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- Email customerservice@OccupationalTherapy.com

Living with HF

The OT Role

1

Learning Outcomes

1. State the pathophysiology of and functional limitations from heart failure
2. Identify key areas to assess and address on individuals with heart failure
3. Identify self-management strategies to promote optimal living of individuals with heart failure

2

Heart

Anatomy and Physiology

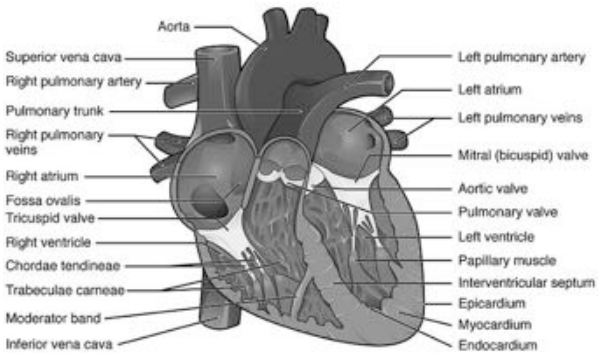
3

The Heart: Structures

Atria
- Upper chamber
- Left and right

Ventricles
- Lower chamber
- Left and right

Septum
- Separates left and right sides of the heart
- Participates in conductivity and ventricular contraction



Anterior view

Illustration from Anatomy & Physiology, Connexions Web site http://cnx.org/content/col11496/1.6/ June 19, 2013. https://commons.wikimedia.org/wiki/File:2008_Internal_Anatomy_of_the_HeartN.jpg

4

The Heart: Structures

Atrioventricular Valves
- Tricuspid: R atrium and R ventricle
- Mitral: L atrium and L ventricle

Semilunar Valves
- Pulmonary: R ventricle and pulmonary artery
- Aortic: L ventricle and aorta

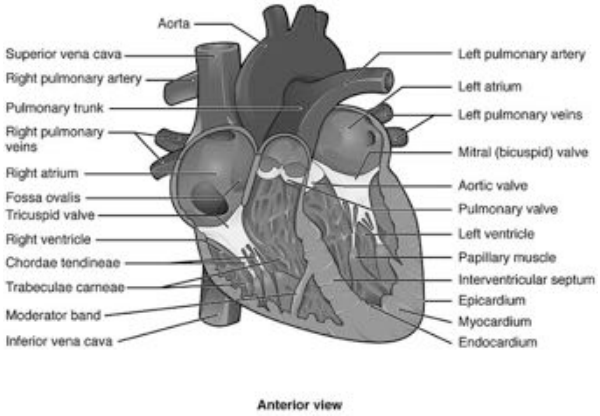
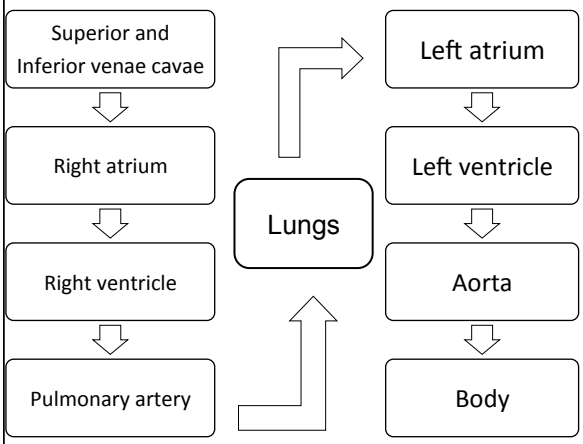
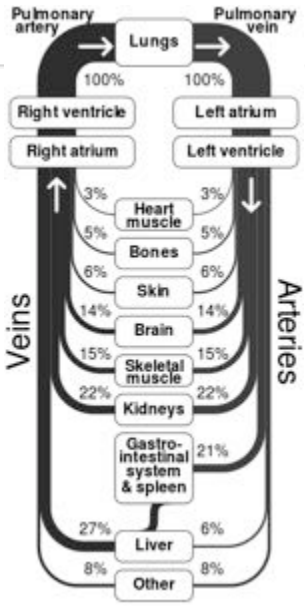


Illustration from Anatomy & Physiology, Connexions Web site http://cnx.org/content/col11496/1.6/ June 19, 2013. https://commons.wikimedia.org/wiki/File:2008_Internal_Anatomy_of_the_HeartN.jpg

5

The Heart: Circulatory System





A Sankey diagram of the human circulatory system with approximate relative percentages of cardiac output delivered to major organ systems, drawn by CMG Lee based on data at http://www.vhlab.umn.edu/atlas/physiology-tutorial/cardiovascular-function.shtml. 26 October 2015 https://commons.wikimedia.org/wiki/File:Sankey_diagram_human_circulatory_system.svg

6

Heart Failure

Definition and Pathophysiology

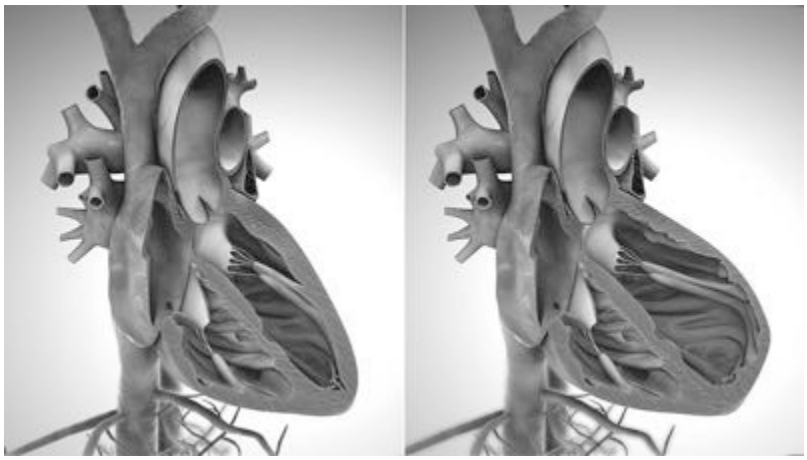
7

Definition

- Inability of the heart to meet the body's metabolic needs (Cassady & Cahalin, 2011)
  - Heart cannot fill chambers with enough blood
  - Heart cannot pump blood to the body effectively (National Heart, Lung, and Blood Institute, n.d.)
- Not all patients with HF are congested (Yancy et al., 2013)
- Complex clinical syndrome vs a diagnosis

