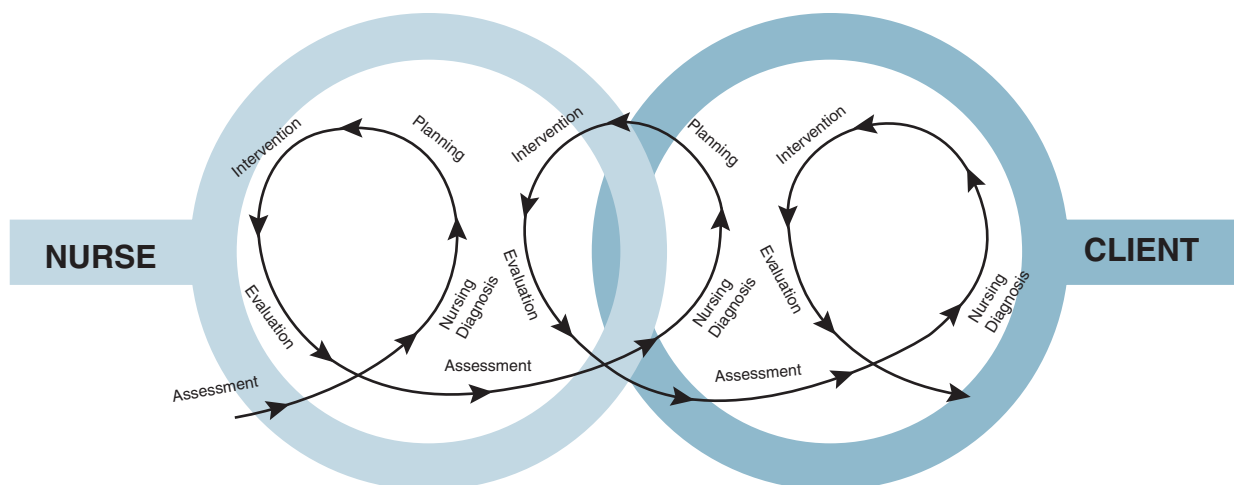


Figure 1.1 Diagram of the nursing process. The steps of the nursing process are interrelated, forming a continuous circle of thought and action that is both dynamic and cyclic.

way of identifying, focusing on, and dealing with specific client needs and responses to actual or high-risk problems and life processes.

While a number of standardized nursing languages have been developed using nursing diagnosis terminology, we have supported and operationalized the NANDA-International's (NANDA-I's) research and ongoing work of identifying client problems and needs for which nurses are accountable. NANDA-I defines nursing diagnosis as "a clinical judgment concerning a human response to health conditions/life processes, or a vulnerability for that response, by an individual, family, group, or community . . . and provides the basis for selection of nursing interventions to achieve outcomes for which the nurse has accountability" (Herdman & Kamitsuru, 2018). NANDA-I nursing diagnosis labels (see page 1049) provide a format for expressing the problem identification portion of the nursing process.

There are **four forms** of nursing diagnoses: "1) **problem-focused**—a clinical judgement concerning an undesirable human response to health conditions/life processes that exists in an individual, family, group, or community; 2) **health promotion**—a clinical judgement concerning motivation and desire to increase well-being and to actualize health potential; 3) **risk**—a clinical judgement concerning the susceptibility of an individual, family, group, or community for developing an undesirable human response to health conditions/life processes; 4) **syndrome**—a clinical judgement concerning a specific cluster of nursing diagnoses that occur together, and are best addressed together and through similar interventions" (Herdman & Kamitsuru, 2018).

HOW THE NURSING PROCESS WORKS WITH NURSING DIAGNOSIS

1. Collect a client database (nursing interview, physical assessment, and diagnostic studies) combined with information collected by other healthcare providers.
2. Review and analyze the client data.

3. Synthesize the gathered client data as a whole and then label the clinical judgment about the client's responses to these actual or high-risk problems and life processes.
4. Compare and contrast the relationships of clinical judgments with related or risk factors and defining characteristics for possible NANDA nursing diagnosis labels. This step is crucial to choosing and validating the appropriate nursing diagnosis label that will be used to create a specific client diagnostic statement. The defining characteristics and related factors associated with the chosen NANDA nursing diagnosis are reviewed and compared with the client data. If the diagnosis is not consistent with at least two or more cues, additional data may be required or another nursing diagnosis considered.
5. The results of the synthesis of the collected data are written concisely to create the client diagnostic statement by combining the nursing diagnosis with the identified NANDA related factors, defining characteristics, or risk factors to best reflect the client's situation.

In this text, to facilitate the steps needed to arrive at a nursing diagnosis and to aid in the critical thinking process, we developed an assessment database that uses a **nursing focus** instead of the traditional medical approach of a review of systems (Fig. 1.2). To achieve this nursing focus, we have grouped NANDA-I nursing diagnoses into related categories titled Diagnostic Divisions (Box 1.1).

These categories reflect a blending of theories, primarily Maslow's hierarchy of needs and a self-care philosophy. And because diagnostic divisions are based on human responses and needs rather than specific body systems, assessment data may be recorded in more than one area. These divisions serve as the framework for data collection and direct the nurse to the corresponding nursing diagnosis labels in the second step of the nursing process. For this reason, the nurse is encouraged to keep an open mind during the assessment phase and to collect as much information as possible before choosing the nursing diagnosis label.

ADULT MEDICAL/SURGICAL ASSESSMENT TOOL**General Information**

Name: _____
 Age: _____ DOB: _____ Gender: _____ Race: _____
 Admission Date: _____ Time: _____ From: _____
 Reason for this admission (primary concern): _____
 Cultural concerns (relating to healthcare decisions, religious concerns, pain, childbirth, family involvement, communication, etc): _____
 Source of information: _____ Reliability (1–4 with 4 = very reliable): _____

Activity/Rest**Subjective (Reports)**

Occupation: _____
 Leisure time/diversional activities: _____
 Able to participate in usual activities/hobbies: _____
 Ambulatory: _____ Gait (describe): _____
 Activity level (sedentary to very active): _____
 Regular exercise/type: _____
 Muscle mass/tone/strength (e.g., normal, increased, decreased): _____ Change: _____
 History of problems/limitations imposed by condition (e.g., immobility, can't transfer, weakness, breathlessness): _____
 Feelings (e.g., exhaustion, restlessness, can't concentrate, dissatisfaction): _____
 Developmental factors (e.g., delayed/age): _____
 Sleep: Hours: _____ Naps: _____ Aids: _____
 Insomnia: _____ Related to: _____
 Difficulty falling asleep: _____
 Difficulty staying asleep: _____
 Rested on awakening: _____
 Excessive grogginess: _____
 Sleeps on more than one pillow: _____
 Bedtime rituals: _____
 Relaxation techniques: _____
 Oxygen use (type): _____ When used: _____
 Medications or herbals for/affecting sleep: _____

Objective (Exhibits)

Observed response to activity: Heart rate: _____
 Rhythm (reg/irreg): _____
 Blood pressure: _____
 Respiration rate: _____
 Pulse oximetry: _____
 Mental status (i.e., cognitive impairment, withdrawn/lethargic): _____
 Neuromuscular assessment:
 Muscle mass/tone: _____
 Posture (e.g., normal, stooped, curved spine): _____
 Tremors: _____
 (location): _____
 ROM: _____
 Strength: _____
 Deformity: _____
 Uses mobility aid (list): _____

Circulation**Subjective (Reports)**

History of/treatment for (date): High blood pressure: _____
 Brain injury: _____ Stroke: _____
 Heart problems/surgery: _____ Palpitations: _____
 Syncope: _____ Rheumatic fever: _____
 Cough/hemoptysis: _____ Blood clots: _____
 Bleeding tendencies/episodes: _____ (location): _____
 Pain in legs w/activity _____
 Extremities: Numbness: _____ (location): _____
 Tingling: _____ (location): _____
 Slow healing (describe): _____
 Change in frequency/amount of urine: _____
 History of spinal cord injury/dysreflexia episodes: _____
 Medications/herbals: _____

Objective (Exhibits)

Color (e.g., pale, cyanotic, jaundiced, mottled, ruddy): _____
 Skin: _____ Mucous membranes: _____ Lips: _____
 Nail beds: _____ Conjunctiva: _____ Sclera: _____
 Skin moisture (e.g., dry, diaphoretic): _____
 BP: Lying: R _____ L _____ Sitting: R _____ L _____
 Standing: R _____ L _____
 Pulse pressure: _____ Auscultatory gap: _____
 Pulses (palpated 1–4 strength): Carotid: _____ Temporal: _____
 Jugular: _____ Radial: _____ Femoral: _____ Popliteal: _____
 Post-tibial: _____ Dorsalis pedis: _____
 Cardiac (palpation): Thrill: _____ Heaves: _____
 Heart sounds (auscultation): Rate: _____ Rhythm: _____
 Quality: _____ Friction rub: _____
 Murmur (describe location/sounds): _____
 Vascular bruit (location): _____ Jugular vein distention: _____
 Breath sounds (location/describe): _____
 Extremities: Temperature: _____ Color: _____
 Capillary refill (1–3 sec): _____ Homans' sign: _____
 Varicosities (location): _____
 Distribution/quality of hair: _____
 Edema (location/severity: mild, moderate, severe): _____
 Trophic skin changes: _____ Nail abnormalities: _____

Ego Integrity

Subjective (Reports)

Relationship status: _____
Expression of concerns (e.g., financial, lifestyle, relationship, or role changes): _____
Stress factors: _____
Usual ways of handling stress: _____
Expression of feelings: Anger: _____ Anxiety: _____
Fear: _____ Grief: _____ Helplessness: _____
Hopelessness: _____ Powerlessness: _____
Cultural factors/ethnic ties: _____
Religious affiliation: _____ Active/practicing: _____
Practices prayer/meditation: _____
Religious/spiritual concerns: _____
Desires clergy visit: _____
Expression of sense of connectedness/harmony with self and others: _____
Medications/herbals: _____

Elimination

Subjective (Reports)

Usual bowel elimination pattern: _____
Character of stool (e.g., hard, soft, liquid): _____
Stool color (e.g., brown, black, yellow, clay colored, tarry): _____
Date of last BM and character of stool: _____
History of bleeding: _____ Hemorrhoids/fistula: _____
Constipation: acute: _____ or chronic: _____
Diarrhea: acute: _____ or chronic: _____
Bowel incontinence: _____
Laxative: _____ (how often): _____
Enema/suppository: _____ (how often): _____
Usual voiding pattern and character of urine: _____
Difficulty voiding: _____ Urgency: _____
Frequency: _____ Retention: _____
Bladder spasms: _____ Pain/burning: _____
Urinary incontinence (type/time of day usually occurs): _____
History of kidney/bladder disease: _____
Diuretic use: _____ Other medications: _____
Herbals: _____

Food/Fluid

Subjective (Reports)

Usual diet (type): _____
Calorie, carbohydrate, protein, fat intake (g/day): _____
of meals daily: _____ Snacks (number/time consumed): _____
Dietary pattern/content:
B: _____
L: _____
D: _____
Snacks: _____
Last meal consumed/content: _____
Food preferences: _____
Food allergies/intolerances: _____
Cultural or religious food preparation concerns/prohibitions: _____
Usual appetite: _____ Change in appetite: _____
Usual weight: _____
Unexpected/undesired weight loss or gain: _____
Nausea/vomiting: _____ (related to): _____
Heartburn/indigestion: _____
(related to): _____ (relieved by): _____
Chewing/swallowing problems: _____
Gag/swallow reflex present: _____

Objective (Exhibits)

Emotional status (check those that apply):
Calm: _____ Anxious: _____
Angry: _____ Withdrawn: _____
Fearful: _____ Irritable: _____
Restive: _____ Euphoric: _____
Observed body language: _____
Observed physiological responses (e.g., palpitations, crying, change in voice quality/volume): _____
Changes in energy field:
Temperature: _____
Color: _____
Distribution: _____
Movement: _____
Sounds: _____

Objective (Exhibits)

Abdomen (auscultation): Bowel sounds (location/type): _____
Abdomen (palpation): Soft/firm: _____
Tenderness/pain (quadrant location): _____
Distention: _____ Palpable mass/location: _____
Size/girth: _____ CVA tenderness: _____
Bladder palpable: _____ Overflow voiding: _____
Residual urine per scan: _____
Rectal sphincter tone (describe): _____
Hemorrhoids/fistula: _____ Stool in rectum: _____
Impaction: _____ Occult blood (+ or -): _____
Presence/use of catheter or continence devices: _____
Ostomy appliances (describe appliance and location): _____

Objective (Exhibits)

Current weight: _____ Height: _____
Body build: _____ Body fat %: _____
Skin turgor (e.g., firm, supple, dehydrated): _____
Mucous membranes (moist/dry): _____
Edema: Generalized: _____
Dependent: _____
Feet/ankles: _____
Periorbital: _____
Abdominal/ascites: _____
Jugular vein distention: _____
Breath sounds (auscultate)/location: _____
Faint/distant: _____ Crackles: _____ Wheezes: _____
Condition of teeth/gums: _____ Appearance of tongue: _____
Mucous membranes: _____
Abdomen: Bowel sounds (quadrant location/type): _____
Hernia/masses: _____
Urine S/A or Chemstix: _____
Blood glucose (Glucometer): _____

Food/Fluid (continued)**Subjective (Reports)**

Facial injury/surgery: _____
 Stroke/other neurological deficit: _____
 Teeth: Normal: ____ Dentures (full/partial): _____
 Loose/absent teeth/poor dental care: _____
 Sore mouth/gums: _____
 Dental hygiene practices: _____
 Professional dental care/frequency: _____
 Diabetes/type: ____ Controlled with diet/pills/insulin: ____
 Vitamin/food supplements: _____
 Medications/herbals: _____

Hygiene**Subjective (Reports)**

Ability to carry out activities of daily living: _____
 Independent/dependent (level 1 = no assistance needed to level 4 = completely dependent): _____
 Mobility: ____ Assistance needed (describe): _____
 Assistance provided by: _____
 Equipment/prosthetic devices required: _____
 Feeding: ____ Help with food preparation: _____
 Help with eating utensils: _____
 Hygiene: ____ Get supplies: ____ Wash body/body parts: ____
 Regulate bath water temperature: ____ Get in/out alone: ____
 Preferred time of personal care/bath: _____
 Dressing: ____ Can select clothing: ____ Can dress self: ____
 Needs assistance with (describe): _____
 Toileting: ____ Can get to toilet/commode alone: _____
 Needs assistance with (describe): _____

Neurosensory**Subjective (Reports)**

History of brain injury, trauma, stroke (residual effects): ____
 Fainting spells/dizziness: _____
 Headaches (location/type/frequency): _____
 Tingling/numbness/weakness (location): _____
 Seizures: ____ History or new onset: _____
 Type (e.g., tonic-clonic, partial): ____ Frequency: ____
 Aura: ____ Postictal state: ____ How controlled: ____
 Vision: Loss/changes in vision: ____ Date last exam: ____
 Glaucoma: ____ Cataract: ____ Eye surgery (type/date): ____
 Hearing loss: ____ Sudden or gradual: _____
 Date last exam: _____
 Sense of smell (changes): _____
 Sense of taste (changes): _____
 Other: _____

Pain/Discomfort**Subjective (Reports)**

Primary focus: _____ Location: _____
 Intensity (use pain scale or pictures): _____
 Quality (e.g., stabbing, aching, burning): _____
 Radiation: _____ Duration: _____ Frequency: _____
 Precipitating factors: _____
 Relieving factors (including nonpharmaceuticals/therapies): _____
 Associated symptoms (e.g., nausea, sleep problems): _____
 Effect on daily activities: _____
 Relationships: _____
 Enjoyment of life: _____
 Additional pain focus (describe): _____
 Medications: _____ Herbals: _____

Objective (Exhibits)

General appearance: Manner of dress: _____
 Grooming/personal habits: _____
 Condition of hair/scalp: _____
 Body odor: _____
 Presence of vermin (e.g., lice, scabies): _____

Objective (Exhibits)

Mental status (note duration of change):
 Oriented/disoriented: Person: _____ Place: _____
 Time: _____ Situation: _____
 Check all that apply: Alert: ____ Drowsy: ____ Lethargic: ____
 Stupor: ____ Comatose: ____ Cooperative: ____ Agitated/restless: ____
 Combative: ____ Follows commands: _____
 Delusions (describe): ____ Hallucinations (describe): _____
 Affect (describe): _____ Speech Pattern: _____
 Memory: Recent: _____ Remote: _____
 Pupil shape: _____ Size/reaction: R/L: _____
 Facial droop: _____ Swallowing: _____
 Hand grasp/release: R: _____ L: _____
 Coordination: _____ Balance: _____ Walking: _____
 Deep tendon reflexes (present/absent/location): _____
 Tremors: _____ Paralysis (R/L): _____ Posturing: _____
 Wears glasses: ____ Contacts: ____ Hearing aids: _____

Objective (Exhibits)

Facial grimacing: _____ Guarding affected area: _____
 Expressive behavior (e.g., crying, withdrawal, anger): _____
 Narrowed focus: _____
 Vital sign changes (acute pain):
 BP: _____
 Pulse: _____
 Respirations: _____
 Photosensitivity: _____
 Effect on lifestyle/employment: _____

Respiration

Subjective (Reports)

Dyspnea/related to: _____
Precipitating factors: _____ Relieving factors: _____
Airway clearance (e.g., spontaneous/device): _____
Cough (e.g., hard, persistent, croupy): _____
Produces sputum (describe color/character): _____
Requires suctioning: _____
History of (year): Bronchitis: _____ Asthma: _____
Emphysema: _____ Tuberculosis: _____
Recurrent pneumonia: _____
Exposure to noxious fumes/allergens, infectious agents/
diseases, poisons/pesticides: _____
Smoker: _____ packs/day: _____ # pack-years: _____
Cigars: _____ Smokeless tobacco: _____ Vapes: _____
Use of respiratory aids: _____ Oxygen (type/frequency): _____
Medications/herbals: _____

Safety

Subjective (Reports)

Allergies/sensitivity (medications, foods, environment,
latex, iodine): _____
Type of reaction: _____
Blood transfusion/number: _____ Date: _____
Reaction (describe): _____
Exposure to infectious diseases (e.g., measles, influenza,
pink eye): _____
Exposure to pollution, toxins, poisons/pesticides, radiation:

(describe reactions): _____
Geographic areas lived in/recent travel: _____
Immunization history: Tetanus: _____ MMR: _____ Polio: _____
Influenza: _____ Pneumonia: _____ Hepatitis: _____ HPV: _____
Altered/suppressed immune system (infection cause): _____
History of sexually transmitted disease (date/type): _____
Testing: _____
High-risk behaviors: _____
Uses seat belt regularly: _____ Helmets: _____
Other safety devices: _____
Workplace safety/health issues (describe): _____
Currently working: _____
Rate working conditions (e.g., safety, noise, heating,
water, ventilation): _____
History of accidental injuries: _____
Fractures/dislocations: _____
Arthritis/unstable joints: _____ Back problems: _____
Skin problems (e.g., rashes, lesions, moles, breast lumps,
enlarged nodes) (describe): _____
Delayed healing (describe): _____
Cognitive limitations (e.g., disoriented, confusion): _____
Sensory limitations (e.g., impaired vision/hearing, detecting
heat/cold, taste, smell, touch): _____
Prostheses: _____ Ambulatory devices: _____
Violence (episodes or tendencies): _____

Sexuality [Component of Social Interaction]

Subjective (Reports)

Sexually active: _____ Monogamous: _____
Birth control method: _____ Use of condoms: _____
Sexual concerns/difficulties (e.g., pain, relationship,
role performance): _____
Recent change in frequency/interest: _____

Male: Subjective (Reports)

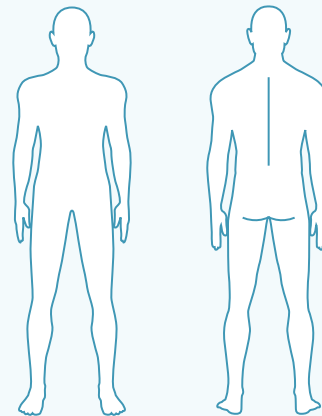
Penis: Circumcised: _____ Vasectomy (date): _____
Prostate disorder: _____
Practices self-exam: Breast: _____ Testicles: _____
Last proctoscopic/prostate exam: _____ Last PSA/date: _____
Medications/herbals: _____

Objective (Exhibits)

Respirations (spontaneous/assisted): _____ Rate: _____
Depth: _____ Chest excursion (e.g., equal/unequal): _____
Use of accessory muscles: _____
Nasal flaring: _____ Fremitus: _____
Breath sounds (presence/absence; crackle, wheezes): _____
Egophony: _____
Skin/mucous membrane color (e.g., pale, cyanotic): _____
Clubbing of fingers: _____
Sputum characteristics: _____
Mentation (e.g., calm, anxious, restless): _____
Pulse oximetry: _____

Objective (Exhibits)

Body temperature/method: (e.g., oral, temporal, tympanic): _____
Skin integrity (mark location on diagram): Scars: _____
Bruises: _____ Rashes: _____ Abrasions: _____
Lacerations: _____ Ulcerations: _____ Blisters: _____
Drainage: _____ Burns [degree/%]: _____



Musculoskeletal: General strength: _____ Muscle tone: _____
Gait: _____ ROM: _____ Paresthesia/paralysis: _____
Results of testing (e.g., cultures, immune function, TB, hepatitis): _____

Objective (Exhibits)

Comfort level with subject matter: _____

Objective (Exhibits)

Genitalia: Penis: Circumcised: _____ Warts/lesions: _____
Bleeding/discharge: _____ Testicles (e.g., lumps): _____
Breast examination: _____
Test results: PSA: _____ STI: _____

Sexuality [Component of Social Interaction] (continued)**Female: Subjective (Reports)**

Menstruation: Age at menarche: ____ Length of cycle: ____
 Duration: ____ Number of pads/tampons used/day: ____
 Last menstrual period: ____
 Bleeding between periods: ____
 Reproductive: Infertility concerns: ____
 Type of therapy: ____ Pregnant now: ____
 Para: ____ Gravida: ____ Due date: ____
 Menopause: ____ Last period: ____
 Hysterectomy (type/date): ____
 Problem with: Hot flashes: ____ Night sweats: ____
 Vaginal lubrication: ____ Vaginal discharge: ____
 Hormonal therapies: ____
 Osteoporosis medications: ____
 Breasts: Practices breast self-exam: ____
 Last mammogram: ____ Biopsy/surgery: ____
 Last PAP smear: ____

Social Interactions**Subjective (Reports)**

Relationship status (check): Single: ____ Married: ____
 Living with partner: ____ Divorced: ____ Widowed: ____
 Years in relationship: ____ Perception of relationship: ____
 Concerns/stresses: ____
 Role within family structure: ____
 Number/age of children: ____
 Perception of relationship with family members: ____
 Extended family/availability: ____
 Other support person(s): ____
 Individuals living in home: ____
 Caregiver (to whom/how long): ____
 Ethnic/cultural affiliations: ____
 Strength of ethnic identity: ____
 Lives in ethnic community: ____
 Feelings of (describe): Mistrust: ____ Rejection: ____
 Unhappiness: ____ Loneliness/isolation: ____
 Problems related to illness/condition: ____
 Difficulties with communication (e.g., speech, another language, brain injury): ____
 Use of speech/communication aids (list): ____
 Interpreter needed: ____ Primary language: ____
 Genogram: Diagram on separate page

Teaching/Learning**Subjective (Reports)**

Communication: Dominant language (specify): ____
 Second language: ____ Literate (reading/writing): ____
 Education level: ____
 Learning challenges (specify): ____
 Cognitive limitations: ____
 Culture/ethnicity: Where born: ____
 If immigrant, how long in this country: ____
 Health and illness beliefs/practices/customs: ____
 Which family member makes healthcare decisions/is spokesperson for client: ____
 Presence of advance directives: ____ Code status: ____
 Durable medical power of attorney: ____
 Designee: ____
 Health goals: ____
 Current health problem: ____
 Client understanding of problem: ____
 Special healthcare concerns (e.g., impact of religious/cultural practices): ____
 Healthcare decisions: ____
 Family involvement: ____

Objective (Exhibits)

Breast examination: ____
 Genitalia: Warts/lesions: ____
 Vaginal bleeding/discharge: ____
 Test results: PAP smear: ____
 Mammogram: ____
 STI: ____

Objective (Exhibits)

Communication/speech: Clear: ____
 Slurred: ____
 Unintelligible: ____
 Aphasic: ____
 Unusual speech pattern/impairment: ____
 Laryngectomy present: ____
 Verbal/nonverbal communication with family/SO(s): ____
 Family interaction (behavioral) pattern: ____

Familial risk factors (indicate relationship):

Diabetes: ____ Thyroid (specify): ____
 Tuberculosis: ____ Heart disease: ____ Stroke: ____
 Hypertension: ____ Epilepsy/seizures: ____
 Kidney disease: ____ Cancer: ____
 Mental illness/depression: ____ Other: ____
 Prescribed medications: Drug: ____ Dose: ____
 Times (circle last dose): ____ Take regularly: ____
 Purpose: ____ Side effects/problems: ____
 Nonprescription drugs/frequency: OTC drugs: ____
 Vitamins: ____ Herbs: ____
 Street drugs: ____ Alcohol (amount/frequency): ____
 Tobacco: ____ Smokeless: ____ Vapes: ____
 Admitting diagnosis per provider: ____
 Reason for hospitalization/visit per client: ____
 History of current concern: ____

Teaching/Learning (continued)

Subjective (Reports)

Expectations of this hospitalization/visit: _____
Will admission cause any lifestyle changes (describe): _____

Previous illnesses and/or hospitalizations/surgeries: _____

Evidence of failure to improve: _____
Last complete physical exam: _____

Discharge Plan Considerations

Projected length of stay (days or hours): _____
Anticipated date of discharge: _____
Date information obtained: _____
Resources available: Persons: _____
Financial: _____
Groups: _____
Community supports: _____
Areas that may require alteration/assistance: _____
Food preparation: _____ Shopping: _____ Transportation: _____
Ambulation: _____ Medication/IV therapy: _____
Treatments: _____ Wound care: _____
Supplies: _____ Durable medical equip: _____
Self-care (specify): _____
Homemaker/maintenance (specify): _____ Socialization: _____
Physical layout of home (specify): _____

Anticipated changes in living situation after discharge: _____
Living facility other than home (specify): _____
Referrals (date/source/services): Social Services: _____
Rehab services: _____ Dietary: _____ Home care: _____
Resp/O₂: _____ Equipment: _____
Supplies: _____ Other: _____
Hospice: _____

Figure 1.2 Adult medical-surgical assessment tool. This is a suggested guide and tool for creating a database reflecting a nursing focus. Although the diagnostic divisions are alphabetized here for ease of presentation, they can be prioritized or rearranged in any manner to meet individual needs. In addition, this assessment tool can be adapted to meet the needs of specific client populations.

Box 1.1 Nursing Diagnoses Organized According to Diagnostic Divisions

After data are collected and areas of concern or need identified, the nurse is directed to the Diagnostic Divisions to review the list of nursing diagnoses that fall within the individual categories. This will assist the nurse in choosing the specific diagnostic label to accurately describe the data. Then, with the addition of etiology or related/risk factors, as well as signs and symptoms or cues (defining characteristics), the client diagnostic statement emerges.

