

The Cardiovascular System: Medical & Psychosocial Aspects

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Outline of session

- Cardiovascular system
 - Specific heart info
 - Specific disease info
 - Heart transplantation info
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graph LR; A[Cardiovascular system] --> B((MED ASPECTS)); C[Specific heart info] --> B; D[Specific disease info] --> B; E[Heart transplantation info] --> F[PSYCHOSOCIAL ASPECTS]
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## Cardiovascular System

- The cardiovascular system is composed of the heart, blood, and vascular system.
- The cardiovascular system distributes food, oxygen, and hormones to all living cells and carries waste products and carbon dioxide away from the cells.

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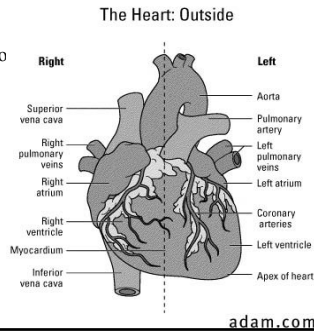
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## The Heart

- It is enclosed in an outer covering consisting of two layers called the pericardium.
- The lining of the inner surface of the heart is called the endocardium.



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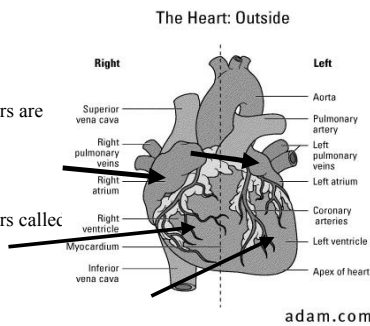
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## Heart (continued)

- The heart has four chambers:
- two upper chambers are called the atria;
- two lower chambers called ventricles



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## Incidence/Frequency of Cardiovascular Disease

- Approximately 5,000,000 individuals have some type of cardiovascular disease.
- CVD is the number one killer in the U. S.
- It is responsible for nearly 1 in every 2.5 deaths.

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## Statistics about Heart Disease

- 4,000 myocardial infarctions (MI's) each day in America
- 2.5 million Americans have vocational disability or limitation caused by cardiac illness/disease
- Coronary Heart Disease is leading disease for which people receive premature disability benefits
- MI Survival rates-70% for initial MI, 50% of those with recurrent MI
- Growing number of people who experience MI's under age 65

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## Good News!

- Cardiovascular disease is, in large part, a preventable disease.

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## Risk Factors for Cardiovascular Disease

- Smoking
- Diabetes
- Obesity
- Stress
- High Blood Pressure [ $>140$  (systolic) / 90 (diastolic)]
- Physical Inactivity



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## Cardiovascular Diseases

- Cardiovascular diseases include those that affect the heart and those that affect the peripheral vascular system.
- The heart and blood vessels may be primarily attacked by these diseases or they may be secondarily affected as a consequence of another disease.

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## Cardiovascular Diseases

- Coronary Artery Disease
- Endocarditis
- Pericarditis
- Rheumatic Heart Disease
- Hypertension
- Cardiac Arrhythmia
- Congestive Heart Failure
- Cardiogenic Shock

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## Coronary Artery Disease (CAD)

- Results from plaques build up on the inner walls of blood vessels that supply the heart muscle (arteriosclerosis).
- In this situation, the heart muscle receives inadequate blood supply (ischemia).
- Because of lack of oxygen to the heart muscle, chest pain (angina pectoris) results.

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## CAD cont

- Because the heart muscle's need for oxygen is greatest when demands are placed on the heart, angina is often experienced during activity.
- The myocardium (heart muscle), like all other muscle, cannot live without oxygen.
- When the cardiac muscle receives no oxygen (anoxia), necrosis (tissue death) of part of the heart muscle results.

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## Endocarditis

•The lining of the inner surface of the heart is called the endocardium.