8

Definition



A depiction of left ventricular enlargement during heart failure. http://www.scientificanimations.com/ [CC BY-SA 4.0 (https://creativecommons.org/licenses/by-sa/4.0)]

9

Prevalence in the United States

- 5.7 million adults
- HF contributed in 1 in 9 deaths in 2009
- 50% of people who develop HF die within 5 years

- Mozzafarian et al., 2016

- $30.7 billion each year (health care services, medications to treat HF, missed work days)

- Heidenreich et al., 2011

10

Signs and Symptoms

- Dyspnea (exertion, paroxysmal nocturnal, orthopnea)
- Fatigue/weakness/lethargy (HF-induced skeletal muscle abnormality)
- Physical: elevated jugular venous pressure, pulmonary rales, lower extremity edema, abdominal distention)
- Right hypochondrial pain (2/2 to R-sided HF)
- Exertional chest pain
- Activity intolerance
  - All HF patients report dependence on at least 1 activity

11

Signs and Symptoms

- Cognitive impairment: 25-80%
  - Acute and fluctuating: delirium (decompensated HF)
  - Chronic: subjective cognitive decline, MCI (most common), mild neurocognitive disorder, dementia (stable HF)
  - Language
  - Attention, executive function, psychomotor speed
  - Visuospatial skills and memory may recover if HF well-controlled (Cannon et al., 2017)
  - Low health literacy is associated with higher all-cause mortality and a barrier to effective disease self-management; is a modifiable risk factor for poor disease outcome

12

Signs and Symptoms

- Depression and Anxiety:
  - Depressive symptoms: 21.5%
  - Anxiety: 13% anxiety disorder and 30% clinically significant levels of anxiety
  - Rutledge et al., depressive symptoms or depressive disorder 2x increase of death or cardiac events
  - Biological and behavioral mechanisms may explain association between depression and anxiety and poor HF outcomes
  - Screen with PHQ-2 and then use PHQ-9 for positive screen

(Celano et al., 2018)

13

Risk Factors

- Coronary heart disease and heart attacks
- High blood pressure
- Diabetes
- Smoking
- Eating foods high in fat, cholesterol, sodium
- Sedentary lifestyle
- Obesity

- Centers for Disease Control and Prevention (CDC), 2019

14

New York Heart Association (NYHA) Functional Classification

NYHA Class	Description of HF Related Symptoms
Class I (Mild)	❑ With cardiac disease but no limitation of physical activity ❑ Ordinary physical activity: No fatigue, palpitation, dyspnea, or chest pain
Class II (Mild)	❑ Slight limitation of physical activity ❑ Rest: comfortable ❑ Ordinary physical activity: fatigue, palpitation, dyspnea, anginal pain
Class III (Moderate)	❑ Marked limitation of physical activity ❑ Rest: comfortable ❑ Less than ordinary activity: fatigue, palpitation, dyspnea, anginal pain
Class IV (Severe)	❑ Inability to carry any physical activity without discomfort ❑ Rest: angina syndrome present ❑ Any physical activity: discomfort increased

15

American Heart Association (AHA) Heart Failure Stages

AHA Stage	Description
Stage A	❑ Presence HF risk factors ❑ No heart disease and no symptoms
Stage B	❑ Heart disease present ❑ No symptoms
Stage C	❑ Structural heart disease ❑ Symptoms have occurred
Stage D	❑ Advanced heart disease ❑ Continued heart failure symptoms requiring aggressive therapy

16

Heart Failure

Compensated Heart Failure

- Medically stable
- Ventricular enlargement, sympathetic nerve activation, renin-angiotensin-aldosterone system activation

Decompensated Heart Failure

- Unable to maintain circulation

17

Heart Failure

RIGHT Side HF

- Cannot pump blood to the lungs for oxygenation
- Blood flows back to the venous system
- Peripheral edema
- Orthopnea

LEFT Side HF

- Cannot pump blood to the body
- Blood flows back to the lungs
- Pulmonary edema
- Tachypnea

(.)

18

Heart Failure

HF with reduced Ejection Fraction (HFrEF)	HF with preserved Ejection Fraction (HFpEF)
Used to be called systolic HF	Used to be called diastolic HF
Left ventricular ejection fraction is ≤40%	Left ventricle ejection fraction is >50%
Heart Failure with reduced ejection fraction	Heart Failure with preserved ejection fraction

19

Medical Management

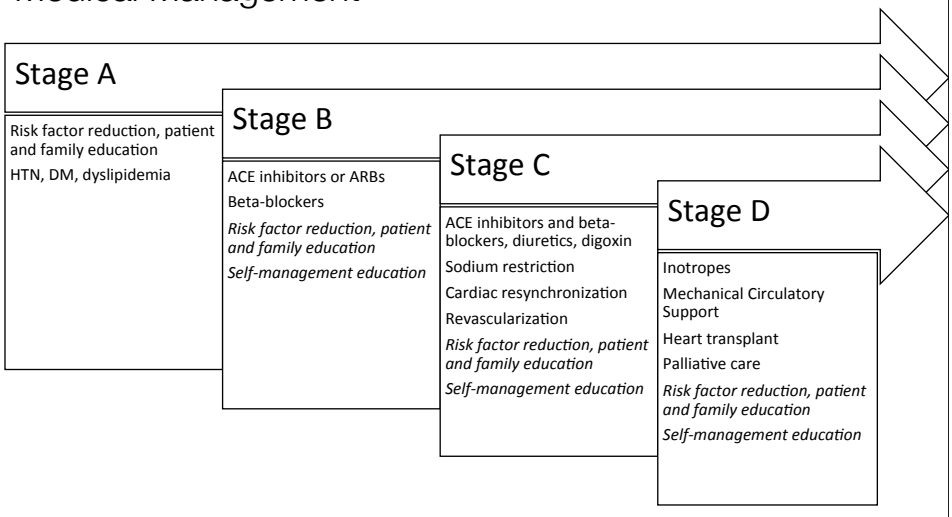
20

Goals of Treatment

- Improve prognosis and reduce mortality
- Relieve symptoms and reduce morbidity
- Reduce length of stay and readmission
- Prevent organ system damage
- Manage comorbidities that lead to poor prognosis