Activity/Rest—ability to engage in necessary or desired activities of life (work and leisure) and to obtain adequate sleep and rest

- Activity Intolerance
- Activity Intolerance, risk for
- Disuse Syndrome, risk for
- Diversional Activity Engagement, deficient
- Fatigue
- Insomnia
- Lifestyle, sedentary
- Mobility, impaired wheelchair
- Sleep, readiness for enhanced
- Sleep deprivation
- Sleep Pattern, disturbed
- Transfer Ability, impaired
- Walking, impaired

Circulation—ability to transport oxygen and nutrients necessary to meet cellular needs

- Adaptive Capacity, decreased intracranial
- Autonomic Dysreflexia

- Autonomic Dysreflexia, risk for
- Bleeding, risk for
- Blood Pressure, risk for unstable
- Cardiac Output, decreased and risk for
- Metabolic Imbalance Syndrome, risk for
- Shock, risk for
- Thromboembolism, risk for venous
- Tissue Perfusion, ineffective peripheral
- Tissue Perfusion, risk for decreased cardiac
- Tissue Perfusion, risk for ineffective cerebral
- Tissue Perfusion, risk for ineffective peripheral

Ego Integrity—ability to develop and use skills and behaviors to integrate and manage life experiences

- Activity Planning, ineffective
- Activity Planning, risk for ineffective
- Anxiety [mild, moderate, severe panic level]
- Body Image, disturbed
- Coping, defensive
- Coping, ineffective
- Coping, readiness for enhanced
- Death Anxiety
- Decision-Making, readiness for enhanced
- Decisional Conflict
- Denial, ineffective
- Emancipated Decision-Making, readiness for enhanced
- Emancipated Decision-Making, impaired
- Emancipated Decision-Making, risk for impaired
- Emotional Control, labile

Box 1.1 Nursing Diagnoses Organized According to Diagnostic Divisions (continued)

- Energy Field, disturbed
- Fear
- Grieving
- Grieving, complicated
- Grieving, risk for complicated
- Health Behavior, risk-prone
- Hope, readiness for enhanced
- Hopelessness
- Human Dignity, risk for compromised
- Impulse Control, ineffective
- Mood Regulation, impaired
- Moral Distress
- Personal Identity, disturbed
- Personal Identity, risk for disturbed
- Post-Trauma Syndrome
- Post-Trauma Syndrome, risk for
- Power, readiness for enhanced
- Powerlessness
- Powerlessness, risk for
- Rape-Trauma Syndrome
- Relationship, ineffective
- Relationship, readiness for enhanced
- Relationship, risk for ineffective
- Religiosity, impaired
- Religiosity, readiness for enhanced
- Religiosity, risk for impaired
- Relocation Stress Syndrome
- Relocation Stress Syndrome, risk for
- Resilience, impaired
- Resilience, readiness for enhanced
- Resilience, risk for impaired
- Self-Concept, readiness for enhanced
- Self-Esteem, chronic low
- Self-Esteem, risk for chronic low
- Self-Esteem, risk for situational low
- Self-Esteem, situational low
- Sorrow, chronic
- Spiritual Distress
- Spiritual Distress, risk for
- Spiritual Well-Being, readiness for enhanced

Elimination—ability to excrete waste products

- Constipation
- Constipation, chronic functional
- Constipation, perceived
- Constipation, risk for
- Constipation, risk for chronic functional
- Diarrhea
- Elimination, impaired urinary
- Gastrointestinal Motility, dysfunctional
- Gastrointestinal Motility, risk for dysfunctional
- Incontinence, bowel
- Incontinence, functional urinary
- Incontinence, overflow urinary
- Incontinence, reflex urinary
- Incontinence, risk for urge urinary
- Incontinence, stress urinary
- Incontinence, urge urinary
- Retention, [acute/chronic] urinary

Food/Fluid—ability to maintain intake of and utilize nutrients and liquids to meet physiological needs

- Blood Glucose Level, risk for unstable
- Breast Milk Production, insufficient
- Breastfeeding, ineffective
- Breastfeeding, interrupted
- Breastfeeding, readiness for enhanced
- Dentition, impaired
- Eating Dynamics, ineffective adolescent
- Eating Dynamics, ineffective child
- Eating Dynamics, ineffective infant
- Electrolyte Imbalance, risk for
- Failure to Thrive, adult
- Feeding Pattern, ineffective infant
- [Fluid Volume, deficient hypertonic or hypotonic]
- Fluid Volume, deficient [isotonic]
- Fluid Volume excess
- Fluid Volume, risk for deficient
- Fluid Volume, risk for imbalanced
- Liver Function, risk for impaired
- Mucous Membrane Integrity, impaired oral
- Nausea
- Nutrition: less than body requirements, imbalanced
- Nutrition, readiness for enhanced
- Obesity
- Overweight
- Overweight, risk for
- Swallowing, impaired

Hygiene—ability to perform activities of daily living

- Self-Care, readiness for enhanced
- Self-Care deficit: bathing
- Self-Care deficit: dressing
- Self-Care deficit: feeding
- Self-Care deficit: toileting
- Self-Neglect

Neurosensory—ability to perceive, integrate, and respond to internal and external cues

- Behavior, disorganized infant
- Behavior, risk for disorganized infant
- Behavior, readiness for enhanced organized infant
- Confusion, acute
- Confusion, risk for acute
- Confusion, chronic
- Memory, impaired
- Neurovascular Dysfunction, risk for peripheral
- [Sensory Perception, disturbed (specify: visual, auditory, kinesthetic, gustatory, tactile, olfactory)]
- Stress Overload
- Unilateral Neglect

Pain/Discomfort—ability to control internal/external environment to maintain comfort

- Chronic Pain Syndrome
- Comfort, impaired
- Comfort, readiness for enhanced
- Pain, acute

(continues on page 10)

Box 1.1 Nursing Diagnoses Organized According to Diagnostic Divisions (continued)

- Pain, chronic
- Pain, labor

Respiration—ability to provide and use oxygen to meet physiological needs

- Airway Clearance, ineffective
- Aspiration, risk for
- Breathing Pattern, ineffective
- Gas Exchange, impaired
- Ventilation, impaired spontaneous
- Ventilatory Weaning Response, dysfunctional

Safety—ability to provide safe, growth-promoting environment

- Acute Substance Withdrawal Syndrome
- Acute Substance Withdrawal Syndrome, risk for
- Adverse Reaction to Iodinated Contrast Media, risk for
- Allergy Reaction, risk for
- Contamination
- Contamination, risk for
- Dry Eye, risk for
- Dry Mouth, risk for
- Falls, risk for
- Frail Elderly Syndrome
- Health Maintenance, ineffective
- Home Maintenance, impaired
- Hyperthermia
- Hyperbilirubinemia, neonatal
- Hyperbilirubinemia, risk for neonatal
- Hypothermia
- Hypothermia, risk for perioperative
- Infection, risk for
- Injury, risk for
- Injury, risk for corneal
- Injury, risk for urinary tract
- Latex Allergy Reaction
- Latex Allergy Reaction, risk for
- Maternal-Fetal Dyad, risk for disturbed
- Mobility, impaired bed
- Mobility, impaired physical
- Neonatal Abstinence Syndrome
- Occupational Injury, risk for
- Perioperative Positioning Injury, risk for
- Poisoning, risk for
- Pressure Ulcer, risk for
- Protection, ineffective
- Self-Mutilation
- Self-Mutilation, risk for
- Sitting, impaired
- Skin Integrity, impaired
- Skin Integrity, risk for impaired
- Standing, impaired
- Sudden infant Death, risk for
- Suffocation, risk for
- Suicide, risk for
- Surgical Recovery, delayed
- Surgical Recovery, risk for delayed
- Surgical Site Infection, risk for

- Thermal Injury, risk for
- Thermoregulation, ineffective
- Thermoregulation, risk for ineffective
- Tissue Integrity, impaired
- Tissue Integrity, risk for impaired
- Trauma, risk for physical
- Trauma, risk for vascular
- Violence, risk for other-directed
- Violence, risk for self-directed
- Wandering [specify sporadic or continual]

Sexuality [component of ego integrity and social interaction]—ability to meet requirements/characteristics of male or female role

- Childbearing Process, ineffective
- Childbearing Process, readiness for enhanced
- Childbearing Process, risk for ineffective
- Female Genital Mutilation, risk for
- Sexual Dysfunction
- Sexuality Pattern, ineffective

Social Interaction—ability to establish and maintain relationships

- Attachment, risk for impaired
- Communication, impaired verbal
- Communication, readiness for enhanced
- Coping, compromised family
- Coping, disabled family
- Coping, ineffective community
- Coping, readiness for enhanced community
- Coping, readiness for enhanced family
- Family Processes, dysfunctional
- Family Processes, interrupted
- Family Processes, readiness for enhanced
- Immigration Transition, risk for complicated
- Loneliness, risk for
- Parenting, impaired
- Parenting, readiness for enhanced
- Parenting, risk for impaired
- Role Conflict, parental
- Role Performance, ineffective
- Role Strain, caregiver
- Role Strain, risk for caregiver
- Social Interaction, impaired
- Social Isolation

Teaching/Learning—ability to incorporate and use information to achieve healthy lifestyle and optimal wellness

- Development, risk for delayed
- Health, deficient community
- Health Literacy, readiness for enhanced
- Health Maintenance, ineffective
- Health Management, ineffective
- Health Management, ineffective family
- Knowledge, deficient
- Knowledge, readiness for enhanced

THE PLAN OF CARE

A well-developed plan of care communicates the client's status to all members of the healthcare team involved in providing care. The plan of care (1) documents the client's past and present health status and current needs, (2) identifies problems solved and those yet to be solved, (3) notes patterns of client responses to interventions, and (4) may be personalized to provide information about successful approaches to problem-solving. In legal terms, the plan of care documents nurse intervention and client response in areas of liability, accountability, and quality improvement. Finally, the plan of care provides a mechanism to help ensure continuity of care when the client leaves one healthcare setting for another while still needing services.

The client plan of care contains not only the actions initiated by medical and nursing orders but also the coordination of care provided by all related healthcare disciplines. The nurse is often the person responsible for coordinating these various activities into the comprehensive functional plan, essential in providing holistic care for the client. Although independent nursing actions are an integral part of this process, collaborative actions are also implemented based on orders from all other disciplines participating in the care of the client.

We believe that because nursing is an essential part of collaborative practice, we have responsibility and accountability in every collaborative problem in which the nurse interacts with the client. Many factors influence whether an intervention is independent or requires collaboration. These factors include the educational preparation and expertise of the nurse, facility standing protocols, delegation of tasks, and the geographic area of care provision—for example, rural or urban, acute care, or community care settings.

DOING IT

Step 1—Assessment (Gathering Data)

The critical element for providing effectively planned nursing care is its relevance to concerns identified in client assessments. ANA's 2010 *Nursing: Scope and Standards of Practice* determined that client assessment is indicated in the following areas and abilities: physical, emotional, sexual, psychosocial, cultural, spiritual/transpersonal, cognitive, functional, age related, economic, and environmental. Nursing assessments, combined with the results of medical findings and diagnostic studies, are documented in the client database and form the foundation for development of the client's plan of care.

Interviewing the client and significant other(s) provides data through conversation and observation. This information includes the client's perceptions, that is, what the individual perceives to be a problem or need and typically what he or she wants to share. Data may be collected during one or more contact periods and should include all relevant information.

During information gathering, the nurse also exercises perceptual and observational skills, assessing the client through the senses of sight, hearing, touch, and smell. The duration and depth of any physical assessment session de-

pends on the current condition of the client and the urgency of the situation, but it usually includes inspection, palpation, percussion, and auscultation. Additionally, the nurse needs to be aware of medically determined diagnoses, results of diagnostic tests, and significant problems that require immediate physician intervention and/or initiation of specific nursing interventions.

Step 2—Diagnosis (Analyzing the Data)

The nursing diagnosis is only as correct as current assessment allows because it is supported by currently collected data. It documents the client's situation in real time and must be updated periodically (sometimes frequently) to reflect changes as they occur in the client's condition. The combination of accurate need identification and accurate diagnostic labeling provides the basis for selecting nursing interventions.

From the specific data recorded in the database, signs and symptoms can be identified, the related or risk factors (etiology) determined, and an individualized client diagnostic statement formulated. The nurse may use one of several formats such as a "problem, etiology, and signs and symptoms (PES)" format to accurately represent the client's situation for a **problem-focused** diagnosis. For example, the diagnostic statement may read as follows: "ineffective peripheral Tissue Perfusion related to smoking, sedentary lifestyle, evidenced by decrease in peripheral pulses, capillary refill >3 seconds, paresthesia." For a **risk or health promotion** diagnosis that does not have related factors, the diagnostic statement might read "risk for ineffective peripheral Tissue Perfusion as evidenced by insufficient knowledge of disease process, sedentary lifestyle, smoking" or "readiness for enhanced Health Management as evidenced by expressed desire to enhance management of risk factors and choices of daily living for meeting goals." To use a **syndrome diagnosis**, at least two or more nursing diagnoses must be present from the identified defining characteristics for the diagnosis—for example, "Chronic Pain Syndrome as evidenced by impaired physical mobility, insomnia, fatigue."

Unlike medical diagnoses (which describe disease conditions), nursing diagnoses change as the client progresses through various stages of illness and/or maladaptation to resolution of the problem or to the conclusion of the condition. Each decision the nurse makes is time dependent, and with additional information gathered at a later time, decisions may change. For example, the initial problems and needs for a client undergoing cardiac surgery may be "acute Pain, decreased Cardiac Output, risk for ineffective Breathing Pattern, and risk for Infection." As the client progresses, problems and needs are likely to shift to "Activity Intolerance, deficient Knowledge, and Self-Care deficit."

Step 3—Planning (Choosing Outcomes and Interventions)

Desired Client Outcomes

The nurse identifies expected outcomes for a plan of care individualized for a specific client (ANA, 2010). These desired outcomes (sometimes called goals) are identified to facilitate

choosing appropriate interventions and to serve as evaluators of both nursing care and client response. Useful desired client outcomes must have the following characteristics:

1. Be specific
2. Be realistic or achievable
3. Be measurable
4. Indicate a definite time frame for achievement or review
5. Consider the client's desires and resources

Desired client outcomes are created by listing items and behaviors that can be measured (i.e., observed, reported, or documented). They are monitored to determine whether an acceptable outcome or goal has been achieved within a specified time frame.

Action verbs describe the client's behavior to be evaluated and time frames are used, for example, "client will ambulate, using cane, within 24 hours of surgery." Time frames are dependent on the client's projected or anticipated length of stay (or period of care) and consider the presence of complications or extenuating circumstances, such as age or debilitating disease process.

When outcomes are properly written, they provide direction for planning and validating the selected nursing interventions. Consider the two following client outcomes: "Client will identify individual nutritional needs within 36 hours" and "... formulate a dietary plan based on identified nutritional needs within 72 hours." Based on the clarity of these outcomes, the nurse can select nursing interventions to ensure that the client's dietary knowledge is assessed, individual needs identified, and nutritional education presented.

Continuing the work on naming what nursing does (as discussed in opening paragraphs of this chapter), a standardized nursing language that focused on outcomes was developed—Nursing Outcomes Classification (NOC), containing more than 540 outcomes (Morehead et al, ed. 6, 2018). NOC outcomes take a more standardized approach, with an outcome label such as *Ambulation* having 16 indicators identified and measured on a five-point Likert-type scale ranging from "severely compromised" to "not compromised." NOC outcomes have been linked with NANDA nursing diagnoses, and we operationalize NOC labels to a limited extent in this textbook.

Interventions/Actions

Once the outcomes are identified, the nurse develops a plan that prescribes strategies and alternatives to achieve the expected outcomes (ANA, 2010). Nursing strategies are interventions and actions to be carried out to assist the client in achieving the stated desired client outcomes (e.g., movement toward health and independence). The expectation is that the prescribed behavior will benefit the client and family in a predictable way related to the identified problem or need and chosen outcomes.

Nursing interventions should be specific and clearly stated, beginning with an action verb indicating what the nurse is expected to do. Qualifiers expressing how, when, where, time, frequency, and amount provide the content of

the planned activity, for example, "Assist as needed with self-care activities each morning"; "Record respiratory and pulse rates before, during, and after activity"; and "Instruct family in postdischarge care."

Continuing the work on naming what nursing does (as discussed in opening paragraphs of this chapter), another standardized nursing language—Nursing Interventions Classification (NIC)—has been linked to NANDA-I nursing diagnoses. NIC has identified more than 550 (Butcher et al, 2018) direct and indirect interventions that are stated in general terms, such as *Respiratory Monitoring*. Each label has a varied number of activities that may be chosen to accomplish the intervention. These three languages—NANDA, NOC, and NIC—have been combined in some computerized clinical decision support programs. We have used NIC labels to a limited extent in this textbook to demonstrate a more complete blending of nursing diagnoses, outcomes, and interventions and operationalize them, especially for use in electronic health records.

To assist in visualizing this critical thinking process, a prototype client situation (Fig. 1.3) is provided as an example of data collection and construction of a plan of care. In the sample situation, we can see that as the client assessment database is reviewed, the nurse can identify the related or risk factors and defining characteristics for formulating the client diagnostic statements. Nursing interventions are based on needs identified by the client and the nurse during data collection. Timelines for outcomes reflect the anticipated length of stay for the client (thus potential discharge planning needs) and individual client-nurse expectations. Although not normally included in a plan of care, rationales are included in this sample for the purpose of explaining or clarifying the choice of interventions by assisting the student and practicing nurse in associating the pathophysiology and psychological principles with the selected nursing interventions.

Another way to conceptualize the client's care needs is to create a mind map, or concept map (Fig. 1.4). This learning tool was developed to help visualize the interconnectedness between various client symptoms, interventions, or problems as they impact each other. This design brings left-brained, linear problem-solving thinking together with the freewheeling, interconnected, creative right brain. Thus, the best parts of the traditional care plan (problem-solving and categorizing) are retained, but the linear and columnar nature of the traditional care plan is expressed in a design that uses the whole brain. Joining mind mapping and care planning enables the nurse to visualize a holistic view of a client, strengthening critical thinking skills and facilitating the creative process of planning client care.

Mind mapping starts with a figure drawn in the center of the page labeled with the main concept—the client. (This helps keep in mind that the client is the focus of the plan, not the medical diagnosis or condition.) From that central thought, other major ideas that relate to the client radiate out from the center like spokes of a wheel. Different concepts can be grouped together by geometric shapes, color coding, or placement on the page. Connections and interconnections

Client Situation: Diabetes Mellitus

Mr. R.S., a client with type 2 diabetes for 8 years, presented to his physician's office with a nonhealing ulcer of 3 weeks' duration on his left foot. Screening studies done in the physician's office revealed blood glucose (BG) of 356/fingerstick and urine Chemstix of 2%. Because of distance from medical provider and lack of local community services, he is admitted to the hospital. Review Database for clues to possible Nursing Diagnosis choices.

Admitting Physician's Orders

Culture/sensitivity and Gram's stain of foot ulcer
 Random blood glucose on admission and fingerstick BG qid—call for BG>250
 CBC, electrolytes, serum lipid profile, glycosylated Hb in a.m.
 Chest x-ray and ECG in a.m.
 Humulin R 10 units SC on admission
 DiaBeta 10 mg, PO bid
 Glucophage 500 mg, PO daily to start—will increase gradually
 Humulin N 10 units SC q a.m. Begin insulin instruction for post-discharge self-care if necessary
 Dicloxacillin 500 mg PO q6h, start after culture obtained
 Percocet 2.5/325 mg 1 or 2 tabs every 6 hrs PRN pain
 Diet—2400 calories, 3 meals with 2 snacks
 Arrange consult with dietitian
 Up in chair ad lib with feet elevated
 Foot cradle for bed
 Irrigate lesion L foot with NS tid, then cover with sterile dressing
 Vital signs qid

Client Assessment Database

Name: R.S. Informant: Client Reliability (Scale 1–4): 3 Age: 73 DOB: 5/3/45 Race: Caucasian
 Gender: M Adm. date: 6/28/2018 Time: 7 p.m. From: Home

ACTIVITY/REST

Subjective (Reports): Occupation: Farmer
 Usual activities/hobbies: reading, playing cards. "Don't have time to do much. Anyway, I'm too tired most of the time to do anything after the chores."
 Limitations imposed by illness: "Have to watch what I order if I eat out."
 Sleep: Hours: 6 to 8 hr/night Naps: No Aids: No
 Insomnia: "Not unless I drink coffee after supper."
 Usually feels rested when awakens at 4:30 a.m. but feeling fatigued past several weeks

Objective (Exhibits): Observed response to activity: limps, favors L foot when walking
 Mental status: Alert/active
 Neuromuscular assessment: Muscle mass/tone: Bilaterally equal/firm
 Posture: Erect ROM: Full all extremities
 Strength: Equal 3 extremities/(favors L foot currently)

CIRCULATION

Subjective (Reports): History of slow healing: Lesion L foot, 3 weeks' duration
 Extremities: Numbness/tingling: "My feet feel cold and tingly like sharp pins poking the bottom of my feet when I walk the quarter mile to the mailbox."
 Cough/character of sputum: Occ./white
 Change in frequency/amount of urine: Yes/voiding more lately

Objective (Exhibits): Peripheral pulses: Radials 3+; popliteal, dorsalis, post-tibial/pedal, all 1+
 BP: R: Lying: 146/90 Sitting: 140/86 Standing: 138/90
 L: Lying: 142/88 Sitting: 138/88 Standing: 138/84
 Pulse: Apical: 86 Radial: 86 Quality: Strong Rhythm: Regular
 Chest auscultation: few wheezes clear with cough, no murmurs/rubs
 Jugular vein distention: 0
 Extremities: Temperature: Feet cool bilaterally/legs warm
 Color: Skin: Legs pale Capillary refill: Slow both feet (approx. 4 seconds)
 Homans' sign: 0 Varicosities: Few enlarged superficial veins both calves
 Nails: Toenails thickened, yellow, brittle
 Distribution and quality of hair: Coarse hair to midcalf, none on ankles/toes
 Color: General: Ruddy face/arms Mucous membranes/lips: Pink
 Nailbeds: Blanch well Conjunctiva and sclera: White

EGO INTEGRITY

- Subjective (Reports):** Report of stress factors: "Normal farmer's problems: weather, pests, bankers, etc."
Ways of handling stress: "I get busy with the chores and talk things over with my livestock. They listen pretty good."
Financial concerns: No supplemental insurance; needs to hire someone to do chores while here
Relationship status: Married
Cultural factors: Rural/agrarian, eastern European descent, "American, no ethnic ties"
Religion: Protestant/practicing
Lifestyle: Middle class/self-sufficient farmer
Recent changes: No
Feelings: "I'm in control of most things, except the weather and this diabetes now."
Concerned re possible therapy change "from pills to shots."
- Objective (Exhibits):** Emotional status: generally calm, appears frustrated at times
Observed physiological response(s): occasionally sighs deeply/ frowns, fidgeting with coin, shoulders tense/shrugs shoulders, throws up hands

ELIMINATION

- Subjective (Reports):** Usual bowel pattern: almost every p.m.
Last BM: last night Character of stool: firm/brown
Bleeding: 0 Hemorrhoids: 0 Constipation: occ.
Laxative used: hot prune juice on occ.
Urinary: Voiding more frequently, up 1 or 2 times nightly
Character of urine: pale yellow
- Objective (Exhibits):** Abdomen tender: no Soft/firm: soft Palpable mass: 0
Bowel sounds: active all 4 quads

FOOD/FLUID

- Subjective (Reports):** Usual diet (type): 2400 calories (occ. "cheats" with dessert; "My wife watches it pretty closely.")
No. of meals daily: 3/1 snack
Dietary pattern: B: Fruit juice/toast/ham/decaf coffee
L: Meat/potatoes/veg/fruit/milk D: ½ meat sandwich/soup/fruit/decaf coffee
Snack: Milk/crackers at HS. Usual beverage: Skim milk, 2 to 3 cups decaf coffee, drinks "lots of water—several quarts"
Last meal/intake: Dinner: Roast beef sandwich, vegetable soup, pear with cheese, decaf coffee
Loss of appetite: "Never, but lately I don't feel as hungry as usual."
Nausea/vomiting: 0 Food allergies: None
Heartburn/food intolerance: Cabbage causes gas, coffee after supper causes heartburn
Mastication/swallowing problems: 0
Dentures: Partial upper plate—fits well
Usual weight: 175 lb Recent changes: Has lost about 6 lb this month
Diuretic therapy: No
- Objective (Exhibits):** Wt: 170 lb Ht: 5 ft 10 in Build: stocky
Skin turgor: Good/leathery
Condition of teeth/gums: Good, no irritation/bleeding noted
Appearance of tongue: Midline, pink
Mucous membranes: Pink, intact, moist
Breath sounds: Few wheezes cleared with cough
Bowel sounds: Active all 4 quads
Urine Chemstix: 2% Fingerstick: 356 (Dr. office) 450 random BG on adm

HYGIENE

- Subjective (Reports):** Activities of daily living: Independent in all areas
Preferred time of bath: p.m.
- Objective (Exhibits):** General appearance: Clean, shaven, short-cut hair; hands, rough and dry; skin on feet dry, cracked, and scaly
Scalp and eyebrows: Scaly white patches
No body odor

NEUROSENSORY

- Subjective (Reports):** Headache: "Occasionally behind my eyes when I worry too much."
 Tingling/numbness: Feet, 4 or 5 times/week (as noted)
 Eyes: Vision loss, farsighted, "Seems a little blurry now." Examination: 2 yr ago
 Ears: Hearing loss R: "Some" L: No (has not been tested)
 Nose: Epistaxis: 0 Sense of smell: "No problem."
- Objective (Exhibits):** Mental status: Alert, oriented to person, place, time, situation
 Affect: Concerned Memory: Remote/recent: Clear and intact
 Speech: Clear/coherent, appropriate
 Pupil reaction: PERRLA/small
 Glasses: Reading Hearing aid: No
 Handgrip/release: Strong/equal

PAIN/DISCOMFORT

- Subjective (Reports):** Primary focus: L foot Location: Medial aspect, L heel
 Intensity (0–10): 4 to 5 Quality: Dull ache with occ. sharp stabbing sensation
 Frequency/duration: "Seems like all the time." Radiation: No
 Precipitating factors: Shoes, walking How relieved: ASA, not helping
 Other concerns: Sometimes has back pain following chores/heavy lifting, relieved by ASA/liniment rubdown; knees ache—uses topical heat ointment
- Objective (Exhibits):** Facial grimacing: When lesion border palpated
 Guarding affected area: Pulls foot away
 Narrowed focus: No
 Emotional response: Tense, irritated

RESPIRATION

- Subjective (Reports):** Dyspnea: 0 Cough: Occ. morning cough, white sputum
 Emphysema: 0 Bronchitis: 0 Asthma: 0 Tuberculosis: 0
 Smoker: Filters pk/day: 1/2 No. yrs: 25+
 Use of respiratory aids: 0
- Objective (Exhibits):** Respiratory rate: 22 unlabored Depth: Good Symmetry: Equal, bilateral
 Auscultation: Few wheezes, clear with cough
 Cyanosis: 0 Clubbing of fingers: 0
 Sputum characteristics: None to observe
 Mentation/restlessness: Alert/oriented/relaxed

SAFETY

- Subjective (Reports):** Allergies: 0 Blood transfusions: 0
 Sexually transmitted disease: 0
 Risk behaviors: Wears seat belt
 Fractures/dislocations: L clavicle, 1960s, fell getting off tractor
 Arthritis/unstable joints: "Some in my knees."
 Back problems: Lower back pain 2 or 3 times/month
 Vision impaired: Requires glasses for reading
 Hearing impaired: Slightly (R), compensates by turning "good ear" toward speaker
 Immunizations: Current flu/pneumonia 3 yrs ago/tetanus maybe 8 yrs ago
- Objective (Exhibits):** Temperature: 99.4°F (37.4°C) tympanic
 Skin integrity: Impaired L foot Scars: R inguinal, surgical
 Rashes: 0 Bruises: 0 Lacerations: 0 Blisters: 0
 Ulcerations: Medial aspect L heel, 2.5-cm diameter, approx. 3 mm deep, wound edges inflamed, draining small amount cream-color/pink-tinged matter, slight musty odor noted
 Strength (general): Equal all extremities Muscle tone: firm
 ROM: Good Gait: Favors L foot Paresthesia/paralysis: Tingling, prickly sensation in feet after walking ¼ mile

SEXUALITY: MALE

- Subjective (Reports):** Sexually active: Yes Use of condoms: No (monogamous)
 Recent changes in frequency/interest: "I've been too tired lately."
 Penile discharge: 0 Prostate disorder: 0 Vasectomy: 0

SEXUALITY: MALE (continued)

Subjective (Reports): Last proctoscopic examination: 2 yr ago Prostate examination: 1 yr ago
Practice self-examination: Breast/testicles: No
Problems/complaints: "I don't have any problems, but you'd have to ask my wife if there are any complaints."

Objective (Exhibits): Examination: Breast: No masses Testicles: Deferred Prostate: Deferred

SOCIAL INTERACTIONS

Subjective (Reports): Marital status: Married 45 yr Living with: Wife
Report of problems: None
Extended family: One daughter lives in town (30 miles away);
one daughter married/grandson, living out of state
Other: Several couples, he and wife play cards/socialize with 2 to 3 times/mo
Role: Works farm alone; husband/father/grandfather
Report of problems related to illness/condition: None until now
Coping behaviors: "My wife and I have always talked things out. You know the 11th commandment is 'Thou shalt not go to bed angry.'"

Objective (Exhibits): Speech: Clear, intelligible
Verbal/nonverbal communication with family/SO(s): Speaks quietly with wife, looking her in the eye; relaxed posture
Family interaction patterns: Wife sitting at bedside, relaxed, both reading paper, making occasional comments to each other

TEACHING/LEARNING

Subjective (Reports): Dominant language: English Second language: 0 Literate: Yes
Education level: 2-yr college
Health and illness/beliefs/practices/customs: "I take care of the minor problems and see the doctor only when something's broken."
Presence of advance directives: Yes—wife to bring in
Durable medical power of attorney: Wife
Familial risk factors/relationship:
Diabetes: Maternal uncle
Tuberculosis: Brother died, age 27
Heart disease: Father died, age 78, heart attack
Strokes: Mother died, age 81
High BP: Mother
Prescribed medications:
Drug: DiaBeta dose: 10 mg bid
Schedule: 8 a.m./6 p.m., last dose 6 p.m. today
Purpose: Control diabetes
Takes medications regularly? Yes
Home urine/glucose monitoring: "Only using Tes-Tape, stopped some months ago when I ran out. It was always negative, anyway. Don't like sticking my fingers."
Nonprescription (OTC) drugs: Occ. ASA Herbals/supplements: No
Use of alcohol (amount/frequency): Socially, occ. beer
Tobacco: 1/2 pk/day Smokeless: No
Admitting diagnosis (physician): Hyperglycemia with nonhealing lesion L foot
Reason for hospitalization (client): "Sore on foot and the doctor is concerned about my blood sugar, and says I'm supposed to learn this fingerstick test now."
History of current complaint: "Three weeks ago I got a blister on my foot from breaking in my new boots. It got sore so I lanced it but it isn't getting any better."
Client's expectations of this hospitalization: "Clear up this infection and control my diabetes."
Other relevant illness and/or previous hospitalizations/surgeries:
1986, R inguinal hernia repair; tonsils, age 5 or 6
Evidence of failure to improve: Lesion L foot, 3 wk
Last physical examination: Complete 1 yr ago, office follow-up 5 mo ago

DISCHARGE CONSIDERATIONS (AS OF 6/28)

Anticipated discharge: 7/1/18 (3 days)
Resources: Self, wife

DISCHARGE CONSIDERATIONS (AS OF 6/28) (continued)

Financial: "If this doesn't take too long to heal, we got some savings to cover things."

Community supports: Diabetic support group (has not participated)

Anticipated lifestyle changes: Become more involved in management of condition

Assistance needed: May require farm help for several days

Teaching: Learn new medication regimen and wound care; review diet; encourage smoking cessation

Referral: Supplies: Downtown pharmacy or AARP

Equipment: Glucometer-AARP

Follow-up: Primary care provider 1 wk after discharge to evaluate wound healing and potential need for additional changes in diabetic regimen

Figure 1.3 Client situation: Diabetes mellitus.