- Endocarditis (inflammation of the membrane that covers the heart valves and chambers of the heart) is caused by bacterial infection.
- Damage to the heart valves can result.
- May be associated with systemic infectious diseases or intravenous drug abuse.
- As the disease progresses, symptoms such as high fever, weight loss, and extreme fatigue become more pronounced.

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## Pericarditis

•The heart is enclosed in an outer covering consisting of two layers called the pericardium.

- Any organism can cause pericarditis (inflammation of the pericardium).
- When inflamed, the pericardial layers can adhere to each other, creating friction as their surfaces rub together during cardiac contraction.
- A common sign of pericarditis is chest pain, which is aggravated by moving and breathing.

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## Rheumatic Heart Disease

- Type of heart disease brought about by rheumatic fever.
- Rheumatic fever is a condition in which the body undergoes a type of allergic reaction in response to an organism called streptococcus.
- Although recovery from rheumatic fever can be complete with no residual effects, some individuals experience permanent cardiac damage as a result.
- Valves of the heart are most frequently affected, resulting in stenosis (a stricture of the opening)

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## Hypertension

- Individuals with hypertension (high blood pressure) have a sustained elevation of pressure in the arteries.
- High Blood Pressure [ $\geq 140$  (systolic)/90 (diastolic)]
- Prolonged elevation of pressure can eventually damage the heart, kidneys, brain, or vessels behind the eye.

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## Hypertension

- Essential (primary) hypertension has a gradual onset and few, if any, symptoms.
- Malignant (resistant to treatment) hypertension, although less common, has an abrupt onset and more severe symptoms.
- Hypertension may go undetected until complications such as heart attack, stroke, or visual problems arise.

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### Risk Factors for HTN

- Race [African American's have higher incidence].
- Age [over 60 years old]
- Comorbidities [e.g. diabetes]
- Maternal history [mother had HBP before she was 65].
- Paternal history [father had HBP before he was 55].
- Lifestyle factors [smoke, obesity]

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### Cardiac Arrhythmia

- An arrhythmia is an abnormality of the heart rate or rhythm.
- The heart may beat too fast (tachycardia), too slow (bradycardia), or irregularly (dysrhythmia or arrhythmia).

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### Cardiac Arrhythmia

- Arrhythmia may decrease the heart's ability to work effectively and to supply adequate amounts of blood
- Some arrhythmia may be life-threatening, while others may be relatively minor and require little or no treatment.
- Other arrhythmia (ventricular) may be modulated with the implant of a cardioverter-defibrillators (pacemaker or AICD).

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## Congestive Heart Failure (CHF)

- There is no definition of heart failure (congestive heart failure) that is entirely satisfactory.
- When the heart consistently must work harder to pump, over time it becomes enlarged (hypertrophy) and ineffective in its pumping action.

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## Congestive Heart Failure

- As a result, fluid accumulates in the lungs, causing congestion, dyspnea (difficulty breathing), and difficulty breathing when lying down at night (nocturnal dyspnea).
- Individuals with congestive heart failure may consequently experience fatigue and physical weakness.

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## Congestive Heart Failure

- If oxygen supply to the brain is inadequate, cognitive changes may also be present.
- Because of insufficient pumping and circulation of blood, fluid may accumulate in the extremities causing swelling (edema).

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## Congestive Heart Failure

- Blood flow to the gastrointestinal system may be impaired, causing congestion with resulting anorexia (loss of appetite) or nausea and vomiting.
- The causes of heart failure include myocardial infarction (heart attack); damage from substance toxic to the heart (e.g., alcohol); as well as hypertension, arteriosclerosis, and valvular dysfunction.
- Sx: SOB, fatigue, and edema
- Can severely limit activities and may cause depression, anxiety, and lower self-esteem.