21

Medical Management



Jessup & Brozena, 2003

22

Medications

Name	Action	Reason
Anticoagulants "blood thinners"	Decrease clotting ability	Prevent clots from forming in the vessels
Antiplatelet agents and dual antiplatelet therapy (DAPT)	Prevents blood platelets from sticking together	Prevent clotting for patients with h/o MI, CVA, TIA
Angiotensin-Converting Enzyme (ACE) Inhibitors *-pril*	Expands blood vessels Lowers Angiotensin II to decrease resistance Easier blood flow and makes heart work more efficient	Improve symptoms of heart failure Immediately beneficial
Angiotensin II Receptor Blocker (ARB) *-artan*	Prevents angiotensin II from having an effect on the heart and blood vessels	Improve symptoms of heart failure

23

Medications

Name	Action	Reason
Angiotensin-Receptor Neprilysin Inhibitor (ARNI) Sacubitril/Valsartan	Neprilysin: enzyme that breaks down natural substances that open narrowed arteries; Reduce sodium retention and decrease heart strain	Treatment of heart failure
Beta Blockers *-olol*	Decrease HR and CO	Lower BP, prevent future MI, treat cardiac arrhythmia Not immediately beneficial
Calcium channel blocker *-ipine* *Diltiazem, Verapimil*	Decrease heart pumping strength and relax blood vessels	HTN, angina, arrhythmias

24

Medications

Name	Action	Reason
Cholesterol-lowering medications *-statin*	Some affect liver Some work in intestines Some interrupt CHO formation	Lower LDL
Digitalis Preparation *Digoxin, Digitoxin*	Increase force of heart contractions	Treat heart failure symptoms, not responding to ACE inhibitors and diuretics
Diuretics *-ide*	Decreases excess fluids and sodium through urination	Lower blood pressure Reduce swelling and excess fluid buildup
Vasodilators *nitrates*	Relax blood vessels Increase blood and oxygen to the heart	Ease angina

25

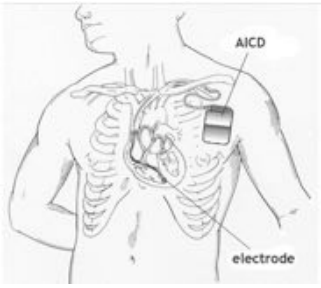
Medical Management

- Management of associated conditions (HFpEF)
  - HTN
  - Lung disease
  - CAD
  - AF
  - Obesity
  - Anemia
  - Diabetes
  - Kidney disease
  - Sleep disordered breathing

26

Minimally Invasive Devices

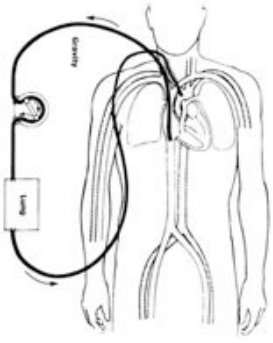
An artificial pacemaker from St. Jude Medical, with electrode. Steven Fruitsmaak, 2007 https://commons.wikimedia.org/wiki/File:St_Jude_Medical_pacemaker_in_hand.jpg



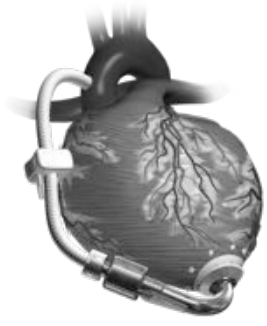
Automatic implantable cardioverter defibrillator https://en.m.wikipedia.org/wiki/File:AICD.jpg

27

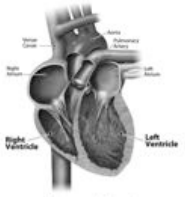
Mechanical Circulatory Support



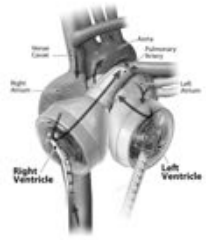
Veno-arterial (VA) ECMO Van Meurs, K, Lally, KP, Peek, G, Zwischenberger, Extracorporeal Life Support Organization, Ann Arbor 2005. https://commons.wikimedia.org/wiki/File:Veno-arterial_(VA)_ECMO_for_cardiac_or_respiratory_failure.jpg



Left Ventricular Assist Device https://commons.wikimedia.org/wiki/File:Blausen_0621_LVAD.png



Human Heart



Total Artificial Heart

Graphic of the SynCardia temporary Total Artificial Heart beside human heart with call-outs. Jumpingree1992 https://commons.wikimedia.org/wiki/File:Graphic_of_the_SynCardia_temporary_Total_Artificial_Heart_beside_a_human_heart.jpg

28

Heart Transplant

- Indications
  - Refractory cardiogenic shock that requires IABP or LVAD
  - Cardiogenic shock that requires continuous intravenous inotropic therapy
  - Peak VO2 less than 10mL/kg per min
  - NYHA class III or IV
  - Recurrent life-threatening L ventricular arrhythmias
  - End-stage congenital HF with no pulmonary HTN
  - Refractory angina

29

Heart Transplant

- Contraindications
  - Advanced irreversible renal failure with Cr>2 or creatinine clearance <30-50 mL/min
  - Advanced irreversible liver disease
  - Advanced irreversible pulmonary parenchymal disease or (FEV1 <1L/min)
  - Advanced irreversible pulmonary artery HTN
  - History of solid organ or hematologic malignancy within last 5 years

30

Lifestyle Modification

- Smoking cessation
  - Smokers vs non-smokers that live with smokers
  - Provide environment that facilitates repeated interventions
  - Willing to quit: quit plan and counseling
  - Nicotine gum, inhaler, lozenge, nasal spray, patch Bupropion SR, Varenicline
  - 5 A's: Ask about tobacco use, Advise to quit, Assess willingness to make a quit attempt, Assist in quit attempts, Arrange follow-up
  - Behavior change strategies: physical and mental-cognitive strategies
  - Address psychosocial issues: anxiety and depression, other mental health disorders, alcohol abuse, social support
  - Identify relapse risk
  - Provide national and local resources: 1-800-QUIT-NOW, Nicotine-Anonymous.org
  - Self-help: BecomeAnex.org; SmokeFree.gov; Heart.org; Lung.org