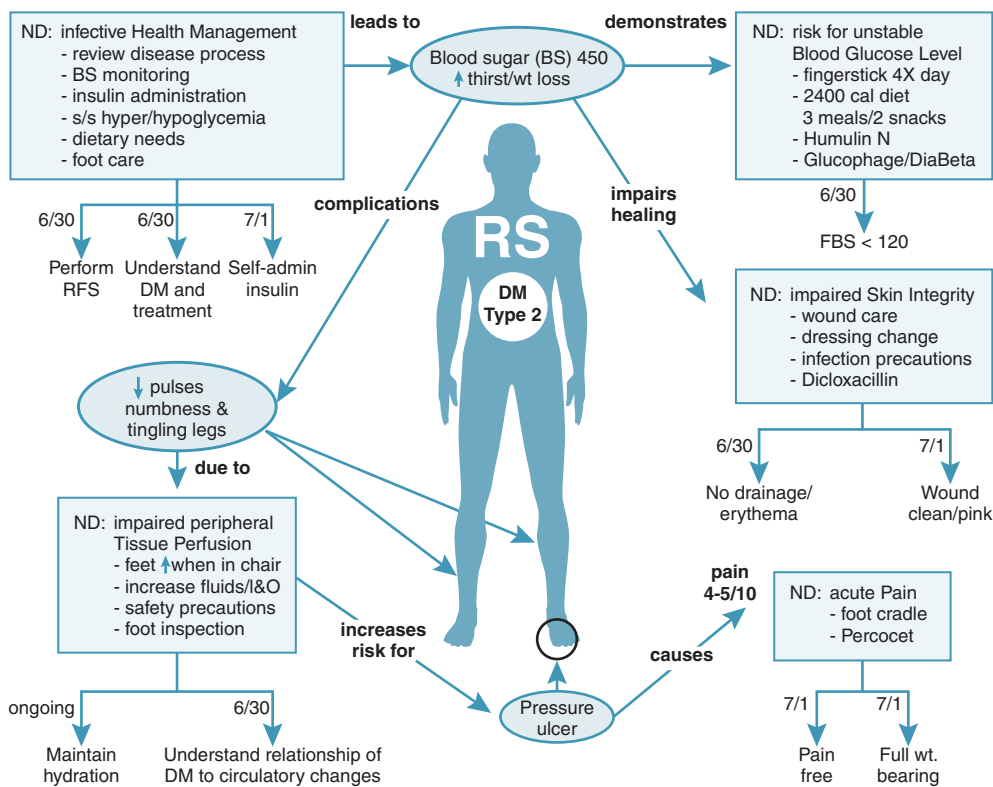


Figure 1.4 Mind map for Mr. R.S.

between groups of ideas are represented by the use of arrows or lines, with defining phrases added that explain how the interconnected thoughts relate to one another. In this manner, many different pieces of information *about* the client can be connected directly *to* the client. When the plan is completed, there should be a clear nursing diagnosis (supported by subjective and objective evaluation assessment data), nursing interventions, and desired client outcome(s) all connected in a manner that shows there is a relationship between them. It is critical to understand that there is no preset order for assembling the pieces because one cluster is not more or less important than another (and one is not subsumed under another). However, it is important that the pieces are in the same order in each spoke. For example, if the first piece is assessment data, followed by the nursing diagnosis, then outcomes, and finally interventions, that order should be maintained throughout the map.

Step 4—Implementation

To operationalize step 4 and implement the plan in a timely and cost-effective manner, first identify the priorities for providing client care. Review the plan for outcomes that are to be evaluated during your time of providing care (e.g., shift or day), followed by planned interventions that are sequential or time related, as well as those that can be combined to maximize nursing time and client effort. This is also the time to review the plan of care with the client/significant other to schedule activities and verify the client's responsibilities. In addition, legal and ethical concerns related to the interventions need to be considered. For example, the wishes of the client and family/significant others regarding what is being done need to be discussed and respected, as well as differences resolved where possible. Finally, it is important to provide an environment conducive to carrying out the planned interventions.

Step 5—Evaluation and Documentation of Plans of Care

As nursing care is provided, ongoing assessment evaluates the client's response to therapy and progress toward accomplishing the desired outcomes. As care is provided, the nurse monitors and documents the client's response to the interventions and communicates this information to other healthcare providers as appropriate.

This activity serves as the feedback and control part of the nursing process through which the status of the individual client diagnostic statement is judged to be resolved, continuing, or requiring revision. Then the data are used to document nursing interventions and client response, as well as to reevaluate and revise the plan of care as needed.

This process is visualized in Figure 1.5. Observation of Mr. R.S.'s wound reveals that edges are clean and pink and drainage is scant. Therefore, he is progressing toward achieving wound healing; this problem will continue to be addressed, although no revision in the treatment plan is required at this time.

Another way to evaluate and document the client's progress (response to care) is by using clinical pathways. These pathways were originally developed as tools for pro-

viding care in case management systems and are now used in many settings. A clinical pathway is a type of abbreviated plan of care that is event oriented (task oriented) and provides outcome-based guidelines for goal achievement within a designated length of stay. The pathway incorporates agency and professional standards of care and may be interdisciplinary, depending on the care setting. As a rule, however, the standardized clinical pathways address a specific diagnosis, condition, or procedure, such as myocardial infarction, total hip replacement, or chemotherapy, and do not provide for inclusion of secondary diagnoses or complications, such as an asthmatic client in alcohol withdrawal. In short, if the client does not achieve the daily outcomes or goals of care, the variance is identified and a separate plan of care must be developed to meet the client's individual needs. Therefore, although clinical pathways are becoming more common in the clinical setting, they have limited value (in place of more individualized plans of care) as learning tools for students who are working to practice the nursing process, critical thinking, and a holistic approach to meeting client needs. A sample clinical pathway (Fig. 1.6) reflects Mr. R.S.'s primary diagnostic problem: nonhealing diabetic wound.

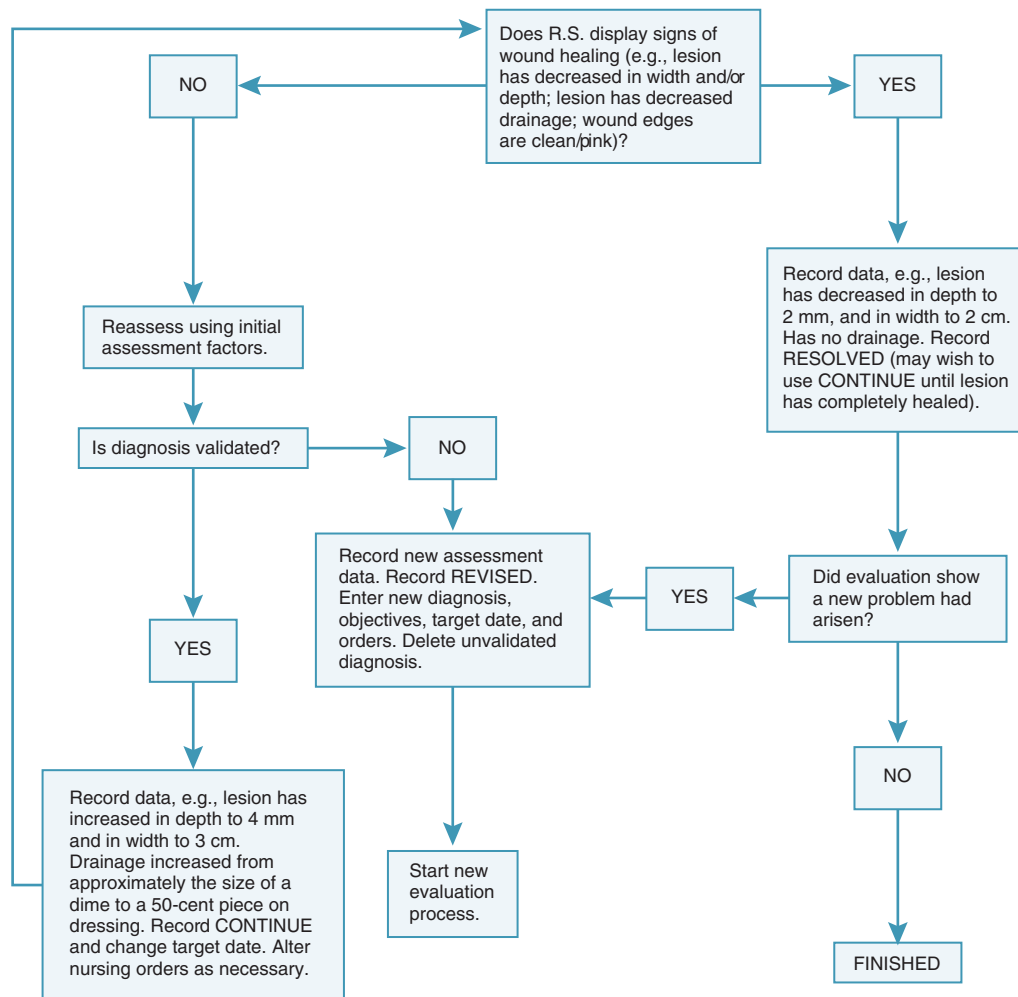


Figure 1.5 Outcome-based evaluation of the client's response to therapy (adapted from Newfield et al, 2016).

CP: Nonhealing Lesion—Diabetic. ELOS: 3 Days—Variations from Designated Pathway Should Be Documented in Progress Notes

ND and Categories of Care		Adm Day 1 6/28 7 p.m.	Day 2 6/29	Day 3 6/30	Discharge 7/1
Impaired Skin/ Tissue Integrity			<p>Actions/Goals: Verbalize understanding of condition Display blood glucose WNL (ongoing)</p>	<p>Actions/Goals: Be free of signs of dehydration Wound free of purulent drainage Verbalize understanding of treatment needs Perform self-care tasks No. 1 and 3 correctly Explain reasons for actions</p>	<p>Actions/Goals: Wound edges show signs of healing process Perform self-care task No. 2 correctly Explain reason for actions Plan in place to meet discharge needs</p>
Referrals			<p>Dietitian & determine need for: Home care Physical therapy Visiting nurse CBC, electrolytes Glycosylated Hb, serum lipid profile →Fingerstick BG qid/call>250 Chest x-ray (if indicated) ECG (if indicated)</p>	→	Fingerstick BG bid if stable
Diagnostic studies	<p>Wound culture/sensitivity Gram's stain Random blood glucose Fingerstick BG hs</p>		→	→ VS each shift → →	→ → D/C →
Additional assessments	<p>VS qid I&O/level of hydration daily Character of wound tid Level of knowledge and priorities of learning needs Observe for signs of antibiotic hypersensitivity reaction</p>		→ → →		
Medications	<p>Antibiotic: <i>Dicloxacillin</i> 500 mg PO q6h Antidiabetic: <i>Humulin R insulin</i> 10 units SC on adm</p>	<p>Antibiotic: <i>Dicloxacillin</i> 500 mg PO q6h Antidiabetic: <i>Humulin R insulin</i> 10 units SC on adm</p>	<p>Antibiotic: same Antidiabetic: <i>Humulin N insulin</i> 10 U SC q a.m. <i>DiaBeta</i> 10 mg PO bid <i>Glucophage</i> 500 mg PO daily</p>	<p>Antibiotic: same Antidiabetic: same</p>	<p>Antibiotic: same Antidiabetic: same</p>
Client education	<p>Provide: <i>Understanding Your Diabetes</i></p>	<p>Film <i>Living with Diabetes</i> Demonstrate and practice tasks: 1. Fingerstick BG 2. Insulin administration 3. Wound care 4. Routine foot care</p>	<p>Group sessions: <i>Diabetic management</i></p>	<p>Practice self-care task No. 2: <i>insulin administration</i> Review discharge instructions</p>	
Additional nursing actions	<p>Up ad lib NS soaks/dressing change tid</p>	→ →	→ →		

CP: Nonhealing Lesion—Diabetic. ELOS: 3 Days—Variations from Designated Pathway Should Be Documented in Progress Notes
(Continued)

ND and Categories of Care		Adm Day 1 <u>6/28 7 p.m.</u>	Day 2 <u>6/29</u>	Day 3 <u>6/30</u>	Discharge <u>7/1</u>
Acute Pain		<p>Actions/Goals</p> <p>State pain relieved or minimized with 1 hr of analgesic administration (ongoing)</p> <p>Verbalize understanding of when to report pain and rating scale used</p> <p>Verbalize understanding of self-care measures</p> <p>No. 1 and 2</p> <p>Explain reason for actions</p>	<p>Actions/Goals</p> <p>Verbalize understanding of self-care test</p> <p>No. 3</p> <p>Explain reason for actions</p>	<p>Actions/Goals</p> <p>Able to participate in usual level: <i>ambulate full weight-bearing</i></p>	<p>Actions/Goals</p> <p>State pain-free/controlled with medication</p> <p>Verbalize understanding of correct medication use</p>
Additional assessments		<p>Characteristics of pain</p> <p>Level of participation activities</p> <p>Individual analgesic needs</p> <p>Analgesic: Percocet 2.5/325 mg PO 1 or 2 tabs q6h PRN</p> <p>Orient to unit/room</p> <p>Guidelines for self-report of pain and rating scale 0–10</p> <p>Safety/comfort measures:</p> <p>1 <i>elevation of feet</i></p> <p>2 <i>proper footwear</i></p> <p>Bed cradle as indicated</p>	<p>→</p> <p>→</p> <p>→</p> <p>Analgesic: same</p> <p>Safety/comfort measures: 3 <i>prevention of injury</i></p>	<p>→</p> <p>→</p> <p>→</p> <p>Analgesic: same</p>	<p>→</p> <p>→</p> <p>→</p> <p>Analgesic: same</p> <p>Review discharge medication instructions: dosage, route, frequency, side effects</p>
Medications					
Allergies: -0-					
Client education					
Additional nursing actions					

Figure 1.6 Sample Clinical Pathway: Nonhealing diabetic wound.

PLAN OF CARE: Mr. R.S.**Client Diagnostic Statement**

impaired Skin Integrity related to pressure over a bony prominence, as evidenced by acute pain, alteration in skin integrity—draining wound L foot.

Outcome

Wound Healing: Secondary Intention (NOC) Indicators:

Client Will

Be free of purulent drainage within 48 hours (6/30, 7 p.m.).

Display signs of healing with wound edges clean and pink within 60 hours (7/1, 7 a.m.).

ACTIONS/INTERVENTIONS**RATIONALE****Wound Care NIC**

Irrigate wound with room-temperature sterile normal saline (NS) tid.

Cleans wound without harming delicate tissues.

Assess wound with each dressing change. Obtain wound tracing on admission and at discharge.

Provides information about effectiveness of therapy and identifies additional needs.

Apply sterile dressing using paper tape.

Keeps wound clean, minimizes cross-contamination.
Note: Adhesive tape may be abrasive to fragile tissues.

Infection Control NIC

Follow wound precautions.

Use of gloves and proper handling of contaminated dressings reduces likelihood of spread of infection.

Obtain sterile specimen of wound drainage on admission.

Culture/sensitivity identifies pathogens and therapy of choice.

Administer dicloxacillin 500 mg per os (PO) q6h, starting at 10 p.m.

Treatment of infection and prevention of complications.
Food interferes with drug absorption, requiring scheduling around meals.

Observe for signs of hypersensitivity: pruritus, urticaria, rash.

Although no history of penicillin reaction, it may occur at any time.

PLAN OF CARE:**Client Diagnostic Statement**

risk for unstable Blood Glucose Level as evidenced by insufficient diabetes management and inadequate blood glucose monitoring (fingerstick 450/adm).

Outcome

Blood Glucose Level (NOC) Indicators:

Client Will

Demonstrate correction of metabolic state as evidenced by fasting blood sugar (FBS) less than 170 mg/dL within 36 hours (6/30, 7 a.m.).

ACTIONS/INTERVENTIONS**RATIONALE****Hyperglycemia Management NIC**

Perform fingerstick blood glucose (BG) qid. Call for BG >250.

Bedside analysis of blood glucose levels is a more timely method for monitoring effectiveness of therapy and provides direction for alteration of medications such as additional regular insulin.

(continues on page 22)

ACTIONS/INTERVENTIONS (continued)**RATIONALE** (continued)

Administer antidiabetic medications:	Treats underlying metabolic dysfunction, reducing hyperglycemia and promoting healing.
10 units Humulin N insulin subcutaneous (SC) every a.m. after fingerstick BG	Intermediate-acting preparation with onset of 2 to 4 hr, peak 6 to 12 hr, with a duration of 18 to 24 hr. Increases transport of glucose into cells and promotes the conversion of glucose to glycogen.
DiaBeta 10 mg PO bid	Lowers blood glucose by stimulating the release of insulin from the pancreas and increasing the sensitivity to insulin at the receptor sites.
Glucophage 500 mg PO daily. Note onset of side effects.	Glucophage lowers serum glucose levels by decreasing hepatic glucose production and intestinal glucose absorption and increasing sensitivity to insulin. By using in conjunction with DiaBeta, client may be able to discontinue insulin once target dosage is achieved (e.g., 2000 mg/d). An increase of 1 tablet per week is necessary to limit side effects of diarrhea, abdominal cramping, and vomiting, possibly leading to dehydration and prerenal azotemia.
Provide diet 2400 cal—three meals/two snacks.	Proper diet decreases glucose levels and insulin needs, prevents hyperglycemic episodes, can reduce serum cholesterol levels, and promotes satiation.
Schedule consultation with dietitian to restructure meal plan and evaluate food choices.	Calories are unchanged on new orders but have been redistributed to three meals and two snacks. Dietary choices (e.g., increased vitamin C) may enhance healing.

PLAN OF CARE:**Client Diagnostic Statement**

acute Pain related to physical injury agent (open wound L foot) as evidenced by self-report of intensity using standardized pain scale (4 to 5/10) and guarding behavior.

Outcome**Pain Level (NOC) Indicators:****Client Will**

Report pain is minimized or relieved within 1 hr of analgesic administration (ongoing).
Report absence or effective control of pain by discharge (7/1).

Outcome**Pain: Disruptive Effects (NOC) Indicators:****Client Will**

Ambulate with ease, full weight-bearing by discharge (7/1).

ACTIONS/INTERVENTIONS**RATIONALE****Pain Management: Acute NIC**

Determine pain characteristics through client's description.	Establishes baseline for assessing improvement and changes.
Place foot cradle on bed; encourage use of loose-fitting slipper when up.	Avoids direct pressure to area of injury, which could result in vasoconstriction and increased pain.
Administer Darvocet-N 100 mg PO every 4 hr as needed. Document effectiveness.	Provides relief of discomfort when unrelieved by other measures.

PLAN OF CARE:**Client Diagnostic Statement**

ineffective peripheral Tissue Perfusion related to insufficient knowledge of disease process and modifiable factors, as evidenced by decrease in peripheral pulses, alteration in skin characteristics [pale/cool feet], capillary refill 4 sec, paresthesia [of feet].

Outcomes

Knowledge: Diabetes Management (NOC) Indicators:

Client Will

Verbalize understanding of relationship between chronic disease (diabetes mellitus) and circulatory changes within 48 hr (6/30, 7 p.m.).

Demonstrate awareness of safety factors and proper foot care within 48 hr (6/30, 7 p.m.).

Maintain adequate level of hydration to maximize perfusion (ongoing), as evidenced by balanced intake/output, moist skin and mucous membranes, and capillary refill less than 4 sec (daily; ongoing).

ACTIONS/INTERVENTIONS**RATIONALE****Circulatory Care: Arterial Insufficiency NIC**

Elevate feet when up in chair. Avoid long periods with feet in dependent position.

Minimizes interruption of blood flow and reduces venous pooling.

Assess for signs of dehydration. Monitor intake/output. Encourage oral fluids.

Glycosuria may result in dehydration with consequent reduction of circulating volume and further impairment of peripheral circulation.

Instruct client to avoid constricting clothing and socks and ill-fitting shoes.

Compromised circulation and decreased pain sensation may precipitate or aggravate tissue breakdown.

Reinforce safety precautions regarding use of heating pads, hot water bottles, or soaks.

Heat increases metabolic demands on compromised tissues. Vascular insufficiency alters pain sensation, increasing risk of injury.

Recommend cessation of smoking.

Vascular constriction associated with smoking and diabetes impairs peripheral circulation.

Discuss complications of disease that result from vascular changes: ulceration, gangrene, and muscle or bony structure changes.

Although proper control of diabetes mellitus may not prevent complications, severity of effects may be minimized. Diabetic foot complications are the leading cause of nontraumatic lower-extremity amputations. *Note:* Skin dry, cracked, scaly; feet cool; and pain when walking a distance suggest mild to moderate vascular disease (autonomic neuropathy) that can limit response to infection, impair wound healing, and increase risk of bony deformities.

Review proper foot care as outlined in teaching plan.

Altered perfusion of lower extremities may lead to serious or persistent complications at the cellular level.

PLAN OF CARE:**Client Diagnostic Statement**

ineffective Health Management related to insufficient knowledge of therapeutic regimen, perceived benefit/susceptibility or seriousness of condition as evidenced by failure to include treatment regimen in daily living [home glucose monitoring, foot care] and failure to take action to reduce risk factors.

Outcomes

Knowledge: Diabetes Management (NOC) Indicators:

Client Will

Perform procedure of home glucose monitoring correctly within 36 hr (6/30, 7 a.m.).

Verbalize basic understanding of disease process and treatment within 38 hr (6/30, 9 a.m.).

Explain reasons for actions within 38 hr (6/30, 9 a.m.).

Perform insulin administration correctly within 60 hr (7/1, 7 a.m.).

ACTIONS/INTERVENTIONS

RATIONALE

Teaching: Disease Process NIC

Determine client's level of knowledge, priorities of learning needs, and desire/need for including wife in instruction.

Establishes baseline and direction for teaching and planning. Involvement of wife, if desired, will provide additional resource for recall and understanding and may enhance client's follow-through.

Provide teaching guide, "Understanding Your Diabetes," 6/28 p.m. Show film *Living With Diabetes*, 6/29, 4 p.m., when wife is visiting. Include in group teaching session, 6/30 a.m. Review information and obtain feedback from client and wife.

Provides different methods for accessing and reinforcing information and enhances opportunity for learning and understanding.

Discuss factors related to and altering diabetic control, such as stress, illness, and exercise.

Drug therapy and diet may need to be altered in response to both short- and long-term stressors and changes in activity level.

Review signs and symptoms of hyperglycemia (e.g., fatigue, nausea, vomiting, polyuria, polydipsia). Discuss how to prevent and evaluate this situation and when to seek medical care. Have client identify appropriate interventions.

Recognition and understanding of these signs and symptoms and timely intervention will aid client in avoiding recurrences and preventing complications.

Review and provide information about necessity for routine examination of feet and proper foot care (e.g., daily inspection for injuries, pressure areas, corns, calluses; proper nail care; daily washing; application of good moisturizing lotion such as Eucerin, Keri, or Nivea bid). Recommend loose-fitting socks and properly fitting shoes (break new shoes in gradually), and avoid going barefoot. If foot injury or skin break occurs, wash with soap or dermal cleanser and water, cover with sterile dressing, inspect wound, and change dressing daily; report redness, swelling, or presence of drainage.

Reduces risk of tissue injury; promotes understanding and prevention of pressure ulcer formation and wound-healing difficulties.

Teaching: Prescribed Medication NIC

Instruct regarding prescribed insulin therapy:

May be a temporary treatment of hyperglycemia with infection or may be permanent combination with oral hypoglycemic agent.

Humulin N insulin, SC

Intermediate-acting insulin generally lasts 18 to 28 hr, with peak effect 6 to 12 hr.

Keep vial in current use at room temperature (if used within 30 days).

Cold insulin is poorly absorbed.

Store extra vials in refrigerator.

Refrigeration prolongs the drug shelf-life by preventing wide fluctuations in temperature.

Roll bottle and invert to mix, or shake gently, avoiding bubbles.

Vigorous shaking may create foam, which can interfere with accurate dose withdrawal and damage the insulin molecule. *Note:* New research suggests that gently shaking the vial may be more effective in mixing suspension. (Refer to facility procedure manual.)

Choice of injection sites (e.g., across lower abdomen in Z pattern).

Provides for steady absorption of medication. Site is easily visualized and accessible by client, and Z pattern minimizes tissue damage.

Demonstrate and then observe client in drawing insulin into syringe, reading syringe markings, and administering dose. Assess for accuracy.

May require several instruction sessions and practice before client and wife feel comfortable drawing up and injecting medication.

Instruct in signs and symptoms of insulin reaction or hypoglycemia: fatigue, nausea, headache, hunger, sweating, irritability, shakiness, anxiety, or difficulty concentrating.

Knowing what to watch for and appropriate treatment such as ½ cup grape juice for immediate response and snack within 30 min (e.g., one slice bread with peanut butter or cheese, or fruit and slice of cheese for sustained effect) may prevent or minimize complications.

ACTIONS/INTERVENTIONS (continued)**RATIONALE** (continued)

Review “sick day rules,” for example, call doctor if too sick to eat normally or stay active; take insulin as ordered. Keep record as noted in Sick Day Guide.	Understanding of necessary actions in the event of mild to severe illness promotes competent self-care and reduces risk of hyperglycemia or hypoglycemia.
Instruct client and wife in fingerstick glucose monitoring to be done four times per day until stable, then twice a day at rotating times, such as FBS and before dinner, or before lunch and at bedtime. Observe return demonstrations of the procedure.	Fingerstick monitoring provides accurate and timely information regarding diabetic control.
Recommend client maintain record or log of fingerstick testing, antidiabetic medication and insulin dosage/site, unusual physiological response, and dietary intake. Outline desired goals, for example, FBS 80 to 110, premeal 80 to 120.	Return demonstration verifies correct learning. Provides accurate record for review by caregivers for assessment of therapy effectiveness and needs.
Discuss other healthcare issues, such as smoking habits, self-monitoring for cancer (breasts and testicles), and reporting changes in general well-being.	Encourages client involvement, awareness, and responsibility for own health; promotes wellness. <i>Note:</i> Smoking tends to increase client’s resistance to insulin.

Cardiovascular

HYPERTENSION: SEVERE

I. Pathophysiology

- a. Multifactorial
 - i. Complex interactions between the vasculature, kidneys, sympathetic nervous system, baroreceptors, renin-angiotensin-aldosterone system, and insulin resistance
- b. Mosaic theory
 - i. Genetic disposition
 - ii. Environmental: dietary Na⁺/fat intake, trace metals, stress, smoking
 - iii. Anatomical: abnormalities of vascular system
 - iv. Adaptive: e.g., regulation of intracellular Na⁺ and Ca⁺⁺ by cell membrane ion pumps
 - v. Neural: variety of complex nerve mechanisms
 - vi. Endocrine: pheochromocytoma, primary aldosteronism
 - vii. Humoral: varied agents that constrict and dilate blood vessels
 - viii. Hemodynamic: blood volume or viscosity, intrarenal hemodynamics

II. Classification and Severity—(Scordo, 2015; American Heart Association [AHA], 2014; Scordo & Pickett, 2015; Weber et al, 2014) (American College of Cardiology/American Heart Association [ACC/AHA], 2017)

- a. Normal adult blood pressure (BP)—less than 120/<80 mm Hg
- b. Elevated blood pressure—120–129/<80 mm Hg
- c. Hypertension stage 1—systolic blood pressure (SBP) 130–139 mm Hg or diastolic blood pressure (DBP) 80–89 mm Hg
- d. Hypertension stage 2—SBP ≥140 mm Hg or DBP ≥90 mm Hg

- e. Hypertensive crisis—SBP higher than 180 mm Hg or DBP higher than 120 mm Hg

III. Etiology

- a. Primary (essential), which accounts for approximately 90% to 95% of all cases, has no identifiable cause
- b. Secondary hypertension, which accounts for 2% to 10% of all cases, occurs because of an identifiable, sometimes correctable, pathological condition, such as kidney disorders, adrenal gland tumors, or primary aldosteronism; medications; drugs; or other chemicals.

IV. Statistics—(Centers for Disease Control and Prevention [CDC], National Center for Health Statistics, 2015; Davis, 2015; Mozaffarian et al, 2015)

1. Morbidity:

- i. Between 2013 and 2014, 33.5% of adults ages 20 and over reportedly had hypertension (measured high blood pressure and/or taking antihypertensive medication).
- ii. Men have a higher prevalence until about age 45; from age 45 to 64 years, the percentages are nearly equal between men and women. Beyond age 64 years, a higher percentage of women have hypertension than men (Mozaffarian et al, 2015).
- iii. Uncontrolled hypertension occurs in almost half of adults (Davis, 2015).

2. Mortality (CDC, 2015a): High blood pressure was reported as a primary or contributing cause of death for more than 410,000 Americans in 2014.

3. Cost: In 2015, the CDC Vital Statistics Cooperative Program reported that high blood pressure costs the nation \$48.6 billion each year (total includes the cost of healthcare services, medications to treat high blood pressure, and missed days of work) (CDC, 2015a).

G L O S S A R Y

Atrial hypertrophy: Increased atrial volume and pressure.

(DBP): Diastolic blood pressure.

Hypokalemia: Low serum potassium.

Resistant hypertension: Blood pressure remains high despite treatment with different types of blood pressure medications. Some studies suggest that people with resistant hypertension have associated risk factors such as **diabetes, obstructive sleep apnea**, enlargement of the

heart chambers, and/or **chronic kidney disease** (Beckerman, 2015).

Systemic vascular resistance (SVR): An index of arterial compliance or constriction throughout the body; equal to BP divided by cardiac output.

(SBP): Systolic blood pressure.

Target organ disease or damage (TOD): Organ or system of organs that are primarily affected by hypertension, such as the heart, kidneys, and brain.

CARE SETTING

Although hypertension is usually treated in a community setting, complications or cardiovascular compromise may require inpatient care, especially when target organ disease (TOD) is present. Most interventions included here can be used in either setting.