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## Cardiogenic Shock

- The most common initiating event in cardiogenic shock is acute myocardial infarction (AMI). Dead myocardium does not contract, and once more than 40% of the myocardium is involved, cardiogenic shock may result.
- It most commonly occurs in association acute ischemic damage to the myocardium (<80 mm Hg Systolic BP)
- Cardiogenic shock occurs in approximately 5-10% of patients with AMI.
- Mortality rates for medically treated patients with AMI and cardiogenic shock exceed 70%.
- Cardiogenic shock is characterized by a decreased pumping ability of the heart

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## Cardiomyopathies & myocarditis

- Cardiomyopathy: any structural or functional abnormality of the myocardium of unknown etiology resulting in systolic or diastolic dysfunction of the heart
- Myocarditis: A focal or diffuse inflammation of the myocardium. Can be acute or chronic, occur at any age.
  - Viral, bacterial, parasites

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## NYHA Functional Classification

- Class I**  
(Post-transplant)
  - No limit to physical activity
  - No physical symptoms
- Class II**  
(Post-transplant)
  - Slight limitation of physical activity
  - Ordinary activity results in *fatigue, palpitation, dyspnea, anginal pain*
- Class III**  
(Pre-transplant)
  - Marked limitation of physical activity
  - Less-than-ordinary activity results in symptoms
- Class IV**  
(Pre-transplant)
  - Inability to carry on any physical activity with discomfort and symptoms

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## Vocational Impact of Cardiac Disease

- Remember,
- 2.5 million Americans have vocational disability or limitation caused by cardiac illness/disease
- Coronary Heart Disease is leading disease for which people receive premature disability benefits
- 88% are able to return to work after an MI
- Jobs may need to be modified, customized

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When a man's an empty kettle  
He should be on his mettle,  
And yet I'm torn apart.  
Just because I'm presumin'  
That I could be kind-a-human,  
If I only had heart.  
I'd be tender - I'd be gentle  
And awful sentimental  
Regarding Love and Art.  
I'd be friends with the sparrows ...  
And the boy who shoots the arrows  
If I only had a heart.  
Picture me - a balcony.  
Above a voice sings low.  
Wherefore art thou, Romeo?  
I hear a beat....  
How sweet!  
Just to register emotion,  
Jealousy - devotion,  
And really feel the part.  
I could stay young and chipper  
And I'd lock it with a zipper,  
If I only had a heart.

## Journey of the Heart: Psychosocial Issues of Heart Transplant Candidates (and Others With Cardiac Disease)

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### Overview of Heart Transplantation

- 4,143 people are listed as waiting for a heart transplant
- In 1999, 2,185 heart transplants were performed
- One year survival rate is 87%
- 77% male
- 53.8% 50-64 years old
- 78% Caucasian



(United Network for Organ Sharing, 2000)

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**Heart transplantation** is the process of removing the sick or diseased heart and replacing it with a healthy, human heart from a deceased donor

#### Who Gets a Heart Transplant?

- Persons with chronic, long-term heart failure
- Persons with cardiomyopathy who do not respond to traditional methods

(American Heart Association)

#### Prognosis

- Persons with end-stage heart failure usually have less than one year to live prior to transplantation



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### UNOS National Ranking of Heart Transplant Candidates

- ⊙ Status One A or B
  - A Those who are hospitalized in critical condition in intensive care
  - B Those who are hospitalized and are dependent on intensive care and require intravenous inotropic or mechanical circulatory support
- ⊙ Status Two
  - Those who remain at home waiting for a heart

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## Psychosocial Adjustment to Heart Transplantation

- Impairments in sexual functioning
- Loss of work
- Separation from family
- Decrease in self-esteem
- Fear
- Guilt
- Perceived freedom
- Leisure functioning
- Preparing to live and preparing to die



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## Stressors Related to Heart Transplantation

- No energy for leisure activities
- Fear that a suitable donor may not be found in time
- New heart might change the person
- Feeling guilty that someone must die
- What if it's not worth the wait?
  - Rejection
  - Possible death
- Inspecifity of the wait period
- Death of other candidates

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## The heart is crucial to one's identity