31

Lifestyle Modification

- Alcohol Abstinence or restriction
- Restrict sodium intake to 3g/day (excessive >6g/day)
- Weight management
- Daily weight monitoring

32

OT Assessment

33

The Heart of the Matter

- Individuals experience both physical changes and emotional reactions coming from a cardiac event.
- How cardiac event affected the individual's
  - Roles
  - Work
  - Confidence
  - Relationships
- Middle aged and older individuals with CAD have higher rates of self-reported decreased ability to perform ADLs compared to same aged individuals without CAD (Ades, 2001)

34

ADLs and IADLs

- Cardiac disease affect the individual's ability to engage in desired occupations, development of the activity limitations, and quality of life (Smith-Gabai & Holm, 2017; Stefanac, 2011)
- Patients with cardiac diseases have significant functional limitations (Duruturk, Tonga, Karatas, & Doganozu, 2015)

35

ADL Difficulties

Activities of Daily Living and Outcomes in Heart Failure

Shannon M. Dunlay, MD, MS; Sheila M. Manemann, MPH; Alanna M. Chamberlain, PhD; Andrea L. Cheville, MD; Ruoxiang Jiang, BS; Susan A. Weston, MS; Véronique L. Roger, MD, MPH

▪ Climbing stairs (45.9%)	▪ Eating (17.1%)
▪ Walking (29%)	▪ Transportation (15.5%)
▪ Housekeeping (25.6%)	▪ Bathing (15.2%)
▪ Dressing (22.9%)	▪ Taking Medications (14.4%)
▪ Toileting (18.6%)	

36

Predictors for ADL Difficulties

- older
- female
- diabetes
- CVD
- dementia
- anemia
- morbid obesity
- unmarried

37

OT Assessment

- Blood pressure (BP)
- Heart Rate (HR)
- Rate of perceived exertion (RPE), BORG Dyspnea Scale
- Oxygen saturation (SPO2)
  - Room air vs. supplemental 02
  - Method of supplemental 02 delivery (nasal canula, mask, etc.)
- Vital sign response to activity: pre/during/post (BP, HR, SP02). Orthostatic hypotension (OH)
- Recovery time if out of normal/expected range for activity

38

Norms

- Blood pressure (BP): Systolic <120mmHg and Diastolic <80mmHg
- Heart Rate (HR): 60-100 bpm
- Oxygen saturation (SPO2): >95%
- Respiratory Rate: 12-16 breaths per minute
- Temperature: 97.8-99.1 Fahrenheit (36.5-37.3 Celsius)

39

Blood Pressure

- Pressure of circulating blood on arterial walls
- Sphygmomanometer: blood pressure meter
- Systolic Pressure: First sound
- Diastolic Pressure: Last sound
- Electronic machine calculates mean arterial pressure (MAP)
- Ventricular assist device patients: use doppler to get the MAP
- What is orthostatic hypotension?
- How high is too high? How low is too low?
- What is the right way to take a person's blood pressure?

40

Blood Pressure

- Before pressure is taken
  - 30 mins before: no smoking, caffeine, or exercise
  - 5 mins before: sit still – feet on the floor, back supported
- While pressure is being taken
  - Cuff is the right size and placed correctly
  - Arm should be at heart level, flat on a surface
  - Position: seated upright, feet flat and uncrossed, back supported, no talking
  - Check pressure on both arms if able, take reading of the higher pressure
- After pressure was taken
  - 1 minute before retaking BP
  - At least 2 readings - average

41

Orthostatic Hypotension (OH)

- Excessive drop in blood pressure of > 20 mm Hg systolic/ > 10 mm Hg diastolic, or both, when upright body position is assumed
- May be symptomatic (i.e. dizziness, light-headedness, confusion or blurred vision.
- Or may be asymptomatic (i.e. no symptoms experienced).
- OH is a manifestation of an abnormal BP response (due to a variety of possible factors)
- May occur at any age, but is more prevalent in the elderly due to decreased baroreceptor responsiveness/reduced arterial compliance
- Symptomatic treatment: supine with lower extremities above the level of the heart (i.e. reclined with legs elevated ideally).

42

Heart Rate (HR)

- Can use cardiac monitoring equipment or manual reading
- When should we use a manual reading?
- Normal heart rate response to exercise
- How high is too high? How low is too low?

43

Heart Rate (HR)

Normal Resting	60-100 bpm
Bradycardia	<60 bpm • Diagnosis • Individual's baseline • Medications • Symptomatic: fatigue/weakness, dizziness, syncope, chest pain, SOB • How low can you go?
Tachycardia	>100 bpm • Diagnosis • Individual's baseline • Medications • Symptomatic: palpitations, dizziness, SOB, chest pain • How high can you go?

44

Peripheral Oxygen Saturation (SpO2)

- Measure of how much oxygen blood is carrying as a percentage of the maximum it could carry
- Carried in the blood attached to hemoglobin molecules
- Referred to as SpO2
  - >95% ideal
  - >90% acceptable
- Challenges with assessing SpO2
  - Poor signal
  - Cold hands
  - Weak pulse
- If not in room air, indicate oxygen system

45

Peripheral Oxygen Saturation (SpO2)

- Increased activity may cause SpO2 to decrease
- Symptoms: fatigue, shortness of breath, dizziness, lightheadedness
- 88-92% may be appropriate for patients with long standing history of hypoxia
- How low is too low?
- What else may cause low oxygen saturation readings?
- If not in room air, indicate oxygen system

46

Borg RPE Scale

- RPE: Rate of Perceived Exertion
- Another way to measure physical activity intensity level
- May provide a fairly good estimate of the actual heart rate during physical activity

47

OT Assessment

- Upper extremity and upper extremity use
- Cognition, Perception, Sensation
- Vision, Hearing
- Trunk Mobility
- Balance
- Skin Integrity

48

ADLs and IADLs

- Quality of ADLs before? Now?
- Barriers to independence
  - Fatigue?
  - Shortness of breath?
  - Anxiety?
  - Self-doubt?
- Health Management and Maintenance
  - Perception and understanding of the problem
  - Readiness to learn
  - Willingness to change
  - Literacy vs. Health literacy

49

Occupational Profile

- Values and Interests
- Life experiences
- Performance patterns
- Supports and barriers to occupational engagement
  - Environment: physical and social
  - Context: personal, temporal, virtual