RELATED CONCERNS

Cerebrovascular accident (CVA)/stroke, page 247

Myocardial infarction, page 72

Psychosocial aspects of care, page 835

Acute kidney injury, page 595

Renal failure: Chronic kidney disease, page 607

CLIENT ASSESSMENT DATABASE

DIAGNOSTIC DIVISION
MAY REPORT

MAY EXHIBIT

**CLIENT MAY NOT HAVE REPORTABLE SYMPTOMS

ACTIVITY/REST

- Sedentary lifestyle (major risk factor for hypertension)
- Weakness, fatigue
- Shortness of breath

- Elevated heart rate
- Change in heart rhythm
- Tachypnea
- Dyspnea with exertion

CIRCULATION

- History of elevated BP over time
- Presence of TOD, such as atherosclerotic, valvular, or coronary artery heart disease, including myocardial infarction (MI), angina, heart failure (HF), and cerebrovascular disease
- Episodes of palpitations, diaphoresis

- **Pulses:** Bounding carotid, jugular, radial pulsations
- Pulse disparities, particularly femoral delay as compared with radial or brachial pulsation and absence of or diminished popliteal, posterior tibial, pedal pulses
- **Apical pulse:** Point of maximal impulse (PMI) possibly displaced or forceful
- **Heart rate and rhythm:** Tachycardia, various dysrhythmias
- **Heart sounds:** Accentuated S₂ at base; S₃ in early HF; S₄, which reflects rigid left ventricle and left ventricular hypertrophy; murmurs of valvular stenosis; vascular bruits audible over carotid, femoral, or epigastrium
- Jugular vein distension (JVD)
- **Extremities:** Discoloration of skin; cool temperature, indicating peripheral vasoconstriction; and slow or delayed capillary refill, indicating vasoconstriction
- **Skin:** Pallor, cyanosis, and diaphoresis, suggesting pulmonary congestion and hypoxemia, or flushing, suggesting pheochromocytoma

EGO INTEGRITY

- Multiple stress factors, such as relationship, financial, or job-related concerns

- Narrowed focus

(continues on page 28)

MAY REPORT (continued)

MAY EXHIBIT (continued)

ELIMINATION

- Past or present renal insult, such as kidney infection, renovascular obstruction, or history of kidney disease

FOOD/FLUID

- Food preferences that are high calorie, high salt, high fat, and high cholesterol, such as fried foods, cheese, eggs, or licorice
- Low dietary intake of potassium, calcium, and magnesium
- Nausea, vomiting
- Recent weight changes
- Current or history of diuretic use

NEUROSENSORY

- History of numbness or weakness on one side of the body; transient ischemia attack (TIA) or stroke
- Fainting spells or dizziness
- Throbbing, suboccipital headaches, usually present on awakening and disappearing spontaneously after several hours
- Visual disturbances, such as diplopia and blurred vision
- Episodes of epistaxis

PAIN/DISCOMFORT

- Severe, throbbing occipital headaches located in suboccipital region, present on awakening and disappearing spontaneously after several hours
- Stiffness of neck, dizziness, and blurred vision
- Abdominal pain or masses, suggesting pheochromocytoma

RESPIRATION

- Dyspnea associated with activity or exertion
- Tachypnea, orthopnea, paroxysmal nocturnal dyspnea
- Cough with or without sputum production
- Smoking history (major risk factor)

SAFETY

- Transient episodes of numbness, unilateral paresthesias
- Lightheadedness with position change

SEXUALITY

- Postmenopausal (major risk factor)
- Erectile dysfunction (ED), which may be associated with hypertension or antihypertensive medications

TEACHING/LEARNING

- Familial risk factors, including hypertension, atherosclerosis, heart disease, diabetes mellitus, and cerebrovascular or kidney disease
- Ethnic or racial risk factors, such as increased prevalence in African American and Southeast Asian populations
- Use of birth control pills or other hormone replacement therapy
- Drug and alcohol use

- May have decreased urinary output, if kidney failure is present, or increased output, if taking diuretics

- Normal weight or obesity. *Note:* Being overweight is a significant risk factor for hypertension. Obesity and older age are two risk factors especially in clients of older age and resistant hypertension (Davis, 2015).
- Presence of edema
- Venous congestion, JVD
- Glycosuria—When patients have both hypertension and diabetes, their risk for cardiovascular disease doubles (AHA, 2016a)

- **Mental status:** Changes in alertness, orientation, speech pattern and content, affect, thought process, or memory
- **Motor responses:** Decreased strength, hand grip, and deep tendon reflexes
- **Optic retinal changes:** From mild sclerosis and arterial narrowing to marked retinal and sclerotic changes with edema or papilledema, exudates, hemorrhage, and arterial nicking, although dependent on severity and duration of hypertension and resulting TOD

- Reluctance to move head, rubbing head, avoidance of bright lights and noise, wrinkled brow, clenched fists; grimacing and guarding behaviors

- Respiratory distress or use of accessory muscles
- Adventitious breath sounds, such as crackles or wheezes
- Pallor or cyanosis generally associated with advanced cardiopulmonary effects of sustained or severe hypertension

- Impaired coordination or gait

MAY REPORT (continued)

- Use of herbal supplements to manage BP, such as garlic, hawthorn, black cohosh, celery seed, coleus, and evening primrose

DISCHARGE PLAN CONSIDERATIONS

- May require assistance with self-monitoring of BP as well as periodic evaluation of and alterations in medication therapy
- ♦ Refer to section at end of plan for postdischarge considerations.

MAY EXHIBIT (continued)

DIAGNOSTIC STUDIES

TEST

WHY IT IS DONE

WHAT IT TELLS ME

BLOOD TESTS

- **Blood urea nitrogen (BUN) and creatinine (Cr):** BUN measures the amount of urea nitrogen in the blood. Cr measures the amount of creatinine in blood or urine.
- **Glucose:** Measures the amount of glucose in the blood at the time of sample collection.
- **Serum potassium:** Potassium is an electrolyte that helps regulate the amount of fluid in the body, stimulate muscle contraction, and maintain a stable acid-base balance.
- **Lipid panel, including total lipids, high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, total cholesterol, triglycerides:** The group of tests that make up a lipid profile has been shown to be good indicators of risk for heart attack or stroke.
- **Thyroid studies:** Blood test and scan to evaluate thyroid function; most commonly used laboratory test is the measurement of thyroid-stimulating hormone (TSH).
- **Serum/urine aldosterone level:** May be done to assess for primary aldosteronism as cause of hypertension.
- **Renin:** An enzyme that activates the renin-angiotensin system and screens for essential, renal, or renovascular hypertension.
- **C-reactive protein (CRP):** A member of the class of acute phase reactants. Serum levels rise dramatically during inflammatory processes occurring in the body.

OTHER DIAGNOSTIC STUDIES

- **Electrocardiogram (ECG):** Record of the electrical activity of the heart that can demonstrate conduction disturbances, enlarged heart, and chamber strain patterns.
- **Kidney and renography nuclear scan (also called renogram):** Assists in diagnosing renal disorders.
- **Urine creatinine clearance:** Determines extent of nephron damage in known kidney disease.
- **Uric acid:** Measures end-product of purine metabolism, providing one index of renal function.

Provides information about renal perfusion and function and can reveal cause if hypertension is related to kidney dysfunction.

Hyperglycemia may result from elevated catecholamine levels and insulin resistance, which increases BP.

Hypokalemia may indicate the presence of primary aldosteronism as a possible cause of hypertension or it may be a side effect of diuretic therapy.

A predisposition for or presence of atheromatous plaque is indicated by the following: HDL levels that are less than 40 mg/dL in men and less than 50 mg/dL in women, triglycerides that are more than 150 mg/dL, and an increase in small-particle LDL. One recent study reported a strong association of hypertension with elevated cholesterol, as well as insulin resistance in hypothyroid adults (Purohit & Mathur, 2013).

Hypothyroidism and triiodothyronine (T3) deficiency have been found to be associated with peripheral vasoconstriction, which is also associated with hypertension (Stabouli et al, 2010).

Elevated in primary aldosteronism.

Elevated in renovascular and malignant hypertension and salt-wasting disorders.

CRP is an indicator of vascular inflammation and can indicate atherosclerotic disease that causes renal artery disease and hypertension.

Broad, notched P wave is one of the earliest signs of hypertensive heart disease.

Determines if hypertension is due to kidney disease.

Reduced in hypertensive patient with renal damage.

Hyperuricemia has been implicated as a risk factor for the development of hypertension.

NURSING PRIORITIES

1. Maintain or enhance cardiovascular functioning.
2. Prevent complications.
3. Provide information about disease process, prognosis, and treatment regimen.
4. Support active client control of condition.

DISCHARGE GOALS

1. BP within acceptable limits for individual.
2. Cardiovascular and systemic complications prevented or minimized.
3. Disease process, prognosis, and therapeutic regimen understood.
4. Necessary lifestyle or behavioral changes initiated.
5. Plan in place to meet needs after discharge.

NURSING DIAGNOSIS: **risk for decreased Cardiac Output**

Risk Factors May Include

Altered afterload [e.g., increased systemic vascular resistance]
Altered contractility [e.g., ventricular hypertrophy or rigidity; myocardial ischemia]

Possibly Evidenced By

(Not applicable; presence of signs and symptoms establishes an *actual* diagnosis)

Desired Outcomes/Evaluation Criteria—Client Will

Circulation Status **NOC**

Maintain BP within individually acceptable range.
Demonstrate stable cardiac rhythm and rate within normal range.
Participate in activities that reduce BP and cardiac workload.

ACTIONS/INTERVENTIONS

RATIONALE

Hypertension Management **NIC**

Independent

Measure BP in both arms. Take three readings, 3 to 5 minutes apart while client is at rest, then sitting, and then standing for initial evaluation. Use correct cuff size and accurate technique. Take note of elevations in systolic as well as diastolic readings.

Serial measurements using correct equipment provide a more complete picture of vascular involvement and scope of problem. Progressive diastolic readings above 120 mm Hg are considered first accelerated, then malignant (very severe). Systolic hypertension also is an established risk factor for cerebrovascular disease and ischemic heart disease even when diastolic pressure is not elevated. In younger client with normal systolic readings, elevated diastolic numbers may indicate prehypertension.

Note presence and quality of central and peripheral pulses.

Bounding carotid, jugular, radial, and femoral pulses may be observed and palpated. Pulses in the legs and feet may be diminished, reflecting effects of vasoconstriction and venous congestion.

Auscultate heart tones and breath sounds.

S_4 is commonly heard in severely hypertensive clients because of the presence of atrial hypertrophy. Development of S_3 indicates ventricular hypertrophy and impaired cardiac functioning. Presence of crackles or wheezes may indicate pulmonary congestion secondary to developing or chronic heart failure.

Observe skin color, moisture, temperature, and capillary refill time.

Presence of pallor; cool, moist skin; and delayed capillary refill time may be due to peripheral vasoconstriction or reflect cardiac decompensation and decreased output.

Observe for dependent and generalized edema.

May indicate onset of heart or kidney failure.

Provide calm, restful surroundings, minimize environmental activity and noise. Consider limiting the number of visitors or length of visitation.

Helps reduce sympathetic stimulation and promotes relaxation.

Maintain activity restrictions (such as bedrest or chair rest) during crisis situation and schedule periods of uninterrupted rest; assist client with self-care activities as needed.

Reduces physical stress and tension that affect BP and the course of hypertension.

ACTIONS/INTERVENTIONS (continued)	RATIONALE (continued)
Provide comfort measures, such as back and neck massage or elevation of head.	Decreases discomfort and may reduce sympathetic stimulation.
Instruct in relaxation techniques, guided imagery, and distractions, if client is interested and able to participate.	Can reduce stressful stimuli and produce calming effect, thereby reducing BP.
Monitor response to medications that control BP.	Response to drug therapy is dependent on both the individual drugs and their synergistic effects. Because of potential side effects and drug interactions, it is important to use the smallest number and lowest dosage of medications possible.
Collaborative	
Administer medications as indicated. Angiotensin-converting enzyme inhibitors (ACEIs), such as enalapril (Vasotec), fosinopril (Monopril), trandolapril (Mavik), diovan (Teveten)	ACEIs may be first-line drugs in early hypertension treatment and are considered first-line drugs for clients with documented congestive heart failure (CHF), diabetes, and those at risk for renal failure (Davis, 2015).
Angiotensin II receptor blockers (ARBs), such as candesartan (Atacand), valsartan (Diovan), losartan (Cozaar), and irbesartan (Avapro)	ARBs block the action of angiotensin II. As a result, blood vessels dilate and BP is reduced. <i>Note:</i> For people of African or Caribbean family origin, an ARB may be preferred over an ACEI in combination with a CCB (from 2011 guidelines per Davis, 2015).
Calcium channel blockers (CCBs), such as nifedipine (Adalat), diltiazem (Cardizem), amlodipine (Norvasc), nicardipine (Cardene)	Calcium channel blockers work by slowing the movement of calcium into the cells of the heart and blood vessel walls, which makes it easier for the heart to pump and widens blood vessels. As a result, the heart doesn't have to work as hard, and blood pressure lowers. Can be used to treat hypertension.
Diuretics, for example, thiazide (e.g., bendroflumethiazide [Naturetin], hydrochlorothiazide [HCTZ]) or thiazide-like diuretics (e.g., chlortalidone [Thalidone]; indapamide [Lozal]) and loop diuretics, such as furosemide (Lasix), bumetanide (Bumex)	Diuretics may be offered for uncomplicated hypertension and may be used alone or in association with other drugs to reduce BP in clients with relatively normal renal function. <i>Note:</i> Loop diuretics are less commonly used for routine treatment of hypertension but are especially useful in the presence of edema associated with congestive heart failure.
Beta blockers, such as acebutolol (Sectral), atenolol (Tenormin), metoprolol (Lopressor), bisoprolol (Zibeta), nadolol (Corgard), carvedilol (Coreg), propranolol (Inderal), labetalol (Tandate), timolol (Blocarden)	Beta blockers are not a preferred initial therapy for hypertension but may be considered in appropriate populations, such as those with an intolerance or contraindication to ACEIs and ARBs; women of childbearing potential; and clients with heart failure and cardiovascular disease.
Combination drugs, such as amlodipine and benazepril (Lotrel), hydralazine and hydrochlorothiazide (Vaseretic), nadolol and bendroflumethiazide (Corzide), hydralazine and hydrochlorothiazide (Apresazide)	Combination treatment means another class of blood pressure medication is added as a drug in order to increase treatment effectiveness. This is sometimes referred to as "stepped" therapy. There are also combination antihypertensives such as beta blockers and diuretics: ACEIs and ARBs or diuretics, etc. <i>Note:</i> Studies show that many people obtain better blood pressure control with combination treatment than with one drug (Beckerman, 2015).
Direct-acting parenteral vasodilators, such as diazoxide (Hyperstat), nitroprusside (Nitropress), and labetalol (Normodyne)	These are given intravenously (IV) for management of hypertensive emergencies.
Implement dietary restrictions, as indicated, such as reducing sodium and calories, and avoiding refined carbohydrates, high-fat foods, and highly processed foods.	Limiting sodium and sodium-rich processed foods can help manage fluid retention and, with associated hypertensive response, decrease myocardial workload. A balanced diet lower in calories, fat, and sodium and rich in calcium, potassium, and magnesium may help lower BP.
Prepare for surgery when indicated.	When hypertension is due to pheochromocytoma, removing the tumor corrects the condition.

NURSING DIAGNOSIS: Activity Intolerance**May Be Related To**

Generalized weakness
Imbalance between oxygen supply and demand

Possibly Evidenced By

Reports fatigue; feeling weak
Abnormal heart rate or BP response to activity
Exertional discomfort or dyspnea
ECG changes reflecting ischemia, arrhythmias

Desired Outcomes/Evaluation Criteria—Client Will**Endurance** **NOC**

Participate in necessary and desired activities.
Report a measurable increase in activity tolerance.
Demonstrate a decrease in physiological signs of intolerance.

ACTIONS/INTERVENTIONS**RATIONALE****Energy Management** **NIC***Independent*

Assess the client's response to activity, noting pulse rate more than 20 beats per minute faster than resting rate; marked increase in BP (systolic increases more than 40 mm Hg or diastolic increases more than 20 mm Hg) during and after activity, dyspnea or chest pain, excessive fatigue and weakness, and diaphoresis, dizziness, and syncope.

Changes in baseline are helpful in assessing physiological responses to the stress of activity and, if present, are indicators of overexertion.

Instruct client in energy-conserving techniques, such as using chair when showering, sitting to brush teeth or comb hair, and carrying out activities at a slower pace.

Energy-saving techniques reduce the energy expenditure, thereby assisting in equalization of oxygen supply and demand.

Encourage progressive activity and self-care when tolerated. Provide assistance as needed.

Gradual activity progression prevents a sudden increase in cardiac workload. Provide assistance only as needed, which encourages independence in performing activities.

NURSING DIAGNOSIS: Acute Pain**May Be Related To**

Physical agent [increased cerebral vascular pressure]

Possibly Evidenced By

Verbal/coded report
Positioning to avoid pain
Self-focus

Desired Outcomes/Evaluation Criteria—Client Will**Pain Control** **NOC**

Report pain or discomfort is relieved or controlled.
Verbalize methods that provide relief.
Follow prescribed pharmacological regimen.

ACTIONS/INTERVENTIONS	RATIONALE
Pain Management: Acute NIC	
<i>Independent</i>	
Determine specifics of pain—location (e.g., suboccipital region), characteristics (e.g., throbbing, neck stiffness, blurred vision), intensity (0 to 10, or similar scale), onset (e.g., present on awakening), and duration (e.g., disappears spontaneously after being up and about). Note nonverbal cues (e.g., reluctance to move head, rubbing head, avoidance of bright lights/noise).	Facilitates diagnosis of problem and initiation of appropriate therapy. Helpful in evaluating effectiveness of therapy.
Encourage and maintain bedrest during acute phase, if indicated.	Minimizes stimulation and promotes relaxation.
Provide or recommend nonpharmacological measures for relief of headache, such as placing a cool cloth to forehead; back and neck rubs; quiet, dimly lit room; relaxation techniques, such as guided imagery and distraction; and diversional activities.	Measures that reduce cerebral vascular pressure and that slow or block sympathetic response are effective in relieving headache and associated complications.
Eliminate or minimize vasoconstricting activities that may aggravate headache, such as straining at stool, prolonged coughing, and bending over.	Activities that increase vasoconstriction accentuate the headache in the presence of increased cerebral vascular pressure.
Assist client with ambulation, as needed.	Dizziness and blurred vision frequently are associated with vascular headache. Client may also experience episodes of postural hypotension, causing weakness when ambulating.
<i>Collaborative</i>	
Administer analgesics, as indicated.	Reduce or control pain and decrease stimulation of the sympathetic nervous system.
Administer antianxiety agents, such as lorazepam (Ativan), alprazolam (Xanax), and diazepam (Valium).	May aid in the reduction of tension and discomfort that is intensified by stress.

NURSING DIAGNOSIS: **Overweight**

May Be Related To

Energy expenditure below energy intake based on standard assessment
 Portion sizes larger than recommended
 High frequency of restaurant or fried foods
 Average daily physical activity is less than recommended for gender and age

Possibly Evidenced By

Adult BMI greater than 25 kg/m²
 Sedentary lifestyle
 Dysfunctional eating patterns

Desired Outcomes/Evaluation Criteria—Client Will

Knowledge: Treatment Regimen **NOC**

Identify correlation between hypertension and obesity.

Weight-Loss Behavior **NOC**

Demonstrate appropriate changes in lifestyle and behaviors, including eating patterns, food quantity and quality, to attain desirable body weight with optimal maintenance of health.
 Initiate and maintain individually appropriate exercise program.

ACTIONS/INTERVENTIONS

RATIONALE

Weight-Reduction Assistance **NIC**

Independent

Assess client's understanding of direct relationship between hypertension and obesity.

Obesity is an added risk with hypertension because of the disproportion between fixed aortic capacity and increased cardiac output associated with increased body mass. Reduction in weight may reduce or eliminate the need for drug therapy needed to control BP. *Note:* Research suggests that losing just 10 pounds can help lower blood pressure 8 to 15 points (Mayo Clinic Staff, 2015a).

Discuss necessity for decreased caloric intake and limited intake of fats, salt, and sugar, as indicated.

Faulty eating habits contribute to atherosclerosis and obesity that can predispose to hypertension and subsequent complications, such as stroke, kidney disease, and heart failure. Excessive salt intake expands the intravascular fluid volume and may damage kidneys, which can further aggravate hypertension.

Determine client's desire to lose weight.

Motivation for weight reduction is internal. The individual must want to lose weight or the program most likely will not succeed.

Review usual daily caloric intake and dietary choices.

Identifies current strengths and weaknesses in dietary program. Aids in determining individual need for adjustment and teaching.

Establish a realistic weight-reduction plan with the client, such as weight loss of 1 to 2 pounds per week.

Slow reduction in weight is associated with fat loss with muscle sparing and generally reflects a change in eating habits.

Encourage client to maintain a diary of food intake, including when and where eating takes place and the circumstances and feelings around which the food was eaten.

Provides a database for both the adequacy of nutrients eaten and the relationship of emotion to eating. Helps focus attention on factors that client can control or change.

Instruct and assist client in appropriate food selections, such as implementing a diet rich in fruits, vegetables, and low-fat dairy foods referred to as the Dietary Approaches to Stop Hypertension (DASH) diet. Help the client identify—and thus avoid—foods high in saturated fat, such as butter, cheese, eggs, ice cream, and meat, and those that are high in cholesterol, such as whole dairy products, shrimp, and organ meats.

Moderation and use of low-fat products in place of total abstinence from certain food items may prevent client's sense of deprivation and enhance commitment to achieving health goals. Avoiding foods high in saturated fat and cholesterol is important in preventing progressing atherogenesis. The DASH diet, in conjunction with exercise, weight loss, and limits on salt intake, may reduce or even eliminate the need for drug therapy in early stages of hypertension (Mayo Clinic Staff, 2015a).

Collaborative

Refer to dietitian or weight management programs, as indicated.

Can provide additional counseling and assistance with meeting individual dietary needs.

NURSING DIAGNOSIS: **Ineffective Coping**

May Be Related To

Situational crisis
Insufficient sense of control
Inadequate resources
Ineffective tension release strategies
Inadequate level of confidence in ability to cope

Possibly Evidenced By

Reports inability to deal with situation or ask for help
Ineffective coping strategies
Inadequate problem-solving
Destructive behavior toward self [overeating/smoking/failing to take medications], or use of forms of coping that impedes adaptive behavior

NURSING DIAGNOSIS: Ineffective Coping (continued)**Desired Outcomes/Evaluation Criteria—Client Will****Coping** **NOC**

Identify ineffective coping behaviors and consequences.

Verbalize awareness of own coping abilities and strengths.

Identify potential stressful situations and steps to avoid or modify them.

Meet psychological needs, as evidenced by identification of options and use of resources.

ACTIONS/INTERVENTIONS**RATIONALE****Coping Enhancement** **NIC***Independent*

Assess effectiveness of coping strategies by observing behaviors, such as ability to verbalize feelings and concerns, and willingness to participate in the treatment plan.

Adaptive mechanisms are necessary to appropriately alter one's lifestyle, deal with the chronicity of hypertension, and integrate prescribed therapies into daily living.

Note reports of sleep disturbances, increasing fatigue, impaired concentration, irritability, decreased tolerance of headache, and inability to cope or problem-solve.

Manifestations of maladaptive coping mechanisms may be indicators of repressed anger and may contribute to hypertension.

Assist client to identify specific stressors and possible strategies for coping with them.

Recognition of stressors is often the first step in altering one's response to the stressor.

Include client in planning of care and encourage maximum participation in treatment plan and with the multidisciplinary team.

Involvement provides client with an ongoing sense of control, improves coping skills, and enhances commitment to achieving health goals. Ongoing intensive assessment and management by a team can promote timely adjustments to therapeutic regimen.

Encourage client to evaluate life priorities and personal goals. Ask questions such as, "Is what you are doing getting you what you want?"

Focuses client's attention on reality of present situation relative to client's goals. Strong work ethic, need for "control," and outward focus may have led to lack of attention to personal needs.

Assist client to identify and begin planning for necessary lifestyle changes. Assist to adjust, rather than abandon, personal and family goals.

Necessary changes should be realistically prioritized so client can avoid being overwhelmed and feeling powerless.

NURSING DIAGNOSIS: ineffective Health Management**May Be Related To**

Complexity of healthcare system or therapeutic regimen

Economically disadvantaged

Perceived seriousness of condition, susceptibility, benefit, or barrier

Insufficient knowledge of therapeutic regimen

Possibly Evidenced By

Failure to take action to reduce risk factors

Failure to include treatment regimen in daily living

Unexpected acceleration of illness symptoms

Desired Outcomes/Evaluation Criteria—Client Will**Health-Promoting Behavior** **NOC**

Verbalize understanding of disease process and need and desire to change actions to achieve agreed-upon health goals.

Demonstrate behaviors and changes in lifestyle necessary to maintain therapeutic regimen.

Identify drug side effects and possible complications that necessitate medical attention.

Maintain BP within individually acceptable parameters.

Describe reasons for therapeutic actions and treatment regimen.

ACTIONS/INTERVENTIONS

RATIONALE

Teaching: Disease Process **NIC**

Independent

Assist client in identifying modifiable risk factors, such as obesity; diet high in sodium, saturated fats, and cholesterol; sedentary lifestyle; smoking; alcohol intake of more than two ounces per day on a regular basis; and a stressful lifestyle.	These risk factors contribute to hypertension and cardiovascular and renal disease.
Problem-solve with client to identify ways in which appropriate lifestyle changes can be made to reduce modifiable risk factors.	Changing “comfortable or usual” behavior patterns can be very difficult and stressful. Support, guidance, and empathy can enhance client’s success in accomplishing his or her health goals.
Discuss importance of eliminating smoking and assist client in formulating a plan to quit smoking. Refer to smoking cessation program or healthcare provider for helpful medications.	Nicotine increases catecholamine discharge, resulting in increased heart rate, BP, vasoconstriction, and myocardial workload, and reduces tissue oxygenation.
Reinforce the importance of adhering to treatment regimen and keeping follow-up appointments.	Lack of engagement in the treatment plan is a common reason for failure of antihypertensive therapy. Therefore, ongoing evaluation for client participation is critical to successful treatment. When client understands causative factors and consequences of inadequate intervention and is motivated to achieve health, the client typically participates in treatment interventions.
Instruct in and demonstrate BP self-monitoring technique, if needed. Observe client/significant other (SO) return demonstration. Evaluate client’s hearing, visual acuity, manual dexterity, and coordination.	Monitoring BP at home is reassuring to client because it provides visual feedback to determine treatment outcomes and helps promote early detection of deleterious changes.
Help client develop a simple, convenient schedule for taking medications.	Individualizing schedule to fit client’s personal habits may make it easier to get in the habit of including antihypertensives in healthcare management activities.
Explain prescribed medications along with their rationale, dosage, and expected and adverse side effects, such as the following:	Adequate information and understanding about side effects can enhance client’s commitment to the treatment plan. For instance, mood changes, initial weight gain, and dry mouth are common and often subside with time.
Diuretics: Take daily or larger dose in the early morning.	Scheduling doses early in the day minimizes nighttime urination.
Weigh self on a regular schedule and record.	Primary indicator of effectiveness of diuretic therapy.
Avoid or limit alcohol intake.	The combined vasodilating effect of alcohol and the volume-depleting effect of a diuretic greatly increase the risk of orthostatic hypotension.
Notify physician if unable to tolerate food or fluid.	Dehydration can develop rapidly if intake is poor and client continues to take a diuretic
Antihypertensives: Take prescribed dose on a regular schedule; avoid skipping, altering, or making up doses; and do not discontinue without notifying the healthcare provider. Review potential side effects and drug interactions, and discuss need for informing healthcare provider about onset of adverse effects such as erectile dysfunction (ED).	Because clients often cannot feel the difference the medication is making in BP, it is critical that there be understanding about the medication’s actions and side effects. For example, abruptly discontinuing a drug may cause rebound hypertension, leading to severe complications, or medication may need to be altered to reduce adverse effects. <i>Note:</i> Many drugs used to treat hypertension have been linked to ED. Drugs may need to be changed or dose adjusted.
Rise slowly from a lying to standing position, sitting for a few minutes before standing. Sleep with the head slightly elevated. Suggest frequent position changes and leg exercises when lying down.	Measures reduce potential for orthostatic hypotension associated with the use of vasodilators and diuretics.
Recommend avoiding hot baths, steam rooms, and saunas, especially with concomitant use of alcoholic beverages.	Prevents vasodilation with potential for dangerous side effects of syncope and hypotension.

ACTIONS/INTERVENTIONS (continued)

RATIONALE (continued)

Instruct client to consult healthcare provider before taking other prescription or over-the-counter (OTC) medications.	Any drug that contains a sympathetic nervous stimulant may increase BP or counteract effects of antihypertensive medications.
Instruct client, as indicated, about increasing intake of foods and fluids high in potassium, such as oranges, bananas, figs, dates, tomatoes, potatoes, raisins, apricots, Gatorade, and fruit juices, and foods and fluids high in calcium, such as low-fat milk, yogurt, or calcium supplements.	Some diuretics can deplete potassium levels. Dietary potassium is a desirable means of correcting deficits and may be more palatable to the client than drug supplements. Correcting mineral deficiencies can also affect BP.
Review the signs and symptoms that require the client to notify the healthcare provider, such as headache present on awakening that does not abate; sudden and continued increase of BP; chest pain; shortness of breath; irregular or increased pulse rate; significant weight gain (2 lb/d or 5 lb/wk); peripheral or abdominal swelling; visual disturbances; frequent, uncontrollable nosebleeds; depression or emotional lability; severe dizziness or episodes of fainting; muscle weakness or cramping; nausea or vomiting; or excessive thirst.	Early detection and reporting of developing complications, decreased effectiveness of drug regimen, or adverse reactions allow for timely intervention.
Explain rationale for prescribed dietary regimen—usually a diet low in sodium, saturated fat, and cholesterol.	Excess saturated fats, cholesterol, sodium, alcohol, and calories have been defined as nutritional risks in hypertension. A diet low in fat and high in polyunsaturated fat reduces BP, possibly through prostaglandin balance in both normotensive and hypertensive people.
Help client identify sources of sodium intake, such as table salt, salty snacks, processed meats and cheeses, sauerkraut, sauces, canned soups and vegetables, baking soda, baking powder, and monosodium glutamate. Emphasize the importance of reading ingredient labels of foods and OTC drugs.	A moderately low-salt diet may be sufficient to control mild hypertension or reduce or eliminate the need for drug therapy to control BP.
Encourage foods rich in essential fatty acids, such as salmon, cod, mackerel, and tuna.	Omega-3 fatty acids in fish tend to relax artery walls, reducing blood pressure. They also make blood thinner and less likely to clot.
Encourage client to establish a regular exercise program, incorporating aerobic exercise within client's capabilities. Stress the importance of avoiding isometric activity.	Besides helping to lower BP, aerobic activity aids in toning the cardiovascular system. Isometric exercise can increase serum catecholamine levels, further elevating BP.
Demonstrate application of ice pack to the back of the neck and pressure over the distal third of nose, and recommend that client lean head forward if nosebleed occurs.	Nasal capillaries may rupture as a result of excessive vascular pressure. Cold temperature and pressure constrict capillaries to slow or halt bleeding. Leaning forward reduces the amount of blood that is swallowed.
Provide information regarding community resources, and support client in making lifestyle changes. Initiate referrals, as indicated.	Community resources, such as the American Heart Association, "coronary clubs," stop smoking clinics, alcohol or drug rehabilitation, weight-loss programs, stress management classes, and counseling services, may be helpful in client's efforts to initiate and maintain lifestyle changes.