*Heartless*                      *Soft-hearted*  
*Achy-breaky heart*          *Warm-hearted*  
*Take heart*          *My heart aches for your*  
*Big hearted*          *Whole-hearted/Half-hearted*  
*I love you with all my heart*  
*In a heartbeat*          *Wear your heart on your sleeve*  
*Played my heart out*          *My heart is pounding*          *He's all heart*  
*My heart skips a beat*          *Take it to heart*  
*My heart's not in it*          *Tugged at my heart strings*  
*Pour my heart out*

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## Phases of Adjustment to Heart Transplantation

(Rauch & Kneen, 1989)

|                        |                                        |
|------------------------|----------------------------------------|
| Pre-transplant         | Chronic stress, depression, anxiety    |
| Transplant proposed    | Anger, denial, disbelief               |
| Pre-operative work-up  | Anxiety re: acceptance into program    |
| Waiting for donor      | Impatience, frustration                |
| Donor available        | Readiness, eager to proceed, fear*     |
| Initial post-operative | Elation, well-being, calm              |
| Post-operative course  | Anxiety                                |
| Rejection of heart     | Demoralization, fear                   |
| Discharge              | Ambivalence, anticipation, fear, guilt |
| Adaptation             | Appropriate sense of well-being        |

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## FEAR

•“Last night I dreamed they called me for the transplant...I remember feeling relieved and ready. The time felt right. My mother was there...

Then I was suddenly gripped by the bizarre aspect of it all. ‘They’re going to cut out my heart’ ...”

Beth Bartlett, *Journey of the Heart*

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I have had a rare opportunity in this life--to live life on the edge of death, to venture into death itself, and then to experience a second birth; to be both very old and very young in the middle years of my life.

Beth Bartlett, heart transplant survivor,  
author of *Journey of the Heart*

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Video~Enjoy!

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### Psychosocial Interventions for Cardiac Disease

- Smoking cessation
- Reduction of BP
- Obesity/weight reduction
- Behavioral control of HTN
- Modification of Type A behaviors, focus on decreasing hostility and managing stress
- Med adherence
- Risk reduction behaviors
- Quality of life
- Social Support
- Stress management
- Control of depression and anxiety
- Return to work
- Control of alcohol/ substance abuse
- Marital and sexual aspects of rehab

Taken from: Sotile, W. (1996). Psychosocial interventions for cardiopulmonary patients. Champaign, IL: Human Kinetics.

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### *Interventions*

- Creative arts
- Stress management
- Leisure education
- Social activities
- Individualized leisure pursuits
- Individual and family counseling
- Adjustment to disease/disability
- Support groups
- Anger management

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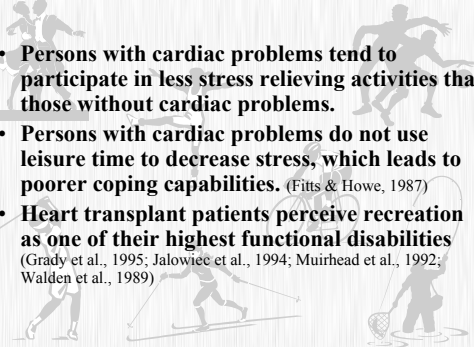
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## *Leisure*

- **Persons with cardiac problems tend to participate in less stress relieving activities than those without cardiac problems.**
- **Persons with cardiac problems do not use leisure time to decrease stress, which leads to poorer coping capabilities.** (Fitts & Howe, 1987)
- **Heart transplant patients perceive recreation as one of their highest functional disabilities** (Grady et al., 1995; Jalowiec et al., 1994; Muirhead et al., 1992; Walden et al., 1989)



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## *Outcomes*

- Increased positive mood
- Decreased anxiety
- Use of appropriate coping skills
- Appropriate use of social support
- Decreased stress
- Increased participation in leisure
- Increased perceptions of freedom
- Increase healthy interactions with family, staff, peers

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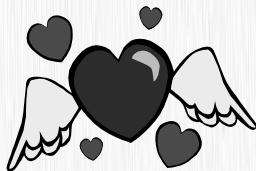
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## *Their Stories . . .*

- *Sammy*
- *Bertha*
- *Karen*



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