50

ADLs and IADLs: Outcome Measures

- FIM
- AM-PAC: Daily Activity
- Performance Assessment of Self-Care Skills (PASS)
- Canadian Occupational Performance Measure (COPM)
- Test of Grocery Shopping Skills (TOGSS)
- Executive Function Performance Test (EFPT)
- Kettle Test
- Weekly Calendar Planning Activity (WCPA)

51

JMR

http://jmr.tums.ac.ir

Review Article

Evaluation of Activities of Daily Living Instruments in Cardiac Patients: Narrative Review

Zeinab Fathipour-Azar[1], Malahat Akbarfahimi[*2], Behnoosh Vasaghi-Gharamaleki[3], Nasim Naderi[4]

1- Department of Occupational Therapy, School of Rehabilitation, Iran University of Medical Sciences, Tehran, Iran
2- Assistant Professor, Department of Occupational Therapy, School of Rehabilitation, Iran University of Medical Sciences, Tehran, Iran
3- Assistant Professor, Department of Basic Sciences in Rehabilitation, School of Rehabilitation, Iran University of Medical Sciences, Tehran, Iran
4- Assistant Professor, Department of Heart Failure, School of Medicine, Cardiac Electrophysiology Research Center, Rajaie Cardiovascular Medical and Research Center, Tehran University of Medical Sciences, Tehran, Iran

- Barthel Index
- Klein-Bell index
- The Kansas City Cardiomyopathy Questionnaire, Green*
- Performance Measure for Activity of Daily Living – 8
- Daily activity Questionnaire in Heart Failure
- PULSES Profile
- *best suited for HF patients

52

Quality of Life Assessment

- Cardiac Health Profile congestive heart failure (CHPchf)
  - https://www.researchgate.net/publication/6158036_The_validation_of_a_new_quality_of_life_questionnaire_for_patients_with_congestive_heart_failure_-_An_extension_of_the_Cardiac_Health_Profile
- Left Ventricular Dysfunction Questionnaire (LVD 36)
- Minnesota Living with Heart Failure® questionnaire*
- Specific Activity Questionnaire (SAQ)
  - https://www.hellenicjcardiol.org/archive/full_text/2009/4/2009_4_269.pdf

*best suited for HF patients

53

Self-Management Assessment

- Self-Care of Heart Failure Index (SCHFI) v.6
  - Measures decision making process in maintaining physiologic stability (maintenance) and response to symptoms (management)

54

OT Interventions

55

Self-Management Assessment

- Self-Care of Heart Failure Index (SCHFI) v.6
  - Measures decision making process in maintaining physiologic stability (maintenance) and response to symptoms (management)

56

Goal Setting

57

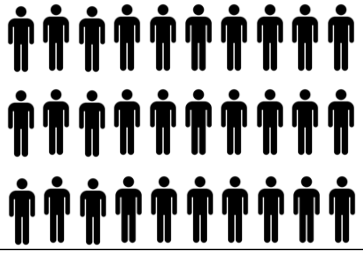
Goals

- Common patient goals
  - Where they want themselves to be
  - “Get fitter”
  - “No Pain”
  - “Better Mindset”
  - “Go back to work”

(Fernandez, Rajaratnam, Evans, & Speizer, 2012)

58

Behavioral Risk Factors for Cardiac Disease VS Actual Goals

SMOKING	SMOKING CESSATION
	

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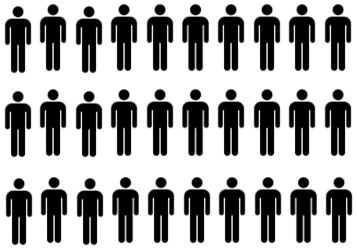
Behavioral Risk Factors for Cardiac Disease VS Actual Goals

SMOKING	SMOKING CESSATION
	

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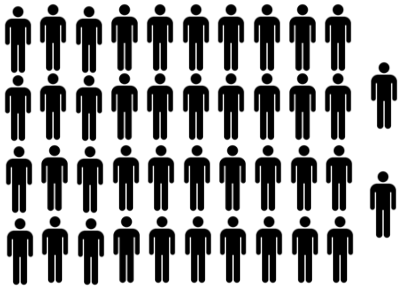
Behavioral Risk Factors for Cardiac Disease VS Actual Goals

OBESE	WEIGHT LOSS
	

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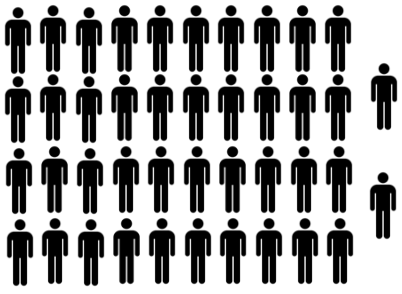
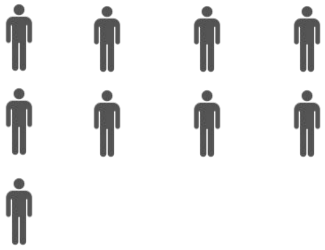
Behavioral Risk Factors for Cardiac Disease VS Actual Goals

OBESE	WEIGHT LOSS
	

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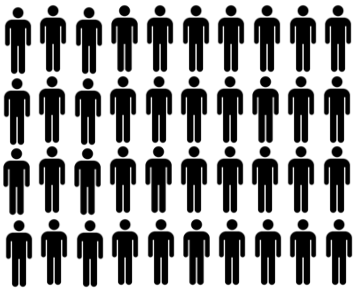
Behavioral Risk Factors for Cardiac Disease VS Actual Goals

(+) STRESS	STRESS REDUCTION
	

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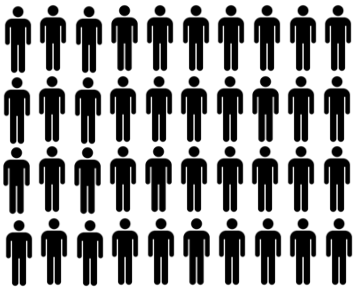
Behavioral Risk Factors for Cardiac Disease VS Actual Goals