POTENTIAL CONSIDERATIONS following acute hospitalization (dependent on client's age, physical condition and presence of complications, personal resources, and life responsibilities)

- **risk for Activity Intolerance**—risk for circulatory problem or respiratory condition, physical deconditioning, age
- **Overweight**—energy expenditure below energy intake based on standard assessment, portion sizes larger than recommended, average daily physical activity is less than recommended for gender and age
- **ineffective Health Management**—complexity of therapeutic regimen, economic difficulties, perceived seriousness
- **Sexual Dysfunction**—altered body function (activity intolerance, side effects of medications)
- **readiness for enhanced family Coping**—SO(s) moves in direction of health promotion

HEART FAILURE: CHRONIC

I. Pathophysiology

- a. Remodeling of the myocardium (as a structural response to injury) changes the heart from an efficient football shape to an inefficient basketball shape, making coordinated contractility difficult.
 - i. Ventricular dilation (systolic dysfunction) results in poor contractility and inadequate emptying of chamber.
 - ii. Ventricular stiffening (diastolic dysfunction) impairs ability of chamber to relax and receive and eject blood.
- b. Failure of the left and/or right chambers of the heart results in insufficient output to meet metabolic needs of organ and tissues.
- c. Cardiac-related elevation of pulmonary or systemic venous pressures leads to organ congestion.
- d. Backward heart failure (HF): Passive engorgement of the veins caused by elevated systemic venous pressure or a “backward” rise in pressure proximal to the failing cardiac chambers (right ventricular failure).
- e. Forward HF: Decreased cardiac output with reduced forward flow into the aorta, systemic circulation (inadequate renal blood flow leads to sodium and water retention), and increasing pulmonary venous pressure results in fluid accumulation in alveoli (left ventricular failure).
- f. Myocardial muscle dysfunction associated with left ventricular hypertrophy (LVH) causes decreased cardiac output, activating neurohormones.
- g. Elevated circulating or tissue levels of neurohormones, norepinephrine, angiotensin II, aldosterone, endothelin, vasopressin, and cytokines cause sodium retention and peripheral vasoconstriction, increasing hemodynamic stresses on the ventricle.

II. Classification

- a. Stages (American College of Cardiology/American Heart Association [ACC/AHA], 2013; Oberg & Guarneri, 2016). Guidelines include specific recommendations for each stage.
 - i. Stage A—high risk for HF associated with such conditions as hypertension, diabetes, and obesity. Treatment is focused on comorbidities and reduction of cardiotoxic agents (e.g., tobacco/other drug use).

- ii. Stage B—presence of structural heart disease, causing damage, such as LVH or previous myocardial infarction (MI), but is asymptomatic. Treatment is focused on retarding the progression of ventricular remodeling and delaying the onset of HF symptoms.
- iii. Stage C—clients with past or current HF symptoms associated with structural heart disease and damage, such as advanced ventricular remodeling. Treatment is focused on modifying fluid and dietary intake and drug therapies as well as nonpharmacological measures, such as biventricular pacing and valvular or revascularization surgery, to improve left ventricular function and client’s functional abilities.
- iv. Stage D—refractory advanced HF symptoms at rest or with minimal exertion and frequently requiring intervention in the acute setting. Treatment is focused on promoting clinical stability, including supportive therapy to sustain life, such as left ventricular assist device, continuous intravenous (IV) inotropic therapy, experimental surgery or drugs, a heart transplant, or end-of-life or hospice care.

III. Etiology

- a. Multifactorial
 - i. Complex clinical syndrome resulting from any structural or functional cardiac disorder that impairs the ability of the ventricle to fill with or eject blood (ACC/AHA, 2013).
 - ii. Risk factors and comorbidities—hypertension; obesity; diabetes; coronary artery disease (CAD); peripheral and cerebrovascular disease; valvular heart disease with onset of atrial fibrillation (AF); sleep disorders such as sleep apnea; history of exposure to cardiotoxins, for example, chemotherapy, alcohol, and cocaine; family history of cardiomyopathy.

IV. Statistics

- a. Morbidity: 5.7 million Americans have HF (American Heart Association [AHA] Statistical Update, 2016).
- b. Mortality: The number of any-mention deaths attributable to HF in the United States in 2013 was approximately 300,000 (American Heart Association News, 2015).
- c. Cost: Direct and indirect costs estimated to be \$30.7 billion annually in 2012 (AHA, 2015a).

GLOSSARY

Angiotensin-converting enzyme inhibitor (ACEI) (also called ACE inhibitor): Medication that blocks the action of the angiotensin-converting enzyme in the lungs so that angiotensin I is not converted into angiotensin II. The production of this powerful blood vessel constrictor is thereby prevented and blood vessels remain dilated, which results in lower blood pressure.

Angiotensin receptor blocker (ARB): Medication that blocks the chemical receptors for angiotensin II on the small arteries. Therefore, the angiotensin cannot cause these arteries to constrict, which lowers blood pressure.

Ascites: Accumulation of fluid in the abdominal cavity can be associated with increased blood pressure in the veins draining the liver, with impaired drainage in the lymph system, and with low levels of albumin and other proteins in the blood.

Bendopnea: Shortness of breath that occurs while bending over at the waist. Phrase coined by researchers in a Texas study that found this symptom in individuals with advanced forms of heart failure. The presence of bendopnea was more commonly experienced by those who had significant fluid retention, as well as elevated cardiac pressures (Thibodeau et al, 2014).

GLOSSARY (continued)

Cardiac remodeling: The left ventricular chamber dilates and becomes more spherical. This condition increases the stress on the myocardial walls and depresses cardiac performance. Remodeling often precedes symptoms and may contribute to worsening of symptoms despite treatment (Paul & Hice, 2014).

Heart failure (HF): A clinical syndrome characterized by inadequate systemic perfusion to meet the body's metabolic demands because of impaired cardiac pump function owing to a weakened or thickened heart muscle. Heart failure may be left-sided (systolic) or right-sided (diastolic) (Oberg & Guarneri, 2016).

Heart sounds: S₁ corresponds to the closure of mitral and tricuspid valves. S₂ corresponds to closure of the aortic

and pulmonary valves. S₃, heard mid-diastolic at the apex, is a low-pitched gallop or blowing sound sometimes called a ventricular gallop and is a common sign of left ventricular failure or distension in adults.

Positive hepatojugular reflex: An elevation of venous pressure, visible in the jugular veins and measurable in the veins of the arm, which is produced by firm pressure with the flat hand over the abdomen in active or impending congestive heart failure.

Pulsus alternans: Alternating weak and strong beats of the pulse associated with weak left ventricular function.

Pulse pressure: Difference between systolic and diastolic blood pressures.

CARE SETTING

Although generally managed at the community level, an in-clinic stay may be required for periodic exacerbation of failure or development of complications.

RELATED CONCERNS

Acute coronary syndrome, page 54

Myocardial infarction, page 72

Hypertension: severe, page 26

Cardiac surgery, page 98

Dysrhythmias, page 85

Aortic aneurysms, page 110

Psychosocial aspects of care, page 835

CLIENT ASSESSMENT DATABASE

DIAGNOSTIC DIVISION
MAY REPORT

MAY EXHIBIT

ACTIVITY/REST

- Fatigue, exhaustion progressing throughout the day
- Inability to perform normal daily activities, such as making bed, climbing stairs, and so on
- Exercise intolerance
- Dyspnea at rest or with exertion
- Insomnia, inability to sleep flat

- Limited exercise tolerance
- Fatigue
- Restlessness, mental status changes, such as anxiety and lethargy
- Vital sign changes with activity

CIRCULATION

- History of hypertension, recent or past MIs, multiple MIs, previous episodes of HF, valvular heart disease, cardiac surgery, endocarditis, systemic lupus erythematosus, anemia, septic shock
- Feeling that heart is skipping, fluttering, pounding, or “stopping”
- Swelling of feet, legs, abdomen, or “belt too tight”

- **Blood pressure (BP)** May be low with cardiac pump failure; in normal range with mild or chronic HF; or high with fluid overload, left-sided HF, and increased systemic vascular resistance (SVR)
- **Pulses:** Peripheral pulses diminished; central pulses may be bounding, for example, visible jugular, carotid, abdominal pulsations, pulse pressure narrow, reflecting reduced ventricular stroke volume
- Pulsus alternans may be noted
- **Heart rate and rhythm:** Tachycardia; dysrhythmias such as atrial fibrillation, premature ventricular contractions, heart blocks
- **Apical pulse:** Point of maximal intensity (PMI) diffuse and displaced to the left

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MAY REPORT (continued)

MAY EXHIBIT (continued)

EGO INTEGRITY

- Anxiety, apprehension, fear
- Depression
- Stress related to illness or financial concerns (job, cost of medical care)

ELIMINATION

- Decreased voiding, dark urine
- Night voiding

FOOD/FLUID

- History of diet high in salt and processed foods, fat, sugar, and caffeine
- Loss of appetite, anorexia
- Nausea, vomiting
- Significant weight gain (may not respond to diuretic use)
- Tight clothing or shoes
- Use of diuretics

HYGIENE

- Fatigue, weakness, exhaustion during self-care activities

NEUROSENSORY

- Weakness
- Dizziness
- Fainting episodes

PAIN/DISCOMFORT

- Chest pain
- Chronic or acute angina
- Right upper abdominal pain (right-sided HF)
- Generalized muscle aches and pains

RESPIRATION

- Dyspnea with exertion or rest
- Nocturnal dyspnea that interrupts sleep (also sometimes called paroxysmal nocturnal dyspnea [PND]) relieved by sitting up or standing. This symptom is often present in exacerbations of heart failure (Fogoros, 2017a).
- Sleeping sitting up or with several pillows
- Cough with or without sputum production, especially when recumbent
- Use of respiratory aids, for example, oxygen or medications

- **Heart sounds:** S₁ and S₂ possibly softened; S₃ gallop rhythm diagnostic of congestive HF; S₄ can occur with hypertension; systolic and diastolic murmurs can indicate the presence of valvular stenosis or insufficiency, causing or exacerbating heart failure.
- Skin tissue color pale, ashen, dusky, or cyanotic
- Nail beds pale or cyanotic, with slow capillary refill
- Edema dependent, generalized, or pitting, especially in extremities
- Bulging neck veins (jugular vein distention [JVD])
- Liver enlarged and palpable; positive hepatjugular reflex may be present in right-sided HF

- Various behavioral manifestations, for example, anxiety, anger, fear, irritability
- Studies have shown that older adults (especially) may experience depression along with coronary heart disease and heart failure and associated decreased functional abilities (Sin et al, 2015)

- Decreased daytime urination and increased nighttime urination (nocturia)

- Rapid or continuous weight gain
- Abdominal distention, suggesting ascites or liver engorgement
- Generalized edema, including whole-body or lower extremity swelling—edema generalized, dependent, pitting, brawny

- Appearance indicative of neglect of personal care

- Lethargy, confusion, disorientation
- Behavior changes, irritability

- Restlessness
- Narrowed focus and withdrawal
- Guarding behavior

- Tachypnea
- Shallow, labored breathing
- Gasping for air, often coughing, and feeling a compelling need to get out of bed (PND)
- Use of accessory muscles, nasal flaring
- Moist cough with left-sided HF (congestive)
- Dry persistent cough
- Sputum may be blood-tinged, pink, and frothy (pulmonary edema)

MAY REPORT (continued)

SAFETY

SOCIAL INTERACTION

- Decreased participation in usual social activities

TEACHING/LEARNING

- Family history of developing HF at young age (genetic form)
- Family risk factors, such as heart disease, hypertension, diabetes
- Use or misuse of cardiac medications
- Use of vitamins, herbal supplements, for example, niacin, coenzyme Q10, garlic, ginkgo, black hellebore, dandelion, or aspirin
- Recent or recurrent hospitalizations
- Evidence of failure to improve

DISCHARGE PLAN CONSIDERATIONS

- Assistance with shopping, transportation, self-care needs, homemaker and maintenance tasks
- Alteration in medication use or therapy
- Changes in physical layout of home
- May need oxygen at home

◆ Refer to section at end of plan for postdischarge considerations.

MAY EXHIBIT (continued)

- Breath sounds may be diminished, with bibasilar crackles and wheezes
- Mentation may be diminished; lethargy, restlessness present
- Pallor or cyanosis

- Changes in mentation and confusion
- Loss of strength or muscle tone
- Increasing risk for falls
- Skin excoriations, rashes

- Many factors impact patient understanding and implementation of self-management, including health literacy (the average HF patient has low health literacy), cognitive impairment, learning ability, language barriers, readiness to learn/sense of priority, influence of illness, the need to learn a large volume of information within a short period of time, and healthcare provider education training.

DIAGNOSTIC STUDIES

TEST
WHY IT IS DONE

WHAT IT TELLS ME

BLOOD TESTS

- **Atrial natriuretic peptide (ANP):** Hormone secreted from right atrial cells when pressure increases.
- **Beta-type natriuretic peptide (BNP):** Neurohormone secreted from the cardiac ventricles as a response to ventricular volume and fluid overload.

Increased in congestive HF.

The level of BNP in the blood increases when symptoms of HF worsen and decreases when symptoms of HF improve to stable condition. Elevation of BNP correlates with both the severity of symptoms and the prognosis in congestive HF. A level of BNP that is greater than 100 pg/mL is predictive of HF and increased risk of sudden death and 1-year mortality (Kociol et al, 2011). *Note:* A variation of BNP, called N-terminal BNP, also is useful in diagnosing heart failure and in some laboratories is used instead of BNP (Mayo Clinic Staff, 2014).

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DIAGNOSTIC STUDIES (contd.)

WHY IT IS DONE (continued)

- **Liver enzyme tests, alanine aminotransferase (ALT) and aspartate aminotransferase (AST) (formally referred to as SPGT and SGOT):** To determine degree of end-organ involvement.
- **Erythrocyte sedimentation rate (ESR):** Shows the alteration of blood proteins caused by inflammatory and necrotic processes.
- **Bleeding and clotting times:** Clotting factors, prothrombin time (PT), partial thromboplastin time (PTT), platelets.
- **Electrolytes (sodium, potassium, chloride, magnesium, calcium):** Elements or chemicals needed for the body and heart to work properly.
- **Arterial blood gas (ABG):** Measures arterial pH, PCO₂, and PO₂. Evaluates respiratory function and provides a measure for determining acid-base balance.
- **Albumin and transferrin, total protein:** Plasma proteins exert oncotic pressure needed to keep fluid in the capillaries.
- **Thyroid studies:** Blood test and scan to evaluate thyroid function. The most commonly used laboratory screening test is the measurement of thyroid-stimulating hormone (TSH).
- **Blood urea nitrogen (BUN) and creatinine:** BUN levels reflect the balance between production and excretion of urea. Creatine is an end-product of creatinine metabolism and must be cleared from blood via the kidneys.

OTHER DIAGNOSTIC STUDIES

- **Chest x-ray:** Evaluates organs and structures within the chest.
- **Electrocardiogram (ECG):** Record of the electrical activity of the heart.
- **Echocardiography (also called two-dimensional echocardiogram or Doppler ultrasound):** Evaluates the left ventricle, including size, valvular function, wall thickness, and pumping action as measured by the ejection fraction (EF).
- **Stress test (also called exercise treadmill or exercise ECG):** Raises heart rate and BP by means of exercise; heart rate can also be raised pharmacologically using such drugs as dobutamine or dipyridamole.
- **Cardiac angiography (also called cardiac catheterization):** Assesses patency of coronary arteries, reveals abnormal heart and valve size or shape, and evaluates ventricular contractility. Pressures can be measured within each chamber of the heart and across the valves.

WHAT IT TELLS ME (continued)

- Elevated in liver congestion, which may be present in right-sided HF.
- May be elevated, indicating acute systemic inflammatory reaction, especially if viral infection is cause of HF. Identifies those at risk for excessive clot formation and identifies therapeutic range for anticoagulant therapy.
- Electrolytes may be altered because of fluid shifts and decreased renal function associated with HF and medications (e.g., diuretics, ACE inhibitors) used in HF treatment.
- Left ventricular failure is characterized by mild respiratory alkalosis (early); respiratory acidosis, with hypoxemia; and increased PCO₂, with decompensated HF.
- May be decreased as a result of reduced protein intake (nutritional) or reduced protein synthesis (congested liver associated with HF).
- Increased thyroid activity suggests thyroid hyperactivity as precipitator of HF. Hypothyroidism can also cause or exacerbate HF.
- Elevated BUN suggests decreased renal perfusion as may occur with HF or as a side effect of prescribed medications (e.g., diuretics and ACE inhibitors). Elevation of both BUN and creatinine is typical in HF.
- May demonstrate calcification in valve areas or aorta, causing blood flow obstruction, or cardiac enlargement, indicating HF. An abnormal ECG can point out the underlying cause of HF, such as ventricular hypertrophy, valvular dysfunction, ischemia, and myocardial damage patterns.
- May reveal enlarged chamber dimensions or alterations in valvular and ventricular function and structure. EF is reduced (less than 50%), indicating systolic dysfunction, or “preserved” (normal is 50% to 65%), indicating diastolic dysfunction. (AHA, 2017).
- Helps detect valvular heart disease ventricular remodeling and structural anomalies and problems with coronary circulation affecting heart function.
- Abnormal pressures indicate problems with ventricular function, helping to identify valvular stenosis or insufficiency and differentiating right-sided versus left-sided HF.

NURSING PRIORITIES

1. Improve myocardial contractility and systemic perfusion.
2. Reduce fluid volume overload.
3. Prevent complications.
4. Provide information about disease and prognosis, therapy needs, and prevention of recurrences.

DISCHARGE GOALS

1. Cardiac output adequate for individual needs.
2. Complications prevented or resolved.
3. Optimum level of activity and functioning attained.
4. Disease process, prognosis, and therapeutic regimen understood.
5. Plan in place to meet needs after discharge.

NURSING DIAGNOSIS: decreased Cardiac Output**May Be Related To**

Altered contractility (such as valvular defects and ventricular aneurysm)
 Alteration in heart rate, rhythm
 Altered afterload (e.g., systemic vascular resistance)

Possibly Evidenced By

Altered heart rate/rhythm: Bradycardia, tachycardia, arrhythmias, ECG changes
 Variations in blood pressure readings (hypotension, hypertension)
 Decreased peripheral pulses
 S_3 , S_4 heart sounds
 Orthopnea, crackles, jugular vein distension, edema, weight gain
 Skin color changes, clammy skin
 Oliguria

Desired Outcomes/Evaluation Criteria—Client Will**Cardiac Pump Effectiveness** **NOC**

Display vital signs within acceptable limits, dysrhythmias absent or controlled, and no symptoms of failure, for example, hemodynamic parameters within acceptable limits and urinary output adequate.
 Report decreased episodes of dyspnea and angina.

Self-Management: Heart Failure **NOC**

Participate in activities that reduce cardiac workload.

ACTIONS/INTERVENTIONS**RATIONALE****Hemodynamic Regulation** **NIC***Independent*

Auscultate apical pulse; assess heart rate, rhythm, and document dysrhythmia if telemetry available.

Tachycardia is usually present, even at rest, to compensate for decreased ventricular contractility. Premature atrial contractions (PACs), paroxysmal atrial tachycardia (PAT), PVCs, multifocal atrial tachycardia (MAT), and AF are common dysrhythmias associated with HF, although others may also occur. *Note:* Intractable ventricular dysrhythmias unresponsive to medication suggest ventricular aneurysm.

Note heart sounds.

S_1 and S_2 may be weak because of diminished pumping action. Gallop rhythms are common (S_3 and S_4), produced as blood flows into noncompliant, distended chambers. Murmurs may reflect valvular incompetence and stenosis.

Palpate peripheral pulses.

Decreased cardiac output may be reflected in diminished radial, popliteal, dorsalis pedis, and posttibal pulses. Pulses may be fleeting or irregular to palpation, and pulsus alternans may be present.

Monitor BP

In early, moderate, or chronic HF, BP may be elevated because of increased SVR. In advanced HF, the body may no longer be able to compensate, and profound or irreversible hypotension may occur. *Note:* Many clients with HF have consistently low systolic BP (80 to 100 mm Hg) due to their disease process and the medications they take.

Inspect skin for pallor and cyanosis.

Pallor is indicative of diminished peripheral perfusion secondary to inadequate cardiac output, vasoconstriction, and anemia. Cyanosis may develop in refractory HF. Dependent areas are often blue or mottled as venous congestion increases.

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ACTIONS/INTERVENTIONS (continued)**RATIONALE** (continued)

Monitor urine output, noting decreasing output and dark or concentrated urine.	Kidneys respond to reduced cardiac output by retaining water and sodium. Urine output is usually decreased during the day because of fluid shifts into tissues but may be increased at night because fluid returns to circulation when client is recumbent.
Note changes in sensorium, for example, lethargy, confusion, disorientation, anxiety, and depression.	May indicate inadequate cerebral perfusion secondary to decreased cardiac output.
Encourage rest, semi-recumbent in bed or chair. Assist with physical care, as indicated.	Physical rest should be maintained during acute or refractory HF to improve efficiency of cardiac contraction and to decrease myocardial oxygen consumption and workload.
Provide quiet environment, explain medical and nursing management, help client avoid stressful situations, listen and respond to expressions of feelings or fears.	Physical and psychological rest helps reduce stress, which can produce vasoconstriction, elevating BP and increasing heart rate and work.
Provide bedside commode. Have client avoid activities eliciting a vasovagal response, for instance, straining during defecation and holding breath during position changes.	Commode use decreases work of getting to bathroom or struggling to use bedpan. Vasovagal maneuver causes vagal stimulation followed by rebound tachycardia, which further compromises cardiac function and output.
Elevate legs, avoiding pressure under knee. Encourage active and passive exercises. Increase ambulation and activity as tolerated.	Decreases venous stasis and may reduce incidence of thrombus and embolus formation.
Check for calf tenderness; diminished pedal pulse; and swelling, local redness, or pallor of extremity.	Reduced cardiac output, venous pooling and stasis, and enforced bedrest increase risk of thrombophlebitis.
Withhold digoxin, as indicated, and notify physician if marked changes occur in cardiac rate or rhythm or signs of digoxin toxicity occur.	Incidence of toxicity is high (20%) because of narrow margin between therapeutic and toxic ranges. Digoxin may have to be discontinued in the presence of toxic drug levels, a slow heart rate, or low potassium level. (Refer to CP: Dysrhythmias; ND: risk for Poisoning [Digoxin Toxicity].)

Collaborative

Administer supplemental oxygen, as indicated.	Increases available oxygen for myocardial uptake to combat effects of hypoxia and ischemia.
Administer medications, as indicated, for example:	A variety of medications (usually a combination of a diuretic, an ACEI, or ARB and beta blocker) may be used to increase stroke volume, improve contractility, and reduce congestion. <i>Note:</i> New first-line drugs that have recently been approved for treatment of heart failure include sacubitril/valsartan (Entresto) and ivabradine (Corlanor). These drugs are given to improve outcomes in certain types of heart failure associated with low ventricular output or to clients who are unable to respond well to beta blockers (Husar, 2016).
Loop diuretics, such as furosemide (Lasix), ethacrynic acid (Edecrin), and bumetanide (Bumex); thiazide and thiazide-like diuretics, such as hydrochlorothiazide (HCTZ) and metolazone (Zaroxolyn)	Diuretics, in conjunction with restriction of dietary sodium and fluids, often lead to clinical improvement in clients with stages I and II HF. In general, type and dosage of diuretic depend on cause and degree of HF and state of renal function. Preload reduction is most useful in treating clients with a relatively normal cardiac output accompanied by congestive symptoms. Loop diuretics block chloride reabsorption, thus interfering with the reabsorption of sodium and water.
ACE inhibitors, such as enalapril (Vasotec), captopril (Capoten), lisinopril (Prinivil), quinapril (Accupril), ramipril (Altace), and moexipril (Univasc)	ACE inhibitors represent first-line therapy to control HF by decreasing ventricular filling pressures and SVR while increasing cardiac output with little or no change in BP and heart rate.
ARBs (also known as angiotensin II receptor antagonists), such as candesartan (Atacand), losartan (Cozaar), eprosartan (Teveten), irbesartan (Avapro), and valsartan (Diovan)	Antihypertensive and cardioprotective effects are attributable to selective blockade of AT ₁ (angiotensin II) receptors and angiotensin II synthesis. <i>Note:</i> ARBs used in combination with ACE inhibitors and beta blockers are thought to have decreased hospitalizations for HF clients.

ACTIONS/INTERVENTIONS (continued)

RATIONALE (continued)

Vasodilators, such as nitrates (Nitro-Dur, Isordil); arteriodilators such as hydralazine (Apresoline); combination drugs, such as prazosin (Minipress) and nesiritide (Natrecor)	Vasodilators are used to increase cardiac and renal output, reducing circulating volume (preload and afterload), and decreasing SVR, thereby reducing ventricular workload. <i>Note:</i> Nesiritide is used in acutely decompensated congestive HF and has been used with digoxin, diuretics, and ACE inhibitors. Parenteral vasodilators are reserved for clients with severe HF or those unable to take oral medications.
β -adrenergic receptor antagonists (also called beta blockers), carvedilol (Coreg), bisoprolol (Zebeta), metoprolol (Lopressor, Toprol), nebivolol (Bystolic), acebutolol (Sectral), atenolol (Tenormin), betaxolol (Kerlone), carteolol (Cartrol), esmolol (Brevibloc), penbutolol (LevatoI), nadolol (Corgard), and pindolol (Visken)	Useful in the treatment of HF by blocking the cardiac effects of chronic adrenergic stimulation. Many clients experience improved activity tolerance and EF.
Inotropic agents, such as amrinone (Inacor), milrinone (Primacor), and vesnarinone (Arkin-Z)	These medications are useful for short-term treatment of HF unresponsive to cardiac glycosides, vasodilators, and diuretics in order to increase myocardial contractility and produce vasodilation.
Digoxin (Lanoxin)	Digoxin is no longer used routinely in HF but may be prescribed for symptomatic individuals with late-stage HF on maximal medication therapy (Suter et al, 2012). <i>Note:</i> In 2015, the American Geriatrics Society (AGS) stated that digoxin is to be “avoided as first-line therapy for heart failure . . . and may be associated with increased mortality” (AGS, 2015).
Antianxiety agents and sedatives	Allays anxiety and breaks the feedback cycle of anxiety to catecholamine release to anxiety. Promotes rest and relaxation, reducing oxygen demand and myocardial workload.
Anticoagulants, such as low-dose heparin, and warfarin (Coumadin), or antiplatelet agents, for example, low-dose aspirin, clopidogrel (Plavix), and tirofiban (Aggrastat)	May be used prophylactically to prevent thrombus and embolus formation in the presence of risk factors, such as venous stasis, enforced bedrest, cardiac dysrhythmias, and history of previous thrombotic episodes.
Administer IV solutions, restricting total amount, as indicated. Avoid saline solutions.	Because of existing elevated left ventricular pressure, client may not tolerate increased fluid volume (preload). Clients with HF also excrete less sodium, which causes fluid retention and increases myocardial workload.
Monitor and replace electrolytes, as indicated.	Fluid shifts and use of diuretics can alter electrolytes (especially potassium and chloride), which affect cardiac rhythm and contractility.
Monitor serial ECG and chest x-ray changes.	ST-segment depression and T-wave flattening can develop because of increased myocardial oxygen demand, even if no CAD is present. Chest x-ray may show enlarged heart and changes of pulmonary congestion.
Measure cardiac output and other functional parameters, as indicated.	Cardiac index, preload and afterload, contractility, and cardiac work can be measured noninvasively by using thoracic electrical bioimpedance (TEB) technique. TEB is useful in determining effectiveness of therapeutic interventions and response to activity.
Prepare for insertion and maintain pacemaker or pacemaker/defibrillator, if indicated.	May be necessary to correct bradydysrhythmias unresponsive to drug intervention, which can aggravate congestive failure and produce pulmonary edema. <i>Note:</i> Biventricular pacemaker and cardiac defibrillators are designed to provide resynchronization for the heart by simultaneous electrical activation of both the right and left sides of the heart, thereby creating a more effective and efficient pump.

(continues on page 46)

ACTIONS/INTERVENTIONS (continued)

Prepare for surgery, such as valve replacement, angioplasty, and coronary artery bypass grafting (CABG), as indicated:

Cardiomyoplasty

Assist with and maintain mechanical circulatory support system, such as intra-aortic balloon pump (IABP) or left-ventricular assist device (LVAD), when indicated.

RATIONALE (continued)

HF due to ventricular aneurysm or valvular dysfunction may require aneurysmectomy or valve replacement to improve myocardial contractility and function. Revascularization of cardiac muscle by CABG may be done to improve cardiac function.

Cardiomyoplasty, an experimental procedure in which the latissimus dorsi muscle is wrapped around the heart and electrically stimulated to contract with each heartbeat, may be done to augment ventricular function while the client is awaiting cardiac transplantation or when transplantation is not an option. *Note:* Cellular cardiomyoplasty is a developing therapy that uses stem cells or progenitor cells for injured heart to improve cardiac function and mitigate heart failure. A significant improvement in cardiac function, metabolism, and perfusion has been observed in clinical trials; however, the procedure requires further study (Lamb et al, 2015).

An IABP may be inserted into the aorta as a temporary support to the failing heart in the critically ill client with potentially reversible HF. A short (external) or long-term (implanted) LVAD may also be used, sometimes as a bridge to transplantation. A growing use of the LVAD is in so-called destination therapy (DT). The DT population typically includes individuals with end-stage heart failure and poor predictive survival in their current medical state. These people are also noneligible for transplantation, usually due to advanced age, significant comorbidities, or psychosocial issues contraindicating transplant. Clients who undergo LVAD implantation live the rest of their lives with the device in place.

NURSING DIAGNOSIS: Activity Intolerance**May Be Related To**

Imbalance between oxygen supply and demand
Generalized weakness
Sedentary lifestyle

Possibly Evidenced By

Reports fatigue, feeling weak
Abnormal blood pressure/heart rate in response to activity
Exertional dyspnea

Desired Outcomes/Evaluation Criteria—Client Will**Endurance** **NOC**

Participate in desired activities; meet own self-care needs.
Achieve measurable increase in activity tolerance, evidenced by reduced fatigue and weakness and by vital signs within acceptable limits during activity.

ACTIONS/INTERVENTIONS**Energy Management** **NIC***Independent*

Check vital signs before and immediately after activity during acute episode or exacerbation of HF, especially if client is receiving vasodilators, diuretics, or beta blockers.

RATIONALE

Orthostatic hypotension can occur with activity because of medication effect (vasodilation), fluid shifts (diuresis), or compromised cardiac pumping function.

ACTIONS/INTERVENTIONS (continued)**RATIONALE** (continued)

Document cardiopulmonary response to activity. Note tachycardia, dysrhythmias, dyspnea, diaphoresis, and pallor.	Compromised myocardium and inability to increase stroke volume during activity may cause an immediate increase in heart rate and oxygen demands, thereby aggravating weakness and fatigue.
Assess level of fatigue, and evaluate for other precipitators and causes of fatigue, for example, HF treatments, pain, cachexia, anemia, and depression.	Fatigue because of advanced HF can be profound and is related to hemodynamic, respiratory, and peripheral muscle abnormalities. Fatigue is also a side effect of some medications (e.g., beta blockers). Other key causes of fatigue should be evaluated and treated as appropriate and desired.
Evaluate accelerating activity intolerance.	May denote increasing cardiac decompensation rather than overactivity.
Provide assistance with self-care activities, as indicated. Intersperse activity with rest periods.	Meets client's personal care needs without undue myocardial stress or excessive oxygen demand.
Collaborative	
Implement graded cardiac rehabilitation and activity program.	Strengthens and improves cardiac function under stress if cardiac dysfunction is not irreversible. Gradual increase in activity avoids excessive myocardial workload and oxygen consumption.