(+) STRESS	STRESS REDUCTION
	

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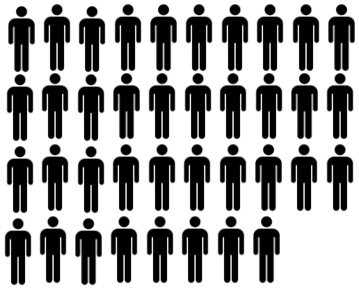
Behavioral Risk Factors for Cardiac Disease VS Actual Goals

SEDENTARY	PHYSICAL ACTIVITY
	

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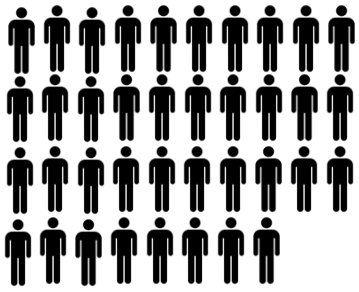
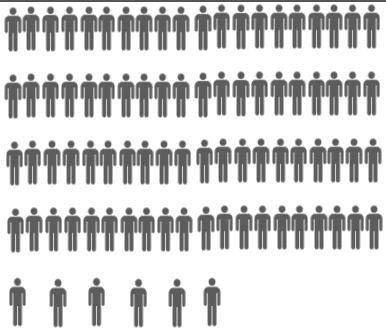
Behavioral Risk Factors for Cardiac Disease VS Actual Goals

SEDENTARY	PHYSICAL ACTIVITY
	

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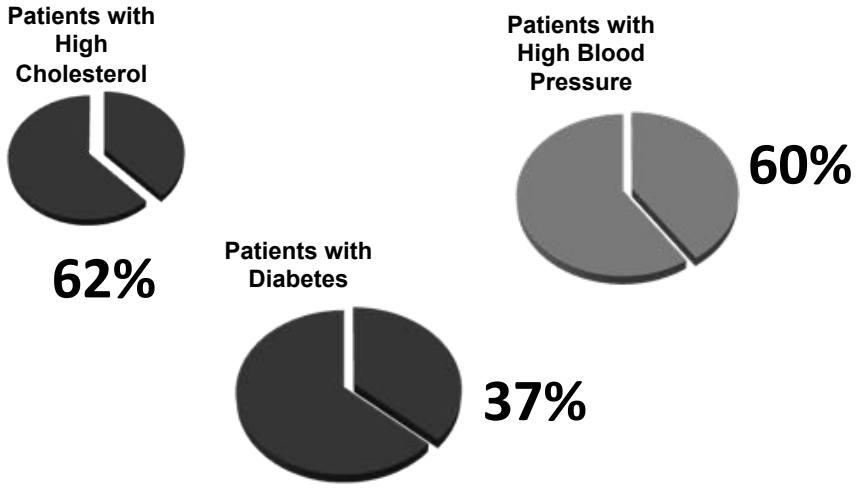


67

Minimally Invasive Devices

- Pacemakers

Activity
- avoid vigorous activity for the first few weeks
- no lifting >10 lbs
- no shoulder flexion or abduction >90° on pacemaker side
- No contact sports

Electromagnetic Interference
- Can use household appliances such as microwave ovens, TVs, radios, toasters, electric blankets

Cellphones and MP3 player headphones
- Do not hold on same side of the pacemaker
- No place in shirt pocket on side of pacemaker
- Hold 6" (15cm) away from pacemaker

Anti-theft systems
- Possible interference but unlikely to have a clinically significant effect if just passing through

Olshanky & Hayes, 2018

68

Minimally Invasive Devices

- Pacemakers

Airport Metal Detectors
- Possible interference due to exposure duration and distance between the security system and pacemaker, walk at normal pace
- Will trigger metal detectors, will need to have an identification card for the pacemaker

External Electrical Equipment
- Welding equipment or strong motor-generator systems can cause interference that can prevent pacing. Patients must stay at least 2ft from external electrical equipment, ensure that the equipment is grounded properly, leave immediately if they become lightheaded or symptoms develop

Olshanky & Hayes, 2018

69

Minimally Invasive Devices

- Leadless Pacemakers

Precautions
- Lie flat 4-6 hours postop
- No lifting more than 10lbs for 1-2 weeks postop
- Return to usual activity after clearance from doctor
- Able to household appliances and electrics
- Able to go though airport security
- Can go to MRI scanners

When to call a doctor
- Signs of heart failure
- Signs of wound infection
- Feel the same way prior to implant
- Pain around pacemaker
- Pacemaker feels loose
- Dizziness
- Hiccups that do not go away
- Fainting or passing out

Olshanky & Hayes, 2018

70

Minimally Invasive Devices

- Automatic Implantable cardioverter-defibrillator (AICD)

- Slowly progress and get back into routine, use energy conservation, rest as needed
- Wound care: coordinate dressing changes, when patient can take a shower or bath, lifting precautions (usually over 10lbs)
- Gently ease back to work, get MD clearance for driving, sex and intimacy
- ID with patient all the time
- Inform HCP about AICD
- Report blow to chest to the doctors
- Action plan for emergencies or when shock is delivered (no driving after shock, call MD ASAP)
- Inform airline security about ICD and show ID card
- No contact sports or activities that involve the chest

71

Mechanical Circulatory Support

- Short term
  - Hemodynamic support by performing the work of a failing left ventricle, right ventricle, or both
  - Intra-aortic balloon pump (IABP)
  - Non-IABP percutaneous mechanical circulatory assist devices
  - Extracorporeal membrane oxygenator pumps
  - Non-percutaneous centrifugal pumps (used during CABG)

Jeevanandam, Eisen, & Pinto, 2019

72

Mechanical Circulatory Support

- Intermediate and long term use
  - Assist and support circulation
  - Patients with decompensating advanced HF who do not improve or stabilize with optimal medical therapy
  - Use
    - Bridge to transplant
    - Bridge to recovery
    - Destination therapy (Birks, 2019)

73

Heartmate II and Heartware




74

Ventricular Assist Device: Home Care

- Incisional care
  - Dressing changes
  - Showering and bathing
- Protect chest from pressure or trauma, may need to accommodate for seatbelt
- Discuss return to work, sexuality and intimacy
- Will need medical ID
- Notify EMS, electric company, fire department, physician, police department, TSA

75

Ventricular Assist Device HeartMate II: Patient and Caregiver Training

- Device and parts (battery, alarm reset, display buttons)
- Switching to and from battery to power module
- Power module function and connections
- System controller change
- Exit site care
- Warnings and precautions
- Action plan during an emergency
- Identifies devices to bring when going outside the house
- Operation of universal battery charger

76

Ventricular Assist Device HeartMate II: Patient and Caregiver Training

- Controller alarms and alerts
  - Red heart alarm
  - Red battery alarm
  - Yellow diamond alarm
  - Power cable disconnect alarm
  - System controller fault alarm
  - Low speed operation
  - Driveline fault
  - System controller backup battery not installed

77

Ventricular Assist Device HeartMate II: Warnings and Precautions

- Do not play contact sports or jumping activities
- Do not swim or take a bath
- Do not try to repair any of the equipment by yourself
- Do not touch television, computer screen, vacuum
- Do not have MRI
- Sleep only when connected to the power module
- Inspect all connections prior to sleeping
- Power module should be plugged into 100v 3-pronged grounded outlet with no adapters or extension cords
- Wear anchor all the time, change anchor weekly or when soiled

78

Ventricular Assist Device HeartMate II: Things to Bring Outside

- Extra controller and controller battery
- 2 sets of extra batteries
- 2 extra battery clips
- Rain poncho
- Emergency phone number/ alarm guides
- Cellphone
- Discharge binder with medication list

79

Ventricular Assist Device HeartWare: Patient and Caregiver Training

- Device and parts (controller)
- Define pump speed, power, and flow
- Switching to and from power sources
- Function and connections to AC power
- Function and connections to battery power
- Controller alarms and alerts
- Controller change
- Driveline exit site care
- Warnings and precautions
- Action plan for emergencies
- Identifies devices to bring when going outside the house
- Operation of battery charger

80

Ventricular Assist Device HeartWare: Patient and Caregiver Training

- Controller alarms and alerts
  - High-critical priority: VAD stopped, critical battery, controller failed
  - Medium priority: controller fault, high watts, electrical fault, low flow, suction
  - Low priority alarms: low battery, power disconnect
  - More than 1 alarm: most severe alarm displayed first

81

Ventricular Assist Device HeartWare: Warnings and Precautions

- Do not play contact sports or jumping activities
- Do not swim or take a bath
- Do not try to repair any of the equipment by yourself
- Do not touch television, computer screen, vacuum
- Do not have MRI
- Sleep only when connected to the power module
- Inspect all connections prior to sleeping

82

Ventricular Assist Device HeartWare: Things to Bring Outside

- Extra controller
- 2 sets of extra batteries
- Rain poncho
- Emergency phone number/alarm guides
- Cellphone
- Discharge binder with medication list
- Cellphone 20 inches away from controller
- Keep magnetic closures away from defibrillator

83

VAD Rehabilitation Considerations

- Hemodynamic monitoring: MAP, RPE, subjective report/ symptoms
- Safety with drive-line: awareness, memory, spatial neglect, wound care if hemiplegic, care when with poor dexterity, amputee
- VAD equipment: can patient manipulate equipment? Can they see the equipment? Can they remember the steps to change to and from main power source to batteries?
- Use interval exercise training at onset of program
- Daily chlorohexidine (CHG) bath. NO showers initially.

84

Self-Management

What is it?

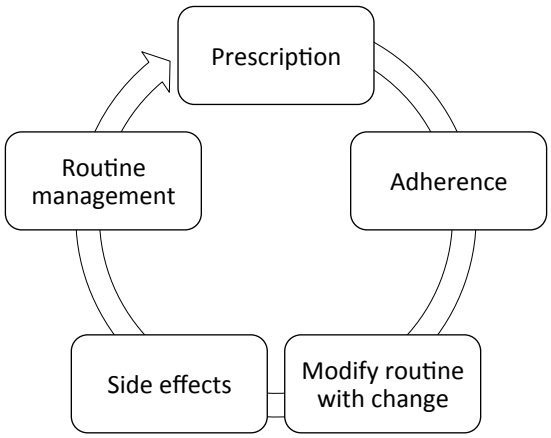
85

Self-Care Maintenance

- Medications
- Diet/Fluids
- Physical Activity

86

Medication Management



87

Medication Management

- Ability to read and understand medication labels
- Vision, dexterity
- Expiration date
- Adaptations?

88

Diet and Fluid Intake

- Ability to understand relationship between excess dietary sodium, increased edema, and impact on cardiac function
- Ability read nutrition label on foods
- Know amount of sodium and fluid recommended per day and how to calculate
- Identification of sodium sources in typical diet and how to reduce
- Low sodium: 140 milligrams or less

89

Physical Activity

- Knowledge of physical activity prescription
  - Intensity
  - Duration
  - Frequency
  - Location: Home vs. facility based
  - Type of activity
  - Method of monitoring exertion level

American Heart Association recommends 150 minutes of moderate aerobic activity or 70 minutes of vigorous aerobic activity

90

Physical Activity

- Increasing confidence in ability to participate in tasks
  - Biofeedback: show vitals, use Borg RPE or dyspnea scale if appropriate
  - Keep a log of activities to show improvement
  - Balance activities patient is confident doing and activities that they are not so sure they can do

91

Physical Activity

- Balance Rest and Activity
  - Emphasize that both are needed for optimal performance
- Energy Conservation Techniques: 4Ps
  - Planning and organizing daily routine and tasks
    - Keep items within reach and in the area you need them
    - Gather all items before starting a task
    - Do you need adaptive equipment or DME to perform task?
    - Divide and conquer
    - Plan ahead
    - Alternate heavy and light tasks

92

Physical Activity

- Energy Conservation Techniques: 4Ps
  - Prioritizing
    - Prioritize activities that are important for you
    - Simplify tasks
  - Positioning
    - Sit if possible
    - Minimize unnecessary movements: arm elevation, chicken wings (keep elbows close to body), support elbows on a surface
    - Minimize need to bend, reach, twist
    - Push vs pull
    - Carry items close to body

93

Physical Activity

- Energy Conservation Techniques: 4Ps
  - Pacing
    - Don't schedule too many things in one day
    - Allow enough time for each task
    - Rest 20 to 30 minutes after each meal
    - Rest before being tired
    - Get a good night sleep