NURSING DIAGNOSIS: excess Fluid Volume**May Be Related To**

Compromised regulatory mechanism (reduced glomerular filtration rate, increased antidiuretic hormone [ADH] production, and sodium and water retention)

Excess sodium intake

Possibly Evidenced By

Orthopnea, S₃ heart sound

Oliguria, increase in central venous pressure, positive hepatojugular reflex

Weight gain over short period of time; edema

Blood pressure changes

Pulmonary congestion, adventitious breath sounds

Desired Outcomes/Evaluation Criteria—Client Will**Fluid Overload Severity** **NOC**

Demonstrate stabilized fluid volume with balanced intake and output, breath sounds clear or clearing, vital signs within acceptable range, stable weight, and absence of edema.

Verbalize understanding of individual dietary and fluid restrictions.

ACTIONS/INTERVENTIONS**RATIONALE****Fluid Management** **NIC****Independent**

Monitor urine output, noting amount and color, as well as time of day when diuresis occurs.	Urine output may be scanty and concentrated (especially during the day) because of reduced renal perfusion. Recumbency favors diuresis; therefore, urine output may be increased at night or during bedrest.
Monitor 24-hour intake and output (I&O) balance.	Diuretic therapy may result in sudden or excessive fluid loss, creating a circulating hypovolemia, even though edema and ascites remain in the client with advanced HF or CHF.
Maintain chair rest or bedrest in semi-Fowler's position during acute phase.	Recumbency increases glomerular filtration and decreases production of ADH, thereby enhancing diuresis.
Establish fluid intake schedule if fluids are medically restricted, incorporating beverage preferences when possible. Give frequent mouth care and ice chips as part of fluid allotment.	Involving client in therapy regimen may enhance sense of control and cooperation with restrictions.

(continues on page 48)

ACTIONS/INTERVENTIONS (continued)**RATIONALE** (continued)

Weigh daily.	Documents changes in or resolution of edema in response to therapy. A gain of 5 lb represents approximately 2 L of fluid. Conversely, diuretics can result in rapid and excessive fluid shifts and weight loss.
Assess for distended neck and peripheral vessels. Inspect dependent body areas for edema with and without pitting; note presence of generalized body edema (anasarca).	Excessive fluid retention may be manifested by venous engorgement and edema formation. Peripheral edema begins in feet and ankles, or dependent areas, and ascends as failure worsens. Pitting edema is generally obvious only after retention of at least 10 lb of fluid. Increased vascular congestion—associated with right-sided HF—eventually results in systemic tissue edema.
Change position frequently. Elevate feet when sitting. Inspect skin surface, keep dry, and provide padding, as indicated. (Refer to ND: risk for impaired Skin Integrity.)	Edema formation, slowed circulation, altered nutritional intake, and prolonged immobility or bedrest are cumulative stressors that affect skin integrity and require close supervision and preventive interventions.
Auscultate breath sounds, noting decreased and adventitious sounds, for example, crackles and wheezes. Note presence of increased dyspnea, tachypnea, orthopnea, paroxysmal nocturnal dyspnea, and persistent cough.	Excess fluid volume often leads to pulmonary congestion. Symptoms of pulmonary edema may reflect acute left-sided HF. With right-sided HF, respiratory symptoms of dyspnea, cough, and orthopnea may have slower onset but are more difficult to reverse.
Investigate reports of sudden extreme dyspnea and air hunger, need to sit straight up, sensation of suffocation, and feelings of panic or impending doom.	May indicate development of complications, such as pulmonary edema or embolus, which differs from orthopnea or paroxysmal nocturnal dyspnea in that it develops much more rapidly and requires immediate intervention.
Monitor BP and central venous pressure (CVP) (if available).	Hypertension and elevated CVP suggest fluid volume excess and may reflect developing or increasing pulmonary congestion, HF.
Assess bowel sounds. Note complaints of anorexia, nausea, abdominal distention, and constipation.	Visceral congestion, occurring in progressive HF, can alter gastrointestinal function.
Provide small, frequent, easily digestible meals.	Reduced gastric motility can adversely affect digestion and absorption. Small, frequent meals may enhance digestion and prevent abdominal discomfort.
Measure abdominal girth, as indicated.	In progressive right-sided HF, fluid may shift into the peritoneal space, causing increasing abdominal girth (ascites).
Palpate abdomen. Note reports of right upper-quadrant pain or tenderness.	Advancing HF leads to venous congestion, resulting in abdominal distention, liver engorgement (hepatomegaly), and pain. This can alter liver function and impair or prolong drug metabolism.
Note increased lethargy, hypotension, and muscle cramping.	These are signs of potassium and sodium deficits that may occur because of fluid shifts and diuretic therapy.

Fluid/Electrolyte Management **NIC**
Collaborative

Administer medications, as indicated, for example:

Diuretics, such as furosemide (Lasix), bumetanide (Bumex), and torsemide (Demadex)	Increases rate of urine flow and may inhibit reabsorption of sodium and chloride in the renal tubules.
Potassium-sparing thiazides such as spironolactone (Aldactone), amiloride (Midamor), and triamterene (Direnium)	Promotes diuresis without excessive potassium losses.
Potassium supplements, such as K-Dur, K-Lor, and Micro-K	Replaces potassium that is lost as a common side effect of diuretic therapy, which can adversely affect cardiac function.

ACTIONS/INTERVENTIONS (continued)**RATIONALE** (continued)

Maintain fluid and sodium restrictions, as indicated.	Fluid restriction is not a general recommendation, but fluids should be restricted to less than 2 L/day in patients who have significant hyponatremia (<130 mEq/L). Fluid restriction may also be considered when patients have difficulty controlling fluid retention despite high diuretic doses and sodium restriction (Heart Failure Society of America [HFSA], 2010).
Consult with dietitian.	May be necessary to provide diet acceptable to client that meets caloric needs within sodium restriction.
Monitor chest x-ray.	Reveals changes indicative of increase or resolution of pulmonary congestion.
Monitor complete blood count (CBC) and electrolytes, especially potassium and sodium.	Hyponatremia and anemia may be signs of disease progression. Hypokalemia is a common adverse effect of diuretic treatment, and hyperkalemia may complicate therapy with ACE inhibitors, ARBs, and aldosterone antagonists (Suter et al, 2012).
Assist with other therapies such as dialysis, or ultrafiltration, as indicated.	Although not frequently used, mechanical fluid removal rapidly reduces circulating volume, especially in pulmonary edema refractory to other therapies.

NURSING DIAGNOSIS: risk for impaired Gas Exchange**Possibly Evidenced By**

Ventilation-perfusion imbalance [such as in altered blood flow, increased vascular resistance; heart failure]

Desired Outcomes/Evaluation Criteria—Client Will**Respiratory Status: Gas Exchange** **NOC**

Demonstrate adequate ventilation and oxygenation of tissues by ABG values and oximetry within client's usual parameters, and be free of symptoms of respiratory distress.

Participate in treatment regimen (e.g., breathing exercise, effective coughing, use of oxygen) within level of ability and situation.

ACTIONS/INTERVENTIONS**RATIONALE****Airway Management** **NIC***Independent*

Auscultate breath sounds, noting crackles and wheezes.	Reveals presence of pulmonary congestion or collection of secretions, indicating need for further intervention.
Instruct client in effective coughing and deep breathing.	Clears airways and facilitates oxygen delivery.
Encourage frequent position changes.	Helps prevent atelectasis and pneumonia.
Maintain chair rest and bedrest in a semi-Fowler's position, with head of bed elevated 20 to 30 degrees.	Reduces oxygen consumption and demands and promotes maximal lung inflation.

Collaborative

Monitor and graph serial ABG values and pulse oximetry.	Hypoxemia can be severe during pulmonary congestion. Compensatory acid-base changes are usually present in chronic HF.
Administer supplemental oxygen, as indicated.	Increases alveolar oxygen concentration, which may correct or reduce tissue hypoxemia.
Administer medications, as indicated, such as diuretics, such as furosemide (Lasix)	Diuresis helps reduce pulmonary congestion, enhancing gas exchange.

NURSING DIAGNOSIS: risk for chronic Pain**Possibly Evidenced By**

Chronic physical disease or condition
Altered ability to continue previous activities

Desired Outcomes/Evaluation Criteria—Client Will**Pain Control** **NOC**

Verbalize and demonstrate relief or control of pain or discomfort.
Demonstrate and initiate behavioral modifications of lifestyle and appropriate use of therapeutic interventions.

ACTIONS/INTERVENTIONS**RATIONALE****Pain Management: Chronic** **NIC***Independent*

Assess for presence of pain.

Pain may or may not be reported as a symptom associated with heart failure. Some studies indicate that pain (as a separate entity) has been understudied in this population. Unexpected sources of pain related to HF and the medications used to manage it include visceral ischemia, musculoskeletal fatigue, ascites-related pain, and skin breakdown secondary to prolonged edema (Evangelista et al, 2009). One recent study found that chronic noncardiac pain is reported by 76% of people with chronic heart failure (McDonald et al, 2015).

Note coexisting condition(s).

Many HF clients are elderly and have multiple chronic conditions, such as angina, arthritis, gout, back pain, claudication, and neuropathies.

Assess for lifestyle effects of heart failure as well as pain, such as deconditioning, severe fatigue, weight loss or gain, sleep difficulties, and depression.

Pain issues should be addressed and managed, when present, even though it may not be possible to determine if pain is a result of the HF itself (associated with underperfused organs) or be related to other conditions.

Provide anticipatory guidance.

In client with HF in which pain is common, educating client and significant other (SO) about when, where, and how to seek interventions or treatment may reduce limitations imposed by pain. If pain is present, pain management should be initiated.

Collaborative

Assist with treatment of underlying or coexisting conditions.

Promotes general well-being.

Administer analgesics, as indicated.

Promotes rest and relaxation and may enhance ability to engage in desired activities.

NURSING DIAGNOSIS: risk for impaired Skin Integrity**Possibly Evidenced By**

Impaired circulation; alteration in sensation
Alteration in fluid volume including presence of edema; alteration in skin turgor
Inadequate nutrition (associated with alteration in metabolism; obesity or emaciation)
Mechanical factor (e.g., shearing forces, pressure, physical immobility)

Desired Outcomes/Evaluation Criteria—Client Will**Risk Control: Pressure** **NOC**

Maintain skin integrity.
Demonstrate behaviors or techniques to prevent skin breakdown.

ACTIONS/INTERVENTIONS	RATIONALE
Pressure Ulcer Prevention NIC	
<i>Independent</i>	
Inspect skin, noting skeletal prominences, presence of edema, and areas of altered circulation and pigmentation.	Skin is at risk because of impaired peripheral circulation, obesity or emaciation, edema, physical immobility, and alterations in nutritional status.
Encourage and instruct in frequent position changes in bed and chair. Assist with active or passive range of motion (ROM) exercises.	Reduces pressure on tissues, improving circulation and reducing time any one area is deprived of full blood flow.
Provide and instruct in good skin care (e.g., shower instead of bath, washing areas thoroughly using mild soap, drying gently and lubricating with lotion or emollient).	Excessive dryness or moisture damages skin and hastens breakdown.
Provide skin care to incontinent client. Change continence pads/brief/diapers as needed. Cleanse perineal areas daily and after each incontinence event. Apply skin-protectant ointment to area as needed.	Meticulous cleansing and care of skin of the incontinent client can prevent or minimize skin breakdown.
Encourage early and ongoing mobilization.	Promotes circulation and reduces risks associated with immobility.
Check fit of shoes or slippers and change as needed.	Dependent edema may cause shoes to fit poorly, thereby increasing risk of pressure and skin breakdown on feet.
Avoid intramuscular route for medication administration.	Interstitial edema and impaired circulation impede drug absorption and predispose to tissue breakdown and development of infection.
<i>Collaborative</i>	
Provide alternating pressure, air- or water-filled mattress, and elbow and heel protectors.	Reduces pressure to sensitive/fragile skin and may improve circulation.
Consult with nutritionist if indicated regarding nutrients and vitamins that aid in tissue repair and skin health.	Client with heart failure is often elderly and debilitated. Supplements may be needed to promote general well-being and healthy skin/tissue.

NURSING DIAGNOSIS: ineffective Health Management

May Be Related To

Complexity of therapeutic regimen or healthcare system
 Insufficient knowledge or excessive demands of therapeutic regimen
 Economic demands; insufficient support

Possibly Evidenced By

Reports difficulty with prescribed regimen
 Failure to include treatment regimen in daily living
 Failure to take action to reduce risk factors
 Unexpected acceleration of illness symptoms

Desired Outcomes/Evaluation Criteria—Client Will

Self-Management: Heart Failure **NOC**

Identify relationship of ongoing therapies (treatment program) to reduction of recurrent episodes and prevention of complications.
 List signs and symptoms that require immediate intervention.
 Identify own stress and risk factors and some techniques for handling them.
 Initiate necessary lifestyle and behavioral changes.

Teaching: Disease Process **NIC***Independent*

Discuss normal heart function. Include information regarding client's variance from normal function. Explain difference between heart attack and HF and that client has a chronic condition that requires long-term management (if heart failure is not acute and resolvable).	Knowledge of disease process and expectations can facilitate client's participation in management of HF, including prescribed treatment regimen if teaching is individualized to the client.
Reinforce treatment rationale. Include SO and family members in teaching as appropriate, especially for complicated regimens such as management of technology, for example, implantable cardioverter-defibrillator (ICD) or LVAD, dobutamine infusion home therapy when client does not respond to customary combination therapy or cannot be weaned from dobutamine, or in those awaiting heart transplant.	Client may believe it is acceptable to alter postdischarge regimen when feeling well and symptom free or when feeling below par, which can increase the risk of exacerbation of symptoms. Understanding of regimen, medications, technology, and restrictions may augment cooperation with control of symptoms. Home IV therapy requires a significant commitment by caregivers to operate and troubleshoot infusion pump, change dressing for peripherally inserted central catheter (PICC) line, and monitor I&O and signs and symptoms of HF.
Encourage developing a regular home exercise program and provide guidelines for activity, including sexual activity.	Promotes maintenance of muscle tone and organ function for overall sense of well-being. Changing sexual habits (e.g., sex in morning when well rested, client on top, inclusion of other physical expressions of affection) may be difficult but provides opportunity for continuing satisfying sexual relationship.
Discuss importance of being as active as possible without becoming exhausted and need for rest between activities.	Keeping as active as possible is important in maintaining strength and function, as well as mood. However, excessive physical activity or overexertion can further weaken the heart, exacerbating failure, and necessitates adjustment of exercise program.
Discuss importance of sodium limitation. Provide list of sodium content of common foods that are to be avoided or limited. Encourage reading of labels on food and drug packages.	Dietary intake of sodium of more than 2 g/day can offset effect of diuretic. Most common source of sodium is table salt and obviously salty foods, although canned soups and vegetables, luncheon meats, and dairy products also may contain high levels of sodium.
Refer to dietitian for counseling specific to individual needs and dietary customs.	May be helpful in meeting client's nutrition needs, especially in the presence of obesity (major risk factor for developing HF), diabetes, or presence of nausea and vomiting and resulting wasting syndrome (cardiac cachexia). Eating six small meals and using liquid dietary supplements and vitamin supplements can limit inappropriate weight loss.
Review medications, purpose, and side effects. Provide both oral and written instructions, including (and not limited to) taking medicine as directed, contacting healthcare provider if you think your medicine is not helping, or if you have adverse side effects. Keep an updated list of the medicines, vitamins, and herbs you take. Carry your medicine list with you to medical appointments and keep on person (if possible) in case of an emergency.	Understanding therapeutic needs, ways to properly manage medication regimen, and importance of prompt reporting of side effects can prevent occurrence of drug-related complications. Anxiety may block comprehension of input or details, and client and SO may refer to written material at later date to refresh memory.
Recommend taking diuretic early in morning.	Provides adequate time for drug effect before bedtime to prevent or limit interruption of sleep.
Instruct and receive return demonstration of ability to take and record pulse and BP, and when to notify healthcare provider, for example, about parameters above or below preset rate and changes in rhythm or regularity.	Promotes self-monitoring of condition and response to therapies. Early detection of changes allows for timely intervention and may prevent complications, such as digoxin toxicity.

ACTIONS/INTERVENTIONS (continued)**RATIONALE** (continued)

Explain and discuss client's role in control of risk factors, such as smoking and alcohol abuse, and precipitating or aggravating factors, such as high-salt diet, inactivity or overexertion, and exposure to extremes in temperature.	Adds to body of knowledge and permits client to make informed decisions regarding control of condition and prevention of recurrence or complications. Smoking potentiates vasoconstriction; sodium intake promotes water retention and edema formation. Improper balance between activity and rest and exposure to temperature extremes may result in exhaustion, increased myocardial workload, and increased risk of respiratory infections. Alcohol can depress cardiac contractility. Limitation of alcohol use to social occasions or maximum of one drink per day may be tolerated unless cardiomyopathy is alcohol induced, which requires complete abstinence.
Review signs and symptoms that require immediate medical attention, such as rapid and significant weight gain, increased swelling in legs and feet, shortness of breath, increased fatigue, cough, hemoptysis, and fever.	Self-monitoring increases client responsibility in health maintenance and aids in prevention of complications such as pulmonary edema, pneumonia. Weight gain of more than 3 lb in 1 week requires medical evaluation or adjustment of diuretic therapy. <i>Note:</i> Client should weigh daily in morning without clothing, after voiding and before eating.
Provide opportunities for client and SO to ask questions, discuss concerns, and make necessary lifestyle changes.	Chronicity and recurrent, debilitating nature of HF often exhausts coping abilities and supportive capacity of both client and SO, leading to depression.
Address caregiver's concerns and needs. Refer for support, assistance, and resources, as indicated.	Caregiver burden can exhaust SO's coping capabilities and health, especially when client has advanced HF, has a ventricular assist device, or is awaiting heart transplantation.
Discuss general health risks, such as infection, and recommend avoidance of crowds and individuals with respiratory infections and obtaining yearly influenza immunization and pneumonia immunization.	This population is at increased risk for infection because of circulatory compromise, potential immunosuppression, and chronicity of disease.
Emphasize importance of reporting signs and symptoms of digoxin toxicity (as indicated): development of gastrointestinal and visual disturbances, changes in pulse rate and rhythm, and worsening of HF.	Early recognition of developing complications and involvement of healthcare provider may prevent toxicity and hospitalization.
Identify community resources or support groups and visiting home health nurse, as indicated.	May need additional assistance with self-monitoring and home management, especially when HF is progressive.
Discuss importance of advance directives and of communicating plan and wishes to family and primary care providers.	Up to 50% of all deaths from HF are sudden, with many occurring at home, possibly without significant worsening of symptoms. The presumption is that sudden cardiac death is produced by a lethal cardiac arrhythmia, as well as structural and functional changes in the heart (Tomasselli & Zipes, 2004). If client chooses to refuse life-support measures, an alternative contact person (rather than 911) needs to be designated should cardiac arrest occur.

POTENTIAL CONSIDERATIONS following discharge from care setting (dependent on client's age, physical condition and presence of complications, personal resources, and life responsibilities)

- **Activity Intolerance**—imbalance between oxygen supply and demand, generalized weakness
- **excess Fluid Volume**—compromised regulatory mechanism, diuretic use, individual fluid and salt intake
- **risk for impaired Skin Integrity**—physical immobilization, changes in skin turgor, impaired circulation, edema
- **ineffective Health Management**—complexity of therapeutic regimen, economic difficulties, perceived seriousness
- **impaired Home Maintenance**—disease (chronic, debilitating condition), insufficient finances, inadequate support systems
- **Self-Care Deficit [specify]**—weakness, fatigue, decreased motivation

ACUTE CORONARY SYNDROME (ACS)

Acute coronary syndrome (ACS) is an umbrella term for a situation where the blood supply to the heart muscle is suddenly blocked, producing a variety of clinical symptoms compatible with myocardial ischemia, and precipitating a medical emergency.

ACS includes (1) unstable angina (UA), (2) non-ST-segment elevation myocardial infarction (NSTEMI), and (3) ST-segment elevation myocardial infarction (STEMI).

I. Pathophysiology (American Heart Association [AHA], 2015a; Fogoros, 2016a; Mayo Clinic, 2016b)

- a. The disorder is characterized by a narrowing of coronary arteries due to atherosclerotic plaque, damaging the internal linings of coronary arteries. This condition is known as coronary artery disease (CAD).
- b. As the process progresses, oxygen transport to the heart muscle is restricted, resulting in myocardial ischemia and pain.
- c. Hard plaque causes hardened arteries, whereas soft plaque can cause formation of blood clots, either of which can restrict blood flow. There can be plaque rupture or clot formation, causing a sudden reduction of blood flow and a partial or complete occlusion of the coronary artery.
- d. Angina (chest pain) is characteristic of ACS. Pain may or may not radiate to jaw, neck, back, or arm. Anginal equivalents may include dyspnea, diaphoresis, nausea, and lightheadedness. Pain may be accompanied by changes in vital signs, decreased oxygen saturation (SaO_2), or cardiac dysrhythmias.
- e. Women often present with atypical symptoms, such as “indigestion,” palpitations, nausea, numbness in the hands, and discomfort (not necessarily pain) and not necessarily in the chest. Other women have reported shortness of breath, pressure or pain in the lower chest or upper abdomen, dizziness, lightheadedness or fainting, upper back pressure, or extreme fatigue (AHA, 2015b).

II. Types of ACS (Fogoros, 2016a)

- a. Unstable angina (UA)
 - i. May be new onset of pain with exertion or at rest, or acceleration in frequency, duration, or intensity of chest pain.
 - ii. Occurs in no regular pattern, usually lasts longer (15 minutes), not generally relieved with rest or medications.
 - iii. Electrocardiographic (ECG) manifestations include ST-segment depression and inverted T waves. These changes are transient and not always detected.
 - iv. Cardiac biomarkers are not elevated.
- b. Non-ST-segment elevation myocardial infarction (NSTEMI)
 - i. Pain and angina equivalents may be much the same as in UA or may be of longer duration and more intense.

- ii. ECG manifestations include ST-segment depression and inverted T waves, which may persist after resolution of ischemia and pain.
- iii. Cardiac biomarkers are elevated.
- c. ST-segment elevation myocardial infarction (STEMI)
 - i. ECG manifestations include ST-segment elevation in two adjoining leads (diagnostic of STEMI) and abnormal Q waves that appear because of alterations in electrical conductivity of the infarcted myocardial cells.
 - ii. The imbalance between oxygen supply and demand is severe enough to cause tissue necrosis, and the client requires emergency revascularization.
- d. *Note:* Both NSTEMI and unstable angina can be considered “incomplete” heart attacks. These two forms of ACS need similar, aggressive medical management to reduce the likelihood that they will progress to a STEMI (often called a “completed” MI) (Fogoros, 2016a).

III. Etiology (Fogoros, 2016a; Go et al, 2013; Mayo Clinic Staff, 2016a; Scordo & Pickett, 2017)

- a. Coronary artery disease (CAD) common cause with plaque formation narrowing vessels and pieces of plaque breaking off, creating emboli, and coronary artery obstruction.
- b. Risk factors—age (older than 45 for men, and 55 for women).
- c. Presence of “metabolic syndrome” (see Glossary).
- d. Being overweight or obese, lack of physical activity, smoking.
- e. Type 2 diabetes and family history of chest pain, heart disease, or stroke.

IV. Statistics (Mozaffarian et al, 2015)

- a. Morbidity: Based on 2013 mortality data, there are an estimated 85.6 million Americans living with some form of cardiovascular disease. Of these, more than 43 million are estimated to be over the age of 60.
- b. Mortality: From 2003 to 2013, death rates attributable to cardiovascular disease (CVD) declined 28.8% yet still accounted for almost one of every three deaths in the United States. There were 614,348 deaths from heart disease in 2014. Heart disease accounted for 24.5% of all deaths in males and 22.3% of all deaths in females (Heron, 2016 [data are for 2014]).
- c. Cost: The estimated direct and indirect costs of cardiovascular diseases and stroke for 2011 to 2012 were \$316.6 billion (Mozaffarian et al, 2015). *Note:* Compiling accurate costs of the various treatments for coronary artery diseases is problematic because of absence of standardization of costs across the United States, as well as the wide variety of individual treatments. For example, one consumer information website (updated 2017) listed a range of \$11,298 to \$36,221 for an average heart stent placement surgery in Oregon. At a hospital in Wisconsin, placement of one cardiac stent that is coated with long-release medication carries a median hospital charge of \$41,228 (“Heart Stent Cost,” 2017).

G L O S S A R Y

Angioplasty: See Percutaneous coronary interventions (PCIs), below.

Cardiac biomarkers: Substances that are released into the blood when the heart is damaged or stressed. Measurement of these biomarkers is used to help diagnose, monitor, and manage people with suspected ACS and cardiac ischemia. The current biomarker test of choice for detecting heart damage is troponin (see below). Other cardiac biomarkers (e.g., CK, CK-MB, myoglobin) are less specific for the heart and may also be elevated in skeletal muscle injury, liver disease, or kidney disease (Lab Tests Online, 2015).

Coronary artery disease (CAD): Disease in which there is a narrowing or blockage of the coronary arteries that carry blood and oxygen to the heart muscle.

Metabolic syndrome: A cluster of metabolic disorders that increases risk for cardiovascular disease, especially when three or more conditions are present: (1) abdominal obesity (waist circumference of 40 inches or above in men and 35 inches or above in women), (2) triglyceride level of >150 (mg/dL), (3) HDL cholesterol of less than 40 mg/dL in men or less than 50 mg/dL in women, (4) systolic blood pressure of 130 mm Hg or greater or diastolic blood pressure of 85 mm Hg or greater, and (5) fasting glucose of 100 mg/dL or greater.

Myocardial infarction (MI): An occlusion or blockage of arteries supplying the muscles of the heart, resulting in injury or necrosis of the heart muscle (heart attack).

Occlusive thrombus: Blood clot that completely blocks a coronary artery.

Percutaneous coronary interventions (PCIs), also known as angioplasty: A nonsurgical procedure used to treat stenotic coronary arteries of the heart found in coronary heart disease. During PCI, a cardiologist feeds a deflated balloon or other device on a catheter from the inguinal femoral artery or radial artery up through blood vessels

until it reaches the site of blockage in the heart. X-ray imaging is used to guide the catheter threading. At the blockage, the balloon is inflated to open the artery, allowing blood to flow. A stent is often placed at the site of blockage to permanently open the artery.

Non-ST-segment elevation myocardial infarction (NSTEMI): Development of heart muscle necrosis without the ECG change of ST-segment elevation, resulting from an acute interruption of blood supply to a part of the heart and demonstrated by an elevation of cardiac markers (CK-MB or troponin) in the blood. NSTEMI involves less than full-thickness damage of heart muscle and is, therefore, a less severe type of heart attack than STEMI (see below) (“NSTEMI,” 2017).

ST-segment elevation myocardial infarction (STEMI): Occurs by complete occlusion of a major coronary artery that produces an entire thickness damage of heart muscle (transmural). This damage of heart muscle produces an ECG change of ST-segment elevation.

Troponin (also known as cardiac-specific troponin I [cTn I] and troponin T [cTn T]): Blood test used to help diagnose a heart attack, to detect and evaluate mild to severe heart injury, and to distinguish chest pain that may be due to other causes.

Unstable angina (UA): Chest pain produced when the heart muscle is not getting enough blood flow is considered “unstable” when it no longer follows the predictable patterns typical of “stable angina.” Unstable angina is called “unstable” for two reasons: (1) symptoms occur in a more random and unpredictable fashion, and (2) it is most often caused by the actual rupture of a plaque in a coronary artery, resulting in clot formation, with impairment of free blood flow to tissues. The imminent risk of a complete myocardial infarction is very high in unstable angina. Such a condition is quite “unstable” and for this reason is a medical emergency (Fogoros, 2011b).

CARE SETTING

Client may have a short hospitalization during acute stage for stabilization and possible cardiac revascularization. The client who has sustained a STEMI or is judged to be at intermediate or high risk for MI will be hospitalized for further evaluation and therapeutic intervention.

RELATED CONCERNS

Angina: chronic/stable, page 64

Cardiac surgery, page 98

Dysrhythmias, page 85

Myocardial infarction, page 72

Psychosocial aspects of care, page 835

CLIENT ASSESSMENT DATABASE

DIAGNOSTIC DIVISION
MAY REPORT

MAY EXHIBIT

ACTIVITY/REST

- Sedentary lifestyle
- Weakness, feeling incapacitated after exercise
- Fatigue
- Activities and sleep disrupted by pain

- Exertional dyspnea

(continues on page 56)

MAY REPORT (continued)

MAY EXHIBIT (continued)

CIRCULATION

- History of heart disease, hypertension in self
- Palpitations

- Tachycardia, dysrhythmias
- Blood pressure (BP) may be normal, elevated, or decreased
- Heart sounds may be normal, late S₄ or transient late systolic murmur may be evident during pain
- Moist, cool, pale skin in presence of vasoconstriction
- Orthostatic blood pressure changes

EGO INTEGRITY

- Stressors of work, family, others, and financial concerns

- Apprehension, uneasiness

FOOD/FLUID

- Nausea, “heartburn,” or epigastric distress
- Diet high in cholesterol and fats, salt, caffeine, liquor

NEUROSENSORY

- History of dizziness, fainting spells, transient numbness, tingling in extremities

Note: Ischemia anywhere in the body can produce transient neurological symptoms.

PAIN

Note: Reports of pain location and severity differ between men and women.

- Substernal or anterior chest pain that may radiate to jaw, neck, shoulders, and upper extremities, often to left side more than right. Women may report pain between shoulder blades, back pain.
- **Quality:** Varies from transient and mild to moderate, heavy pressure, tightness, squeezing, burning. Women may report dull aching pain.
- **Duration:** Usually more than 15 minutes
- **Precipitating factors:** May be unpredictable or occur during rest or sleep
- **Relieving factors:** Pain may not be responsive to relief mechanisms, such as rest and antianginal medications

- Placing fist over midsternum
- Rubbing left arm, muscle tension
- Autonomic responses, for example, tachycardia, blood pressure changes

RESPIRATION

- Exertional dyspnea, which may resolve with rest or pain relief
- Smoking history

- Increased rate and rhythm, alteration in depth

TEACHING/LEARNING

- Family history or risk factors of CAD: obesity, sedentary lifestyle, hypertension, stroke, diabetes, smoking, and hyperlipidemia
- Use or misuse of cardiac, antihypertensive, and over-the-counter (OTC) drugs

DISCHARGE PLAN CONSIDERATIONS

- Assistance with physical care, medication management, homemaker or maintenance tasks

DIAGNOSTIC STUDIES

TEST
WHY IT IS DONE

WHAT IT TELLS ME

DIAGNOSTIC STUDIES

- **Electrocardiogram (ECG):** Record of the electrical activity of the heart to detect dysrhythmias, to identify any myocardial ischemia present or any damage to myocardial tissue from the past.
- **Echocardiography (also called two-dimensional echocardiogram and Doppler ultrasound):** Provides visual of working heart and structures.
- **Cardiac catheterization with angiography:** Assesses patency of coronary arteries, reveals abnormal heart and valve size or shape, and evaluates ventricular contractility.
- **Coronary computed tomography angiography (CTA) (also called CT angiography or fast CT):** High-resolution, three-dimensional pictures of the moving heart and great vessels.
- **Chest x-ray:** Documents heart size and visualizes infiltrates that may be present in the lung.

BLOOD TESTS

- **Cardiac enzymes, including troponin I and troponin T. Also CK-MB:** Substances released from heart muscle when it is damaged.
- **C-reactive protein (CRP):** A marker for inflammation.
- **Metabolic profile, including blood glucose electrolytes BUN/Cr**

In the emergency setting, ECG is the most important diagnostic test. It may show changes during symptoms and in response to treatment; confirms a cardiac basis for symptoms. It also may demonstrate preexisting structural or ischemic heart disease (left ventricular hypertrophy, Q waves). ECG changes associated with unstable angina (UA) include ST-segment depression, transient ST-segment elevation, and T-wave inversion or some combination of these factors (Coven et al, 2016). *Note:* Unstable angina may be associated with new electrocardiographic changes but can be present in the absence of ECG changes (Manesh et al, 2017).

May play an important role in the setting of ACS as it identifies regional wall motion abnormalities associated with myocardial ischemia.

An echocardiogram can also help in defining the extent of an infarction when muscle damage occurs.

Cardiac catheterization defines coronary anatomy and the extent of a client's disease. Client in early stages of an acute heart attack or client with intractable angina (despite medication) should immediately undergo cardiac catheterization and stent placement to stop damage to heart muscle and/or to stabilize plaque (Coven et al, 2016; Fogoros, 2016a).

Scanners can do a full cardiac scan in 10 seconds and produce high-resolution images that allow fine details of coronary arteries to be seen. This technology allows for noninvasive and early diagnosis of CAD and thus earlier treatment before the coronary arteries become more or completely occluded.

Helps in assessing cardiomegaly and pulmonary edema, or it may reveal complications of ischemia, such as pulmonary edema.

Cardiac-specific troponins are not detectable in the blood of healthy individuals; therefore, they provide high specificity for detecting injury to cardiac contractile muscle. Troponins are also more sensitive than CK-MB for myocardial necrosis and therefore improve early detection of small myocardial infarctions.

Note: Some research has supported the use of point-of-care testing for cardiac troponin (PoCT-cTn). Results are rapidly available and can be used to rule out or rule in ACS, thereby facilitating timely treatment (Chew et al, 2011; Li et al, 2014).

Growing numbers of studies suggest that elevation of high-sensitive CRP (hs-CRP) levels predict clinical outcomes in ACS and may be used in conjunction with troponin I or T levels to identify high-risk patients for more aggressive management with antiplatelet agents and statins (Shrivastava et al, 2015).

Important for client with new-onset angina. Close monitoring of potassium and magnesium levels is important in client with ACS because low levels may predispose to ventricular dysrhythmias. Creatinine levels must be considered before using an angiotensin-converting enzyme (ACE) inhibitor and particularly if cardiac catheterization is considered.

(continues on page 58)

DIAGNOSTIC STUDIES (contd.)

WHY IT IS DONE (continued)

- **Serum lipids, including total lipids, lipoprotein electrophoresis, isoenzymes, cholesterol (HDL, LDL, very low-density lipoprotein [VLDL]), triglycerides, and phospholipids:** A group of tests that make up a lipid profile.
- **Coagulation studies, including partial thromboplastin time (PTT), activated partial thromboplastin time (aPPT), and platelets:** Injury to a vessel wall or the tissue initiates the coagulation cascade and formation of a thrombus.

WHAT IT TELLS ME (continued)

The presence of lipid abnormalities increases the risk of CAD. *Note:* Recently, an elevated triglyceride (Tg) has been identified as an *independent* risk factor for development of coronary artery disease (Van Leeuwen & Bladh, 2015).
Thrombus formation can potentiate ischemic damage to the myocardium as blood flow is blocked.

NURSING PRIORITIES

1. Relieve or control pain.
2. Prevent or minimize development of myocardial complications.
3. Provide information about disease process, prognosis, and treatment.
4. Support client or significant other (SO) in initiating necessary lifestyle or behavioral changes.

DISCHARGE GOALS

1. Desired activity level achieved, with return to activity baseline, and self-care needs met with minimal or no pain.
2. Remains free of complications.
3. Disease process, prognosis, and therapeutic regimen understood.
4. Participates in treatment program and behavioral changes.
5. Plan in place to meet needs after discharge.

NURSING DIAGNOSIS: acute Pain

May Be Related To

Biological agents (tissue ischemia, increased cardiac workload and oxygen consumption, decreased myocardial blood flow)

Possibly Evidenced By

Verbal/coded reports of pain

Expressive behaviors (such as moaning, crying, pacing, or restlessness)

Diaphoresis; changes in blood pressure, heart rate, respiratory rate, pupillary dilation

Self-focus

Desired Outcomes/Evaluation Criteria—Client Will

Pain Level **NOC**

Report pain is relieved or controlled.

Demonstrate relief of pain as evidenced by stable vital signs and absence of muscle tension and restlessness.

ACTIONS/INTERVENTIONS

Pain Management: Acute **NIC**

Independent

Instruct client to notify nurse immediately when chest pain occurs.

Identify precipitating event, if any; identify frequency, duration, intensity, and location of pain.

RATIONALE

Pain and decreased cardiac output may stimulate the sympathetic nervous system to release excessive amounts of norepinephrine, which increases platelet aggregation, and release of thromboxane A₂. This potent vasoconstrictor causes coronary artery spasm, which can precipitate, complicate, and prolong an anginal attack. Unbearable pain may cause vasovagal response, thus decreasing BP and heart rate.

Helps differentiate chest pain and aids in evaluating possible progression or process. Pain associated with UA, NSTEMI, and STEMI is usually intense, occurs unpredictably, may last a longer period of time, and is not usually relieved by nitroglycerine (NTG) or rest.

ACTIONS/INTERVENTIONS (continued)	RATIONALE (continued)
Evaluate reports of pain in jaw, neck, shoulder, arm, or hand (typically on left side).	Cardiac pain may radiate; for example, pain is often referred to more superficial sites served by the same spinal cord nerve level.
Assess and document client response and effects of medication.	Provides information about progression of coronary blockage. Aids in evaluating effectiveness of interventions and may indicate need for change in therapeutic regimen.
Monitor vital signs every 5 minutes during initial pain attack.	BP may initially rise because of sympathetic stimulation and then fall if cardiac output is compromised. Tachycardia also develops in response to sympathetic stimulation and may be sustained as a compensatory response if cardiac output falls.
Monitor heart rate and rhythm.	Client with unstable angina has an increased risk of acute life-threatening dysrhythmias, which occur in response to ischemic changes and stress hormones. (Refer to ND: risk for decreased Cardiac Output.)
Place client at complete rest during anginal episodes.	Reduces myocardial oxygen demand to minimize risk of tissue injury and necrosis.
Elevate head of bed if client is short of breath.	Facilitates gas exchange to decrease hypoxia and resultant shortness of breath.
Observe for associated symptoms, such as dyspnea, nausea, vomiting, dizziness, palpitations, and desire to urinate.	Decreased cardiac output (which may occur during ischemic myocardial episode) stimulates sympathetic or parasympathetic nervous system, causing a variety of vague sensations that client may not identify as related to anginal episode.
Stay with client who is experiencing pain or appears anxious.	Anxiety releases catecholamines, which increase myocardial workload and can escalate or prolong ischemic pain. Presence of nurse can reduce feelings of fear and helplessness.
Maintain quiet, comfortable environment; restrict visitors as necessary.	Mental or emotional stress increases myocardial workload.
Collaborative	
Collaborate in treatment of condition.	Initial therapy for ACS should focus on stabilizing the client's condition, relieving ischemic pain, and providing anti-thrombotic therapy to reduce myocardial damage and prevent further ischemia. (Refer to NDs: risk for decreased cardiac Tissue Perfusion, and risk for decreased Cardiac Output, for discussion of additional medications.)
Provide supplemental oxygen.	Increases oxygen available for myocardial uptake to relieve ischemic pain.
Administer analgesics, such as morphine sulfate (MS) or fentanyl (Duragesic) by appropriate route.	Potent opioid analgesic may be used in acute angina because of its beneficial side effects. Such effects include peripheral vasodilation and reduced myocardial workload; sedation, which produces relaxation; and interrupted flow of vasoconstricting catecholamines, thereby effectively relieving severe chest pain.
Administer antianginal medication(s) promptly, as indicated, for example:	
Sublingual and/or IV nitroglycerin	Nitrates do not improve mortality. However, they provide symptomatic relief by means of several mechanisms, including coronary vasodilation, improved collateral myocardial blood flow, and reduction of cardiac workload (Fogoros, 2016a).
Calcium channel blockers, such as bepridil (Vascor), amlodipine (Norvasc), nifedipine (Cardene), nifedipine (Procardia), felodipine (Plendil), isradipine (DynaCirc), and diltiazem (Cardizem)	Produce relaxation of coronary vascular smooth muscle, dilate coronary arteries, and decrease peripheral vascular resistance.

NURSING DIAGNOSIS: risk for decreased cardiac Tissue Perfusion**Possibly Evidenced by Risk Factors of**

Hypoxemia, hypertension; coronary artery spasm
Elevated C-reactive protein; hyperlipidemia
Family history of cardiac disease

Desired Outcomes/Evaluation Criteria—Client Will**Cardiac Pump Effectiveness** **NOC**

Demonstrate adequate coronary perfusion as appropriate (e.g., vital signs within client's normal range; free of chest pain or discomfort).
Participate in behaviors and activities that reduce the workload of the heart.

ACTIONS/INTERVENTIONS**RATIONALE****Hemodynamic Regulation** **NIC***Independent*

Maintain bedrest or chair rest in position of comfort during acute episode.	Decreases oxygen consumption and demand, reducing myocardial workload and risk of decompensation.
Monitor vital signs and cardiac rhythm.	Tachycardia and changes in blood pressure (hypotension or hypertension) may be present because of pain, anxiety, hypoxemia, and circulating stress hormones. ECG changes reflecting ischemia and dysrhythmias indicate need for additional evaluation and therapeutic intervention.
Auscultate breath sounds and heart sounds.	S ₃ , S ₄ may occur with cardiac decompensation or pulmonary complication.
Monitor for and document effects of and adverse response to medications, noting BP, heart rate, and rhythm (especially when giving combination of calcium antagonists, beta blockers, and nitrates).	Desired effect is to decrease myocardial oxygen demand by decreasing cardiac stress. Drugs with negative inotropic properties can decrease perfusion to an already ischemic myocardium.
Encourage immediate reporting of pain for prompt administration of medications, as indicated.	Timely interventions can reduce oxygen consumption and myocardial workload and may prevent or minimize cardiac complications.
Assess for signs and symptoms of heart failure.	Angina is only a symptom of underlying pathology causing myocardial ischemia. Progression of disorder may compromise cardiac function to point of decompensation.

Collaborative

Monitor serial ECG, noting ST-segment changes associated with ischemia.	Ischemia associated with NSTEMI or UA may cause transient ST-segment depression or elevation and T-wave inversion. Serial tracings verify ischemic changes, which may disappear when client is pain free. They also provide a baseline against which to compare later pattern changes. If ST-segment is elevated or other ECG changes occur over a short time, STEMI myocardial infarction is most likely evolving. Refer to CP: Myocardial Infarction.
Administer supplemental oxygen as needed.	Increases oxygen available for myocardial uptake to improve contractility and reduce ischemia.
Monitor pulse oximetry or arterial blood gases (ABGs), as indicated.	Oxygen saturation may decrease as oxygen demands increase for heart muscle and systemic circulation. Monitoring determines adequacy of respiratory function and O ₂ therapy.
Administer medications, as indicated, for example: Statins, such as atorvastatin (Lipitor), simvastatin (Zocor), and others	Statins may be given emergently to lower circulating cholesterol and to stabilize plaque deposits, reducing the likelihood of plaque rupture (Mayo Clinic Staff, 2016a).

ACTIONS/INTERVENTIONS (continued)**RATIONALE** (continued)

Beta blockers, such as metoprolol (Lopressor), nadolol (Corgard), and esmolol (Brevibloc)	Beta blockers have antiarrhythmic and antihypertensive properties, as well as the ability to reduce ischemia. They minimize the imbalance between myocardial supply and demand by reducing afterload and wall stress (Coven et al, 2016; Mayo Clinic Staff, 2016a).
Antiplatelet therapy, including aspirin (Anacin, Bayer aspirin)	Aspirin remains a first-line therapy for managing patients with UA/NSTEMI and is often given in prehospital transport or emergency room (Anderson, 2013; Mayo Clinic Staff, 2016a).
Other drugs (such as ticagrelor [Brilinta], clopidogrel [Plavix], and prasugrel [Effient])	Aspirin plus an anticoagulant (e.g., heparin) may be followed by a second antiplatelet agent (e.g., clopidogrel, ticagrelor) or an intravenous glycoprotein IIb/IIIa agent before angiography (Anderson, 2013; Vallerand et al, 2017).
Glycoprotein IIb/IIIa receptor antagonists such as abciximab (ReoPro), eptifibatide (Integrilin), and tirofiban (Aggrastat)	These agents prevent the binding of fibrinogen, thereby blocking platelet aggregation, and in combination with aspirin are considered standard antiplatelet therapy for client at high risk for unstable angina. Tirofiban has been approved for use in combination with heparin for patients with UA who are being treated medically and for patients undergoing PCI (Coven et al, 2016).
Anticoagulants, such as heparin, and low-molecular-weight heparins (LMWHs), such as enoxaparin (Lovenox) and dalteparin (Fragmin)	An IV bolus of heparin, followed by continuous infusion, is recommended to help reduce risk of subsequent MI by reducing the thrombotic complications of plaque rupture for clients diagnosed with intermediate or high-risk UA. Use of low-molecular-weight heparins is increasing because they are more predictable, have fewer adverse effects, and do not require anticoagulation monitoring (Anderson, 2013; Vallerand et al, 2017).
Prepare for interventions such as angioplasty (with or without intracoronary stent placement) or bypass/grafting, as indicated.	<p>Angioplasty, also called percutaneous coronary intervention (PCI) or transluminal coronary angioplasty (PTCA), is a procedure carried out to improve coronary blood flow. Angioplasty opens coronary arteries narrowed or blocked by atherosclerotic plaque and may be used to relieve symptoms of ACS or to reduce heart damage during or after a heart attack.</p> <p>Intracoronary stents may be placed to provide structural support within the coronary artery and improve the odds of long-term patency. Some stents (called drug-eluting stents) are coated with slow-releasing drugs to prevent fibrosis that, together with clots, could block the stented artery, a process called restenosis (Beckerman, 2016).</p>

NURSING DIAGNOSIS: **risk for decreased Cardiac Output****Possibly Evidenced by**

Alteration in heart rate or rhythm
 Altered contractility, stroke volume
 Altered preload

Desired Outcomes/Evaluation Criteria—Client Will**Cardiac Pump Effectiveness** **NOC**

Maintain hemodynamic stability, such as BP, cardiac output within normal range, adequate urinary output, decreased frequency or absence of dysrhythmias.
 Report/demonstrate decreased episodes of dyspnea and angina.

ACTIONS/INTERVENTIONS

RATIONALE

Cardiac Care: Acute **NIC**

Independent

Obtain blood pressure (BP) readings. Compare both arms and obtain lying, sitting, and standing pressures when able.

Hypotension may occur related to ventricular dysfunction, hypoperfusion of the myocardium, and vagal stimulation. However, hypertension is also a common phenomenon, possibly related to pain, anxiety, catecholamine release, and preexisting vascular problems.

Monitor heart rate and rhythm. Document dysrhythmias.

Dysrhythmias, especially premature ventricular contractions or heart blocks, can compromise cardiac function or increase ischemic damage. Acute or chronic atrial flutter or fibrillation may be seen with coronary artery involvement and may or may not be pathological.

Auscultate heart sounds. Note development of S₃ and S₄.

S₄ may be associated with myocardial ischemia, ventricular stiffening, and pulmonary or systemic hypertension. S₃ is usually associated with heart failure, but it may also be noted with left ventricular overload that can accompany infarction in STEMI.

Auscultate breath sounds.

Crackles reflect pulmonary congestion; may develop because of depressed myocardial function.

Have emergency equipment and medications available.

Sudden coronary occlusion, lethal dysrhythmias, extension of infarct, and unrelenting pain are situations that may precipitate cardiac arrest, requiring immediate life-saving therapies or transfer to the critical care unit (CCU).

Collaborative

Administer supplemental oxygen, as indicated.

Increases amount of oxygen available for myocardial uptake, reducing ischemia and resultant cellular irritation and dysrhythmias.

Review serial ECGs, noting onset or resolution of dysrhythmias.

Provides information regarding progression or resolution of ischemia and status of coronary perfusion.

Review chest x-ray.

May reflect pulmonary edema related to ischemia and ventricular dysfunction.

Monitor laboratory data, such as cardiac enzymes, arterial blood gases (ABGs), and electrolytes.

Enzymes monitor resolution or extension of infarction. Presence of hypoxia indicates need for supplemental oxygen. Electrolyte imbalances, such as hypo- or hyperkalemia, adversely affect cardiac rhythm and contractility.

Maintain IV or saline-lock access, as indicated.

Patent line is important for administration of fluids to support circulation and to administer emergency drugs in the presence of persistent lethal dysrhythmias or chest pain.

Administer medications, as indicated:

Angiotensin-converting enzyme inhibitors (ACEIs) such as benazepril (Lotensin), enalapril (Vasotec), and lisinopril (Zestril)

Given to expand blood vessels, allowing heart to work more easily and efficiently, and improving cardiac output/systemic perfusion.

Angiotensin receptor blockers (ARBs), such as isosartan (Cozaar), valsartan (Diovan), and irbesartan (Avapro)

Helps lower blood pressure, alone or in combination with other agents, in order to reduce systemic vascular resistance and improve organ perfusion.

Antidysrhythmic drugs (refer to CP: Dysrhythmias)

Dysrhythmias are usually treated symptomatically but have the potential for becoming lethal; therefore, must be monitored diligently and treated promptly.

Refer to CP: Myocardial Infarction for additional interventions.

If STEMI is occurring, many more supportive interventions may be needed.

NURSING DIAGNOSIS: deficient Knowledge regarding condition, postprocedural care, potential complications
May Be Related To

Insufficient information
Alteration in cognitive functioning or memory
Insufficient knowledge of resources

Possibly Evidenced By

Insufficient knowledge
Inaccurate follow-through of instruction
Development of preventable complication

Desired Outcomes/Evaluation Criteria—Client Will
Self-Management: Coronary Artery Disease NIC

Verbalize understanding of condition, postprocedure needs, and potential complications.
Identify individual risk factors.
Initiate necessary lifestyle changes.

ACTIONS/INTERVENTIONS
RATIONALE
Cardiac Risk Management NIC
Independent

Reinforce explanation of ACS incident, associated procedures and treatment provided, and self-care needs.	Individually specific information creates knowledge base for management of condition.
Begin with information client already knows and move to what client does not know, progressing from simple to complex. Use short simple sentences and concepts initially. Repeat and summarize as needed. Avoid giving too much information in one setting.	This client has often come into acute care because of a sudden-onset chest pain and experienced all the chaos of a life-threatening medical emergency. In addition to the “brain fog” of being very sick initially, the client is subjected to overwhelming demands of major healthcare decisions in a short period. Teaching must be geared to the client’s cognitive and physical abilities of the moment.
Deal with client’s/family’s anxiety or other strong emotions.	Anxiety can interfere with ability to learn or retain information. The nurse may need to adjust timing or sequence of teaching to improve client/family retention comprehension.
Provide written information or guidelines for client/caregiver to refer to as needed.	Reinforces the learning process and allows client to proceed at own pace.
Encourage identification and reduction of individual risk factors such as smoking, alcohol consumption, and obesity.	These behaviors and lifestyle factors have direct adverse effects on cardiovascular function, may impede recovery, and increase risk for complications.
Discuss appropriate activity/exercise guidelines and limitations (e.g., avoiding long periods of standing; not lifting heavy objects).	Individual capabilities and expectations depend on type of procedure performed, location of the catheter insertion (e.g., femoral or radial artery), underlying cardiac function, and prior physical conditioning.
Remind client to rest as needed. Encourage setting of realistic goals for activities and/or cardiac rehabilitation.	These needs vary per individual. Client may feel weak and fatigued after procedure (typical) or be feeling effects of recent ACS and ongoing heart issues.
Review medication regimen, including new drugs as well as drugs client was taking prior to incident. Discuss schedule for taking each medication, as well special instructions (e.g., don’t take NSAIDs while on anticoagulants).	Treatment regimen may be complex with numerous drugs, addition of/removal of certain medications, etc. The age and severity of client’s current illness can interfere with full understanding of treatment.
Provide medication list in writing. Discuss expected drug effects, as well as potential side effects and interactions. Review potential problems that need reporting.	Helps client/caregiver understand medication plan, and know when to contact a healthcare professional.
Emphasize importance of checking with physician before taking OTC drugs.	OTC drugs may potentiate or negate effects of prescribed medications.

(continues on page 64)

ACTIONS/INTERVENTIONS (continued)

Discuss use of herbals such as ginseng, garlic, ginkgo, hawthorn, and bromelain, as indicated.
Review catheter insertion site care and reportable symptoms, as needed.
Emphasize symptoms to be reported to physician, particularly recurrence of chest pain, development of hematoma, or bleeding at catheter site; changes in response to medications.
Identify services and resources available after discharge.

RATIONALE (continued)

Some herbals can affect bleeding and clotting, especially when added to medications such as Plavix or Coumadin, which increase bleeding. Others, such as hawthorn, can increase the effects of certain heart medications.
Instructions may include such things as when to take the dressing off, what the site may look like (e.g., bruised, swollen, slightly pink), when to shower/bathe, and use of lotions/ointments.
Knowledge of expectations can not only avoid undue concern for insignificant events but also prevent delay in treatment of worrisome symptoms.
Provides for ongoing monitoring, continuation of prescribed therapies, and support for lifestyle changes.

POTENTIAL CONSIDERATIONS following discharge from care setting (dependent on client's age, physical condition and presence of complications, personal resources, and life responsibilities)

- **acute Pain**—biological agents (decreased myocardial blood flow, tissue ischemia)
- **Activity Intolerance**—imbalance between oxygen supply and demand, sedentary lifestyle
- **ineffective Health Management**—complexity of therapeutic regimen, perceived barriers, economic difficulties

ANGINA: CHRONIC/STABLE

I. Pathophysiology (Fihn et al, 2012; Mayo Clinic Staff, 2016c; National Guideline Clearinghouse [NCG], 2012; Roth, 2015)

- Chronic/stable angina is an episodic clinical manifestation of ischemic heart disease due to transient myocardial ischemia. May be called “angina pectoris,” “stable ischemic heart disease” (SIHD), or “ischemic heart disease” (IHD).
- Stable means no increase in frequency or severity of attacks over a prolonged period of time.
- Usually presents as chest discomfort precipitated by stress or exertion that rapidly resolves with rest or nitrates.
- Pain follows a trackable, predictable pattern (e.g., occurs when climbing stairs, during exposure to cold, after heavy meals, when feeling rushed or angry) and is similar in nature to previous chest pain.
- Most commonly caused by atherosclerotic coronary artery disease (CAD).
- Atypical presentations of angina are more common in women than in men. Heart disease in men is more often due to blockages in the coronary arteries, referred to as **obstructive CAD**. Women more frequently develop heart disease within the very small arteries that branch out from the coronary arteries. This is referred to as **microvascular disease** (MVD) and occurs particularly in younger women (American Heart Association [AHA], 2015b)
- Many people experience anginal attacks despite revascularization and pharmacological antianginal treatments. This is sometimes classified as refractory angina. See Glossary (Mannheimer et al, 2002).

II. Etiology (Mozaffarian et al, 2016; NCG, 2012; Snow et al, 2004)

- Conditions that create increased myocardial oxygen demand (including hyperthyroidism, hyperthermia, stimulant use (e.g., cocaine and others), valvular disease such as aortic stenosis, and severe uncontrolled hypertension)
- Conditions that create diminished myocardial oxygen supply, such as anemia, or hypoxemia secondary to pulmonary disease

III. Diagnosis and Management

- A diagnosis of stable angina can be based on clinical assessment alone or with the addition of diagnostic testing such as stress testing.
- Management of stable angina includes (1) lifestyle changes (a key aspect of angina management), namely in the areas of diet, exercise, smoking, diabetes, hypertension, and psychological issues, and (2) medical therapy, the aim of which is to help reduce symptoms and prevent cardiovascular events (Bellchambers et al, 2016; Montalescot et al, 2013).
- Complications of angina pectoris include unstable angina, MI, cardiogenic shock, heart failure, cardiac arrest, and death.

IV. Statistics:

- Prevalence: Stable angina affects more than 8 million people in the United States each year (Mozaffarian et al, 2016). The prevalence of chronic stable angina (as reported in 2010) increases with age for women but peaks between 55 and 65 years of age for men and then declines (Lloyd-Jones et al, 2010).

- b. **Morbidity:** A recent study reported that patients with stable CAD and angina have higher rates of future cardiovascular events compared with patients without angina, especially heart failure, cardiovascular hospitalization, and coronary revascularization (Eisen et al, 2016).
- c. **Mortality:** There were 614,348 deaths from heart disease in 2014 (includes ischemic heart disease, inclusive of but not specifically angina) (Heron, 2016)).
Cost: Direct and indirect costs of coronary artery disease were estimated to have topped \$177 billion in 2010 (includes but is not specific to angina) (Kohan & Annex, 2015).

GLOSSARY

Angina: Chest pain or discomfort that occurs if an area of heart muscle doesn't get enough oxygen-rich blood. Angina isn't a disease; it's a symptom of an underlying heart problem, usually **coronary heart disease** (National Institutes of Health [NIH], 2011a).

Angioplasty (also called percutaneous transluminal coronary angioplasty or PTCA or percutaneous coronary intervention [PCI]): Procedure that increases coronary blood flow by compression of atheromatous lesions and dilation of the vessel lumen in an occluded coronary artery.

Cardiovascular disease (CVD): Diseases of the heart and blood vessels.

Coronary artery disease (CAD): A disease in which there is a narrowing or blockage of the coronary

arteries that carry blood and oxygen to the heart muscle.

Hypertension (HTN): High blood pressure.

Metabolic syndrome: Name for a group of risk factors (e.g., fasting hyperglycemia and insulin resistance, hypertension, central obesity, decreased high-density lipoprotein [HDL] and elevated low-density lipoprotein [LDL] cholesterol, elevated triglycerides) that raises the risk of heart disease.

Refractory angina: A chronic condition characterized by the presence of angina caused by coronary insufficiency in the presence of CAD, which is not amenable to a combination of medical therapy, angioplasty, or coronary bypass surgery in a patient with evidence of ischemia (Mannheimer et al, 2002).

CARE SETTING

Client may be seen in community physician offices or emergency department. Clients judged to be at intermediate or high risk for MI are often hospitalized for further evaluation and therapeutic intervention.

RELATED CONCERNS

Acute coronary syndrome, page 54

Cardiac surgery, page 98

Dysrhythmias, page 85

Myocardial infarction, page 72

Psychosocial aspects of care, page 835

CLIENT ASSESSMENT DATABASE

DIAGNOSTIC DIVISION MAY REPORT

ACTIVITY/REST

- Sedentary lifestyle
- Weakness, feeling incapacitated after exercise
- Fatigue
- Activities and sleep disrupted by pain

CIRCULATION

- History of heart disease in self or family (especially early age onset)
- Hypertension in self or family
- History of MI or revascularization procedure

EGO INTEGRITY

- Stressors of work, family, others, and financial concerns

FOOD/FLUID

- Diet high in cholesterol and fats, salt, caffeine, liquor

MAY EXHIBIT

- Exertional dyspnea

- Tachycardia, dysrhythmias
- Blood pressure (BP) normal, elevated, or decreased
- Heart sounds may be normal, late S₄, or transient late systolic murmur that may be evident during pain

- Apprehension, uneasiness

(continues on page 66)

MAY REPORT (continued)

MAY EXHIBIT (continued)

PAIN

Note: Individual with chronic stable angina is usually not surprised by pain episodes as they tend to be similar in character and precipitated by predictable factors.

- Substernal or anterior chest pain that may radiate to jaw, neck, shoulders, and upper extremities, often to left side more than right. Women may report pain between shoulder blades, back pain.

• **Quality:** Varies from transient and mild to moderate; may describe heavy pressure, tightness, squeezing, burning. Women may report dull aching pain.

• **Duration:** Usually less than 15 minutes

• **Precipitating factors:** Physical exertion or great emotion, such as anger or sexual arousal; exercise in weather extremes

• **Relieving factors:** Pain usually responsive to relief mechanisms, such as rest and antianginal medications

RESPIRATION

- Dyspnea associated with activity
- Smoking currently or in the past

SAFETY

- History of falls, fainting spells, or lightheadedness

SEXUALITY

- Chest pain during sex

TEACHING/LEARNING

- Family history or risk factors of CAD: obesity, sedentary lifestyle, hypertension, stroke, diabetes, smoking, hyperlipidemia
- Use or misuse of cardiac, antihypertensive, and over-the-counter (OTC) drugs
- History of hormone replacement therapy (HRT) in postmenopausal women
- Use of vitamins or herbal supplements, such as niacin, coenzyme Q10, ginger, bilberry, comfrey, garlic, or L-carnitine
- Use or misuse of alcohol or illicit drug use, such as cocaine or amphetamines

DISCHARGE PLAN CONSIDERATIONS

- Assistance with homemaker or maintenance tasks
- Changes in physical layout of home

◆ Refer to section at end of plan for postdischarge considerations.