94

Physical Activity

- Do ECT lecture with a **P**lanned activity
  - If cooking is the planned activity:
    - Ask patient how they plan to complete the activity
    - Ask if doing all the steps would make them tired, if yes, which steps should they prioritize doing for this session.
    - What positions should they use during the task? Equipment?
    - Observe how they pace themselves and give feedback

95

Self-Care Monitoring

- Daily Weights: easy to read numbers, big, same time, log book, greater than 2-3 pounds weight gain needs immediate action
- LE Edema Checks: daily checks, how far is the edema, how much
- Symptom Recognition
  - Activity tolerance
  - Breathing ability (ability to lie flat without pillows)
  - Lightheadedness/Dizziness

96

Barriers to Timely Care

- Unsure which doctor to contact (individuals often see several)
- May have few options besides ED (rural areas)
- May wait weeks to get appointment with doctor
- May be physically unable to get to doctor's office
- May be concerned about cost

97

Barriers to Timely Care

- Performed infrequently and inadequately performed by individuals with heart failure
- Fewer than 50% report weighing themselves daily
- Of those who do weigh themselves, few consider fluid weight gain to be a significant/ relevant problem

98

Reasons Symptoms are Not Recognized

- Lack or inconsistent symptom monitoring
- Lack of ability to interpret significance of symptoms
- Belief that symptoms are not severe
- Belief that symptoms are caused by medication side effects or another condition

99

Self-Care Management

- Respond to Symptoms
- Seek Needed Treatment

100

Action Plan

Congestive Heart Failure Zones for Management

Green Zone: All Clear	Green Zone Means
Your Goal Weight: • No shortness of breath • No swelling • No weight gain • No chest pain • No decrease in your ability to maintain your activity level	• Your symptoms are under control • Continue taking your medications as ordered • Continue daily weights • Follow low salt diet • Keep all physician appointments
Yellow Zone: Caution	**Yellow Zone Means:**
If you have any of the following signs and symptoms: • Weight gain of 2-3 or more pounds in 2 days • Increased cough • Increased swelling • Increase in shortness of breath with activity • Increase in the number of pillows needed • Anything else unusual that bothers you • **Call your physician if you are going into the YELLOW zone**	• Your symptoms may indicate that you need an adjustment of your medications • **Call your physician, nurse coordinator, or home health nurse.** Name:_____ Number:_____ Instructions:_____
Red Zone: Medical Alert	**Red Zone Means**
• Unrelieved shortness of breath: shortness of breath at rest • Unrelieved chest pain • Wheezing or chest tightness at rest • Need to sit in chair to sleep • Weight gain or loss of more than 5 pounds in 2 days • Confusion **Call your physician immediately if you are going into the RED zone**	This indicates that you need to be evaluated by a physician right away • **Call your physician right away** Physician_____ Number_____

https://innovations.ahrq.gov/qualitytools/red-yellow-green-congestive-heart-failure-chf-tool

101

Self-Care Management Barriers

- Inadequate patient education and skill development
- Low health literacy
  - Health care workers may underestimate/ not recognize
  - 5th grade reading level
- Inability to follow through with complex regimen for chronic condition (cognition, depression, coping, caregiver support)
- Overwhelmed with information from multiple providers
- Medication cost
- Medication side effects
- Multiple chronic co-morbidities with complex regimens: e.g., renal, diabetes

102

Ability to Perform Self-Management

- Understand the patient's abilities
- Assessment and collaboration by all members of the healthcare team
- Cognition
- Health Literacy
- Vision/Perception
- Mobility
- Behavior and readiness to change
- Psychological status and coping
- Caregiver support

103

Barriers for Healthcare Professionals

- Lack of knowledge and preparation to recognize patients' individual needs
- Difficulty providing appropriate education
- Over-estimation of patient ability. Under-estimation of the complexity of the regimen on a daily basis for patients
- Lack of reimbursement from third party payers for education/ counseling services
- Need for coordination/communication with other multiple providers

104

Patient Education: Heart Failure Society of America Guidelines

- Heart failure education should occur at all points along the healthcare continuum Acute Care to Outpatient settings
- Education should be specific to an individual's literacy level/ abilities and encompass post teaching assessment to ascertain patient understanding

105

Patient Education for Effective Self-Care Skills

Knowledge Base:
"Teach back"
Specific questions about material
Limit teaching points to 3-4 per session
Repeat, repeat, repeat! At all visits

Skills:
Experiential learning: Self-medication program while in hospital
Role play: Have patient problem solve what to do in a situation
Use groups to facilitate learning

106

Case Study

Mrs. KJ is a 73 year old female with pAfib on Eliquis, hypertrophic obstructive cardiomyopathy, DMII, CAD with 70% calcified LAD, EF of 25%.

MD orders: heart healthy diet

Nursing education: smaller portion size, eat more vegetables, limit unhealthy fats, low sodium diet

Thank You!

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109

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Thank You!

110

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113

Questions?

- Camille.Magsombol@nyulangone.org

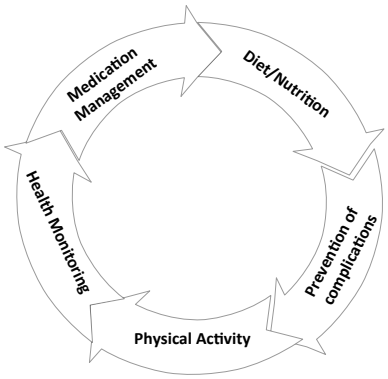
114

Cardiac Rehabilitation

What is it?

115

Heart Failure



116

Outcomes

1. Blood pressure control
2. Diet modification and weight control
3. Improved activity tolerance
4. Lipid management
5. Smoking cessation
6. Symptom control
7. Psychological well-being/stress management
8. Return to work
9. Maximizing medical treatment of comorbidities

117

Phases of Cardiac Rehab

1A and 1B	• Hospital • Early mobility • Improve ADL/IADL	• Exercise prescription with RPE goals • Improve VS response to activity	• Patient education • EKG and lab value monitoring
2	• Outpatient • Gym: stretch, strength, balance	• VS monitored • 36 sessions, 2-3x/week • Ed: risk factor modification	• Lifestyle modification: smoking, glucose, blood pressure, physical activity
3	• Maintenance, wellness, prevention	• Minimal monitoring, no telemetry • VS PRN	
4	• Community • Independent with exercise	• Implements lifestyle changes and dietary modification independently	• Monitors VS

118