Pain that is outside of client's usual experience can be indicative of developing a complication.

- Facial grimacing, restlessness
- Placing fist over midsternum
- Rubbing left arm, muscle tension
- Autonomic responses; for example, tachycardia, blood pressure changes

If pain is unrelieved by usual means or is worsening, prompt medical evaluation is indicated.

- Increased rate and rhythm, alteration in depth

DIAGNOSTIC STUDIES

TEST

WHY IT IS DONE

WHAT IT TELLS ME

BLOOD TESTS

- **Cardiac enzymes, including troponin I and cardiac troponin T, CPK, CK and CK-MB, LDH, and isoenzymes LD₁, LD₂:** Substances released from heart muscle when it is damaged.
- **Serum lipids, including total lipids, lipoprotein electrophoresis, isoenzymes, cholesterol (HDL, LDL, very low-density lipoprotein [VLDL]), triglycerides (TGs), phospholipids:** A group of tests that make up a lipid profile.
- **C-reactive protein (CRP):** A marker for inflammation.

- **Electrocardiogram (ECG):** Record of the electrical activity of the heart to detect dysrhythmias, to identify electrolyte imbalance, to identify any myocardial ischemia present or any damage to myocardial tissue from the past.

- **Exercise or pharmacological stress electrocardiography (also called stress test, exercise treadmill, or exercise ECG):** Raises heart rate and blood pressure using exercise. The heart can also be stressed with drugs such as dobutamine or persantine.

- **Myocardial perfusion imaging (MPI) scans, which may include stress MPI and single-photon emission computed tomography (SPECT):** Scans the heart using radioactive dyes to show areas of increased metabolic activity and decreased blood flow.

- **Calcium scoring (also called coronary artery calcium scoring computed tomography, or CT, scan):** Ultrafast CT scan that measures the amount of calcium in the coronary arteries.

Usually within normal limits. Any elevation indicates myocardial damage.

The presence of lipid abnormalities can increase the risk of CAD and complications. *Note:* Recent studies suggest that elevated triglyceride is an independent risk **factor** for development of CAD (Scordo & Pickett, 2017; Van Leeuwen & Bladh, 2015). CRP levels have been shown to predict risk of both recurrent ischemia and death among those with stable and unstable angina (Jiang et al, 2011).

Often normal when patient at rest or when pain free; depression of the ST-segment or T-wave inversion signifies ischemia. Dysrhythmias and heart block may also be present. Significant Q waves are consistent with a prior MI.

Can determine whether pain episodes correlate to ECG or change during exercise or activity. *Note:* Stress imaging (not exercise ECG) is recommended in (1) client with previous cardiac catheterization and (2) client with a previous revascularization now showing significant change in anginal pattern suggestive of ischemia (Snow et al, 2004; Belleza, 2016).

MPI is the most widely used imaging test for the evaluation of suspected myocardial ischemia. SPECT can assess cardiovascular risk with a high degree of accuracy, measuring both ventricular function and relative regional perfusion at rest and with stress.

Elevated calcium scoring in a client with other risk factors, such as family history, hypertension, diabetes, or hypercholesterolemia, is an indication of some level of CAD.

NURSING PRIORITIES

1. Relieve or control pain.
2. Prevent or minimize development of myocardial complications.
3. Provide information about disease process, prognosis, and treatment.
4. Support client or significant other (SO) in initiating necessary lifestyle or behavioral changes.

DISCHARGE GOALS

1. Desired activity level achieved, with a return to activity baseline, and self-care needs met with minimal or no pain.
2. Remains free of complications.
3. Disease process, prognosis, and therapeutic regimen understood.
4. Participates in treatment program and behavioral changes.
5. Plan in place to meet needs after discharge.

NURSING DIAGNOSIS: **acute Pain**

Related to:

Biological injury agent (e.g., tissue ischemia)

Possibly Evidenced By

Self-report of pain characteristics and intensity

Guarding behavior; positioning to ease pain

Changes in physiological parameter (e.g., blood pressure, heart, and respiratory rate)

(continues on page 68)

NURSING DIAGNOSIS: acute Pain (continued)**Desired Outcomes/Evaluation Criteria—Client Will****Pain Level** **NOC**

Report relief of chest pain.

Demonstrate relief of pain as evidenced by stable vital signs and absence of muscle tension and restlessness.

Report decrease in frequency, severity of anginal pain, or equivalents over time (specify).

ACTIONS/INTERVENTIONS**RATIONALE****Pain Management: Acute** **NIC***Independent*

Perform thorough pain assessment with each reported pain episode, using appropriate pain scale, when client is in acute healthcare setting. Discuss pain episodes client has been experiencing when client is reporting in from home/community (e.g., phone call to office). Identify precipitating event, if any; identify frequency, duration, intensity, and location of pain.

Helpful in identifying changes from client's usual angina discomfort, which has certain typical characteristics in location, duration, or intensity. If nature of angina is changing, angina may become unstable or new-onset coronary occlusion may be occurring.

Ascertain if client has any angina equivalents.

Patient with stable angina may report typical and regularly recurrent symptoms (pain equivalent) rather than chest pain. For example, older patients, those with diabetes, and women often have fatigue and shortness of breath as angina equivalents rather than outright pain (NIH, 2011a & 2011b).

Monitor for changes in vital signs during pain episode if it is different from usual pattern of angina.

BP may initially rise because of sympathetic stimulation and then fall if cardiac output is compromised. Tachycardia also develops in response to sympathetic stimulation and may be sustained as a compensatory response if cardiac output falls.

Evaluate heart rate and rhythm, as indicated.

Client with changes may now have unstable angina, with an increased risk of acute life-threatening dysrhythmias, which occur in response to ischemic changes and stress.

Assess and document client response to and effects of usual medication. Evaluate need for change in medication regimen.

Client with established CAD and/or history of cardiac reperfusion procedures will likely be on a regimen of various medications, including beta blockers, ACE inhibitors, and other drugs, including nitrates, for control of persistent angina discomfort.

Encourage client to maintain pain diary documenting frequency, severity, duration, precipitating factors.

Allows evaluation over time to assess appropriateness of therapeutic regimen, progression of disease.

Collaborative

Collaborate in treatment and monitoring of underlying conditions and status of stable angina, as indicated.

Management may include changes in medications (e.g., antianginals, antihypertensive, diabetic medications) or may require evaluation for/treatment of new-onset heart problems. Guideline recommendations in 2012 noted that patients with stable ischemic heart disease should receive periodic follow-up at least annually to (1) evaluate symptoms and clinical function; (2) observe for complications of stable angina, including heart failure and dysrhythmias; and (3) monitor risk factors and adequacy of/adherence to recommended lifestyle changes and medical therapy (Qaseem et al, 2012).

Provide supplemental oxygen, as indicated.

Increases oxygen available for myocardial uptake and reversal of ischemia. Patient may benefit from periodic oxygen therapy such as during exercise or when dyspnea is occurring.

Administer medications as indicated, for example, antiplatelet agents (such as aspirin or clopidogrel [Plavix])

Guideline recommendations for prevention of complications (including MI and death) include 75 to 162 mg daily, continued indefinitely in the absence of contraindications in patients with stable angina (NGC, 2012). Other antiplatelet medications may also be used.

ACTIONS/INTERVENTIONS (continued)

RATIONALE (continued)

Antianginal medication(s) as indicated, for example:	
Nitrates: NTG sublingual (Nitrostat, NitroQuick), metered-dose spray (Nitrolingual, Nitromist), transdermal patch (Minitran, Nitrodisc), and isosorbide (Isordil, Imdur)	Nitrate can be used as chronic therapy to help prevent episodes of angina. The biggest problem is “tolerance,” where chronic exposure to nitrates causes a diminished effect, and the antianginal effect of the drug disappears. Nitrate tolerance can be prevented by scheduling dosing in such a way as to guarantee daily nitrate-free intervals. If client is still experiencing pain after following prescribed nitrate use, further assessment of chest pain and additional interventions may be required.
Miscellaneous anti-ischemic agents (e.g., ranolazine [Ranexa])	Cardioselective anti-ischemic agent for chronic angina unresponsive to other antianginal treatments (Alaeddini, 2016).
Beta blockers, such as atenolol (Tenormin), carteolol (Cartrol), labetalol (Toprol, Lopressor), and bisoprolol (Zebeta)	The benefits provided by beta blockers have made them the drugs of first choice in treating patients with CAD and angina. In client with angina, beta blockers are effective in improving the amount of exercise that can be performed without developing ischemia or angina. Also, beta blockers are the only antiangina drugs that have been shown to lower the risk of having another myocardial infarction in patients who have already had a heart attack (Fogoros, 2011b).
Calcium channel blockers, such as diltiazem (Cardizem, Dilacor), amlodipine (Norvasc), and verapamil (Calan, Covera)	By reducing calcium influx into muscle cells, calcium channel blockers cause the muscle cells to “relax.” This relaxing effect results in the dilation of blood vessels and a reduced force of contraction of the heart muscle. In treating angina, the most commonly used calcium blockers are the longer-acting forms of diltiazem and verapamil, Norvasc, or Plendil.
Review ECG, as indicated.	Ischemia during an anginal attack may cause transient ST-segment depression or elevation and T-wave inversion. Serial tracings verify ischemic changes, which may disappear when client is pain free or may reveal a new-onset cardiac blockage.
Prepare for/assist with additional diagnostic studies, procedures, or interventions, as indicated. (Refer to CPs: Acute Coronary Syndrome; Cardiac Surgery, for related interventions.)	If angina is atypical or unrelenting, complications may be occurring, such as MI, new-onset occlusion, coronary artery restenosis, or blockage of stent in client who has had past revascularization procedures. <i>Note:</i> Revascularization may be required (usually CABG) when testing confirms myocardial ischemia due to left main coronary artery disease or symptomatic three-vessel disease, especially in those with left ventricular dysfunction.

NURSING DIAGNOSIS: risk for Activity Intolerance**Possibly Evidenced by**

Circulatory problem [imbalance between oxygen supply and demand]

Altered heart rate, rhythm

Physical deconditioning (weakness, sedentary lifestyle; aging) [side effects of medications]

Desired Outcomes/Evaluation Criteria—Client Will**Cardiac Pump Effectiveness** **NOC**

Demonstrate increased activity tolerance.

Report or display decreased episodes of dyspnea, angina, and dysrhythmias.

Participate in behaviors and activities that reduce the workload of the heart.

ACTIONS/INTERVENTIONS

RATIONALE

Hemodynamic Regulation **NIC**

Independent

Evaluate client's level of physical activity when not experiencing angina.

Provides a baseline for determining activity tolerance and future needs. *Note:* Client may be frail from age, comorbid conditions, or has self-limited activities to avoid anginal episodes.

Monitor vital signs and cardiac rhythm.

Tachycardia and changes in blood pressure (hypotension or hypertension) may be present because of pain, anxiety, hypoxemia, and reduced cardiac output. ECG changes reflecting ischemia and dysrhythmias indicate need for additional evaluation and therapeutic intervention.

Assess BP before, during, and after activities, as indicated.

Helps in identifying actions/activities that can affect blood pressure. Changes in or timing of activities and medications may improve client's tolerance.

Provide for and encourage adequate rest periods interspersed with activity. Assist with or perform self-care activities, as indicated.

Rest between activities conserves energy and reduces cardiac workload.

Remind client to keep antianginal pills close by or on person or to use prophylactically when indicated.

Patient with stable and predictable angina can help manage anginal responses to desired/required activities.

Note and discuss with client emotional response to limitations. Offer additional support/referrals as indicated.

Depression over the inability to perform desired activities can be a source of stress to both client/caregiver.

Evaluate need for support at home.

Client might benefit from certain services (e.g., homemaker, shopping, laundry, additional care assistance) to cope with limitations and conserve energy.

Assess for signs and symptoms of heart failure.

Angina is only a symptom of underlying pathology causing myocardial ischemia. Disease may compromise cardiac function to the point of decompensation.

Collaborative

Administer supplemental oxygen as needed.

Increases oxygen available for myocardial uptake to reduce ischemia and improve activity tolerance.

Monitor chest x-ray.

Identifies new or worsening congestive heart failure (often associated with refractory angina).

Administer/remind client to take medications, as indicated.
Refer to ND: acute Pain, above.

Adherence to medication regimen is important for managing symptoms or well-being, reducing the risk of preventable complications.

NURSING DIAGNOSIS: ineffective Health Management

May Be Related To

Complexity or insufficient knowledge of therapeutic regimen
Perceived barriers, economic difficulties
Family pattern of healthcare

Possibly Evidenced By

Reports difficulty with prescribed regimen
Failure to include treatment regimen in daily living or to take action to reduce risk factors
Ineffective choices in daily living for meeting health goals
Unexpected acceleration of illness symptoms

Desired Outcomes/Evaluation Criteria—Client Will

Knowledge: Coronary Artery Disease Management **NOC**

Verbalize understanding of condition, disease process, and potential complications.
Verbalize understanding of and participate in therapeutic regimen.
Initiate necessary lifestyle changes.

ACTIONS/INTERVENTIONS

RATIONALE

Cardiac Risk Management **NIC***Independent*

Discuss the pathophysiology of condition. Emphasize need for preventing and managing anginal attacks.	Clients with stable angina need to learn why it occurs and what they can do to manage it. This focus on therapeutic management aims to reduce the likelihood of MI, heart failure, and sudden death and to promote a heart-healthy lifestyle.
Encourage avoidance of factors or situations that may precipitate anginal episodes, such as emotional stress, extensive or intense physical exertion, use of recreational drugs, ingestion of a large or heavy meal (especially close to bedtime), and exposure to extremes of environmental temperature.	This is a crucial step in limiting or preventing anginal attacks.
Review importance of cessation of smoking, weight control, dietary changes, and exercise.	Knowledge of the significance of risk factors provides client with the opportunity to make needed changes.
Review significance of cholesterol and triglyceride levels in heart disease and address the benefits of lowering lipid levels and triglycerides. Emphasize importance of periodic laboratory measurements and use of cholesterol-lowering (statins) drugs.	In patients with stable angina, an intensive lipid-lowering therapy has shown to provide significant clinical benefit and improve prognosis (LaRosa et al, 2005). Many patients will require both pharmacologic and nonpharmacologic interventions to reach target goals: (1) LDL: less than 100 mg/dL for all patients, ideal less than 70 mg/dL, especially for high-risk patients; (2) HDL: 40 mg/dL or greater; and (3) triglycerides: less than 150 mg/dL (NGC, 2013; Scordo & Pickett, 2017).
Encourage client to follow prescribed reconditioning or cardiac rehabilitation program.	Fear of triggering attacks may cause client to avoid participation in activity that has been prescribed to enhance recovery. Cardiac rehabilitation programs provide a phased approach to increasing client's activity and exercise tolerance.
Demonstrate how and encourage client to monitor own pulse and BP during and after activities, when appropriate, and to schedule and simplify activities and take rest periods.	Allows client to identify those activities that can be modified to avoid cardiac stress and stay below the anginal threshold.
Ask client/caregiver about client's emotional status. Discuss means of acquiring support (e.g., counseling, medications) as needed/desired.	This patient may be anxious, feel emotional and out of control of situation, and overwhelmed by self-care requirements. These factors can bring on or worsen depression. Many studies have correlated depression with heart disease. Predictors of depression include remote history of depression, female sex, and more symptomatic angina (Szpakowski et al, 2016).
Discuss impact of condition on desired lifestyle and activities, including work, driving, sexual activity, and hobbies. Provide information, privacy, or consultation, as indicated.	Client may be reluctant to resume or continue certain activities because of fear of anginal attack or death. If symptoms have worsened or the client has decreased physical activity to avoid precipitating angina, then he or she should be reevaluated and treated accordingly. <i>Note:</i> Erectile dysfunction (ED) can be a sign of CAD or diabetes in men. Use of Viagra, or similar drugs, is contraindicated with nitrates, which are usually used for angina.
Review prescribed medications for control and prevention of anginal attacks. (Refer to ND: acute Pain in this care plan, and CP: Acute Coronary Syndrome, ND risk for decreased cardiac Tissue Perfusion for discussion of drugs.)	Angina is a complicated condition that often requires the use of many drugs to decrease myocardial workload, improve coronary circulation, and control the occurrence of attacks.
Emphasize importance of checking with physician before taking OTC drugs.	OTC drugs may potentiate or negate effects of prescribed medications.
Discuss use of herbals such as ginseng, garlic, ginkgo, hawthorn, and bromelain, as indicated.	Some herbals, such as ginkgo, ginseng, and bromelain, can affect bleeding and clotting, especially when added to medications such as Plavix or Coumadin, which increase bleeding. Others, such as hawthorn, can increase the effects of certain heart medications.

(continues on page 72)

ACTIONS/INTERVENTIONS (continued)**RATIONALE** (continued)

Review symptoms to be reported to physician, particularly an increase in frequency and duration of attacks and changes in response to medications.	Knowledge of expectations can avoid undue concern for insignificant events or prevent delay in treatment of worrisome symptoms.
Discuss importance of follow-up appointments (e.g., physician evaluation, laboratory monitoring, etc.).	Angina is a symptom of CAD that can be progressive, should be monitored, and may require occasional adjustment of treatment regimen.
Encourage client to wear medical alert bracelet or necklace.	Alerts care, providers of client's diagnosis when an emergency occurs.
Recommend that SO/caregivers have ready access to emergency phone numbers and encourage them to take CPR classes.	Helps family to be prepared for emergency actions when needed.

POTENTIAL CONSIDERATIONS following discharge from care setting (dependent on client's age, physical condition and presence of complications, personal resources, and life responsibilities)

- **risk for decreased cardiac Tissue Perfusion**—coronary artery spasm
- **Activity Intolerance**—imbalance between oxygen supply and demand, sedentary lifestyle
- **ineffective Denial**—lack of control of life situation, anxiety
- **interrupted Family Processes**—situational transition or crisis, shift in health status of family member
- **impaired Home Maintenance**—impaired functioning, inadequate support systems, unfamiliarity with neighborhood resources

MYOCARDIAL INFARCTION

I. Pathophysiology

- a. Marked reduction or loss of blood flow through one or more of the coronary arteries, resulting in cardiac muscle ischemia, and over a finite period, resulting in necrosis.
- b. Occurs most often due to coronary artery disease (CAD).
- c. Cellular ischemia and necrosis can affect the heart's rhythm, pumping action, and blood circulation.
- d. Other problems may also ensue, such as heart failure, life-threatening arrhythmias, and death.
- e. Delay in seeking treatment is the largest barrier to receiving therapy quickly.

II. Classification

- a. Types of myocardial infarction (MI) can be identified on the electrocardiogram (ECG).
 - i. ST-segment elevation (also called STEMI)
 - ii. Non-ST elevation (NSTEMI)
- b. Location of MI can be identified on the ECG.
 - i. Anterior wall of the ventricle
 - ii. Inferior wall of the ventricle
 - iii. Posterior wall of the ventricle
 - iv. Lateral wall of the ventricle
- c. Infarcts are usually classified by size.
 - i. Microscopic (focal necrosis)
 - ii. Small (<10% of the left ventricle)
 - iii. Medium (10% to 30% of the left ventricle)
 - iv. Large (>30% of the left ventricle)

- d. Point of time can be identified on the ECG by the Q wave and the client's history.

- i. Acute or evolving infarction is characterized by the presence of polymorphonuclear leukocytes unless the interval between the onset of infarction and death is brief (e.g., 6 hours), minimal, or no polymorphonuclear leukocytes may be seen.
- ii. Old or healed infarction is manifested as scar tissue without cellular infiltration, a process usually requiring 5 to 6 weeks or more.

III. Etiology

- a. A common cause of coronary artery disease (CAD) is plaque buildup on the wall of the arteries, causing narrowing of the blood vessels and increased risk of pieces of plaque breaking off, creating emboli.
- b. Nonatherosclerotic causes include the following: coronary occlusion secondary to vasculitis, ventricular hypertrophy, coronary artery emboli (secondary to cholesterol, air, or the products of sepsis), coronary trauma, drug use (e.g., cocaine, amphetamines), aortic dissection and aneurysms of coronary arteries, factors that increase oxygen requirement (e.g., heavy exertion, fever, hyperthyroidism), and factors that decrease oxygen delivery (e.g., hypoxemia of severe anemia, carbon monoxide poisoning, or acute pulmonary disorders) (Zafari & Abdou, 2017).
- c. Risk factors—age, being overweight or obese, smoking, hyperlipidemia, family history.
- d. Greater risk in presence of kidney problems, peripheral arterial disease, or prior MI.

IV. Statistics

- a. Morbidity: About 750,000 people in the United States have heart attacks each year (Benjamin et al, 2017).
- b. Mortality: Coronary heart disease is the most common type of heart disease, killing about 365,000 people in the United States in 2014 (Mozaffarian et al, 2016).
Acute myocardial infarction (MI) is associated with a 30% mortality rate; about 50% of the deaths occur prior to arrival

- at the hospital. Additional 5% to 10% die within the first year after their myocardial infarction (Zafari & Abdou, 2017). CAD is a leading killer of both men and women in the United States.
- c. Cost: MI (\$11.5 billion) and coronary heart disease (CHD) (\$10.4 billion) were 2 of the 10 most expensive hospital principal discharge diagnoses in 2011 (Pfuntner et al, 2013).

GLOSSARY

Atherosclerosis: Abnormal accumulation of lipid deposits and fibrous tissue within the arterial walls and lumen.

Cardiac biomarkers: Substances that are released into the blood when the heart is damaged or stressed. Measurement of these biomarkers is used to help diagnose, monitor, and manage people with suspected cardiac ischemia. The current biomarker test of choice for detecting heart damage is troponin (see below). Other cardiac biomarkers (e.g., CK, CK-MB, myoglobin) are less specific for the heart and may also be elevated in skeletal muscle injury, liver disease, or kidney disease (Lab Tests Online, 2015).

Coronary artery bypass graft (CABG): Surgical procedure in which a blood vessel from another part of the body is grafted onto the occluded coronary artery above and below the occlusion in such a way that blood flow bypasses the blockage.

Coronary artery disease (CAD): Narrowing or blockage of the arteries and vessels that provide oxygen and nutrients to the heart, caused by atherosclerosis. The resulting blockage restricts blood flow to the heart. When the blood flow is completely cut off, the result is a heart attack (also called a myocardial infarction, MI).

Ejection fraction (EF): An EF is a percentage of blood that is pumped out of the heart during each beat. In a healthy heart, each beat should pump out at least 50% of the blood in the left ventricle. A EF range between 50% and 75% indicates the heart is pumping well and able to deliver an adequate supply of blood to the body and brain. Poor pumping and a low EF can occur if the heart muscle has been damaged due to a heart attack, a diseased heart valve, or heart failure.

Myocardial infarction (MI, also called acute MI, or AMI): An occlusion or blockage of arteries supplying the

muscles of the heart, resulting in injury or necrosis of the heart muscle (heart attack).

Non-ST-segment elevation myocardial infarction (NSTEMI): Development of heart muscle necrosis without the ECG change of ST-segment elevation, resulting from an acute interruption of blood supply to a part of the heart and demonstrated by an elevation of cardiac markers (CK-MB or troponin) in the blood. NSTEMI involves less than full-thickness damage of heart muscle and is, therefore, a less severe type of heart attack than STEMI (see below) (“NSTEMI,” 2017).

Percutaneous coronary interventions (PCIs): A nonsurgical procedure used to treat the stenotic coronary arteries found in coronary heart disease. During PCI, a cardiologist feeds a deflated balloon or other device on a catheter from the femoral artery or radial artery up through blood vessels until it reaches the site of blockage in the heart. X-ray imaging is used to guide the catheter threading. At the blockage, the balloon is inflated to open the artery, allowing blood to flow. A stent is often placed at the site of blockage to permanently open the artery.

ST-segment elevation myocardial infarction (STEMI): Occurs by complete occlusion of a major coronary artery that produces an entire thickness damage of heart muscle (transmural). This damage of heart muscle produces an ECG change of ST-segment elevation.

Stent: Woven mesh that provides structural support to a coronary vessel, preventing its closure.

Thrombolytic: Agent or process that breaks down blood clots.

Troponin (also known as cardiac-specific troponin I [cTn I] and troponin T [cTn T]): Blood test used to help diagnose a heart attack, to detect and evaluate mild to severe heart injury, and to distinguish chest pain that may be due to other causes.

CARE SETTING

Myocardial infarctions are treated in the emergency room, inpatient acute hospital, critical care unit (CCU), intensive care unit (ICU), step-down unit, or medical unit.

RELATED CONCERNS

Acute coronary syndrome, page 54

Angina: chronic/stable, page 64

Dysrhythmias, page 85

Heart failure: chronic, page 38

Psychosocial aspects of care, page 835

Venous thromboembolism (VTE): deep vein thrombosis (DVT) and pulmonary embolism (PE), page 120

ACTIVITY/REST

- History of sedentary lifestyle, sporadic exercise schedule
- Weakness, fatigue, intolerance to usual activities
- Women often report unusual fatigue

CIRCULATION

- History of previous MI, CAD, heart failure, hypertension, diabetes mellitus, hypercholesterolemia

EGO INTEGRITY

- Denial of significance of symptoms and presence of condition
- Fear of dying, feelings of impending doom
- Anger at inconvenience of illness and the “unnecessary” attention and hospitalization
- Worry about family, employment, finances, childcare, elders at home, and pets at home

FOOD/FLUID

- History of/current obesity
- Diet high in cholesterol, saturated fats, salt, caffeine
- Nausea, vomiting, belching, heartburn

NEUROSENSORY

- History of dizziness, fainting spells, falling

PAIN/DISCOMFORT

***Reports of pain location and severity differ between men and women. Pain is sometimes absent in postoperative clients, those with prior stroke or heart failure, diabetes, hypertension, or an older person.

- Sudden onset of chest pain unrelieved by rest or nitroglycerin (common symptom, particularly in men)
- **Location:** Substernal or anterior chest pain that may radiate to jaw, neck, shoulders, and upper extremities, often to left side more than right. Women may report pain between shoulder blades, back pain.
(May have atypical location, such as pain in epigastric or abdominal area, elbow, jaw, back, neck, between shoulder blades, or throat)
- **Quality:** Crushing, constricting, squeezing, heavy, steady pain. Women may report dull aching pain.
- **Intensity:** Usually a 10 on a scale of 0 to 10 or the “worst pain ever experienced”

- Chest pain with activity or rest
- Tachycardia, dyspnea with rest or activity
- Fatigue with normal daily activities

- **Color:** Pallor or cyanosis; mottling of the skin, nail beds, mucous membranes, and lips
- **Blood pressure (BP):** May be increased or decreased; orthostatic changes may occur
- **Pulses:** May be normal, full, bounding, or having a weak or thready quality with delayed capillary refill
- Tachycardia, bradycardia, other irregularities may be noted
- **Heart sounds:** S₃ and S₄, reflecting a pathological condition such as cardiac failure, decreased ventricular contractility, or compliance
- Murmurs reflecting valvular insufficiency or papillary muscle dysfunction
- Friction rub (suggests pericarditis)
- **Edema:** Signs of jugular vein distention (JVD), peripheral edema, dependent edema, generalized edema

- Withdrawal, anxiety, lack of eye movements
- Irritability, anger, combative behavior; may refuse emergent care
- Focus on self and pain

- Vomiting
- Decreased urine output
- Poor skin turgor, dry or diaphoretic skin

- Weakness
- Mentation changes such as disorientation, poor memory, changes in thought processes

- Facial grimacing, changes in body posture; crying, groaning, squirming, stretching
- May place clenched fist on midsternum when describing pain
- Autonomic responses: Changes in heart rate and rhythm, blood pressure, respirations, skin color and moisture, and level of consciousness

MAY REPORT (continued)

- **Duration:** Usually more than 15 minutes
- **Precipitating factors:** May or may not be associated with activity or increased stress
- **Relieving factors:** Pain is not responsive to relief mechanisms, such as rest and antianginal medications

RESPIRATION

- Recent history of dyspnea with or without exertion, nocturnal dyspnea, unable to sleep flat
- Recent history of cough with or without sputum production
- History of smoking, chronic respiratory disease

SOCIAL INTERACTION

- Recent history of stressors such as work, family, financial, caretaking
- Difficulty coping with recent or current stressors
- May be worried about current hospitalization's effect on self and family and question coping abilities

SEXUALITY

- Postmenopausal; history of hormone replacement therapy
- Erectile dysfunction (ED): May be associated with hypertension or antihypertensive medications

TEACHING/LEARNING

- Family history of heart disease, MI, diabetes, stroke, hypertension, peripheral vascular disease, hypercholesterolemia
- Use of tobacco; may express desire or attempts at smoking cessation
- Use of alcohol or other drugs
- Use or misuse of cardiac medications, over-the-counter (OTC) preparations
- Use of vitamins and herbal supplements such as vitamin E, ginseng, garlic, ginkgo, hawthorn, bromelain

DISCHARGE PLAN CONSIDERATIONS

- May require assistance with activities of daily living (ADLs), food preparation, shopping, transportation, homemaking or maintenance tasks, modifications of physical layout of home

♦ Refer to section at end of plan for postdischarge considerations.

MAY EXHIBIT (continued)

- Increased respiratory rate, shallow and labored breathing
- **Color:** Pallor or cyanosis
- Decreased oxygen saturation on pulse oximetry
- **Breath sounds:** May be clear or crackles and wheezes present
- Difficulty resting quietly
- Overemotional responses such as intense anger or fear
- Withdrawal from family
- Not willing to cooperate with treatment recommendations; not responsive to teaching

DIAGNOSTIC STUDIES

TEST
WHY IT IS DONE

WHAT IT TELLS ME

DIAGNOSTIC STUDIES

- **Electrocardiogram (ECG):** Record of the electrical activity of the heart to detect dysrhythmias, to identify any myocardial ischemia present or any damage to myocardial tissue from the past.

In the emergency setting, the ECG is the most important diagnostic test. High probability of myocardial infarction is indicated by ST-segment elevation greater than 1 mm in two anatomically contiguous leads (indicates acute MI in 90% of people, as confirmed by serial measurements of cardiac biomarkers) or by the presence of new Q waves (Kumar & Cannon, 2009). A new-onset left bundle branch block (LBBB) in ECG is also considered as STEMI ("NSTEMI," 2017).

(continues on page 76)