CMPE 80A: Universal Access: Disability, Technology, and Society

Older Adults

- People live longer now than ever before
- By 2030, 20% of the US population will be 65 and older
- Significant challenge to medicine - ethical, financial, etc.

Significance of Human Aging

- Gender is a significant factor
- Lifestyle a primary factor
- Various theories of aging attempt to explain the process - bottom line, there is disruption of homeostasis

Stages of Life

- Chronological age typically used to note life's transitions

<table>
<thead>
<tr>
<th>Stage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal life</td>
<td>Fertilization through week 1</td>
</tr>
<tr>
<td>Infant</td>
<td>Weeks 2-8</td>
</tr>
<tr>
<td>Toddler</td>
<td>Months 9-12</td>
</tr>
<tr>
<td>Childhood</td>
<td>Months 1-6</td>
</tr>
<tr>
<td>Early Adulthood</td>
<td>Years 7-12</td>
</tr>
<tr>
<td>Middle Age</td>
<td>Prepubertal, infancy 9-12; early 13-16</td>
</tr>
<tr>
<td>Late Adulthood</td>
<td>Puberty 13-16; maturation 16-25</td>
</tr>
<tr>
<td>Adulthood</td>
<td>Between 20 and 65 years</td>
</tr>
<tr>
<td>Senescence</td>
<td>From 65 years on</td>
</tr>
<tr>
<td>Death</td>
<td></td>
</tr>
</tbody>
</table>

Significance of Human Aging

- What is “normal” in the aging process - primary aging
- More susceptibility to disease - secondary aging
- More heterogeneity in older adults population
- Onset indeterminable and progression varied
- Genetic and environmental factors

Stages of Life

- Adulthood is attainment of physiologically optimal integrated function
- Function in adulthood is the standard measure
- Unsound and incorrect to state that changes with aging are necessarily “abnormal”
- Three observations of older adults:
  - Greater heterogeneity in responses
  - Changes in function do not occur simultaneously
  - Changes in function do not occur to the same degree
- Old age should not be viewed as a “disease” nor should a time clock be put on aging
Human Longevity
► Significant increase in longevity over past centuries
► Due to decline in deaths resulting from infectious disease along with improved public health
► Heart disease, cancer and stroke now most common cause of death
► Death rates have actually declined in older adults
► Is there a limit to human life span and should we prolong life at the expense of overall health?
► We should be talking in the context of “health span” not life span

Successful Aging
► Chronologic age ≠ physiologic age due to complex interactions of genetics and environment
► Prevalence of disease increases with age
► Proposed pathways of aging:
  ▪ Aging with disease and disability
  ▪ Usual aging; absence of pathology but presence of decline in function
  ▪ Healthy aging; no pathology or functional loss
► Pathway goals:
  ▪ De-emphasize aging characterized by decline
  ▪ Emphasize heterogeneity among elderly
  ▪ Underscore positive pathway of aging
  ▪ Highlights possible avoidance of disease associated with aging

Successful Aging
► Older adults with weak muscles are at greater risk for mortality than age-matched individuals
► Increase in amount and rate of loss of muscle increases risk of premature death
► Physical inactivity is 3rd leading cause of death in US and plays role in chronic illnesses of aging

Aging and Disease
► Aging is associated with increase in incidence and severity of disease
► Factors predispose individuals to functional losses later in life

Sensory Impairments
► Vision
  ▪ Presbyopia and shrinkage of the visual field
  ▪ Decreased sensitivity to glare
  ▪ Pupil reduces in size and yellowing of lens → lower levels of light reaching the retina (requiring higher contrast)
  ▪ Reduced colour perception (especially on blue-green range) and spatial perception (difficulty reading maps).
► Hearing
  ▪ Decline in sensitivity to high frequencies (presbyacusis)
► Motor
  ▪ Reduced grip strength and flexibility (can’t open jars)
  ▪ Slower reaction time

Aging and exercises

TABLE 3.6
Physiologic Parameters in Aging, Physical Inactivity and Weightlessness (In Space)

<table>
<thead>
<tr>
<th>Reduced</th>
<th>Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum oxygen consumption (VO2 max)</td>
<td>Symptomatic hypotension and peripheral resistance</td>
</tr>
<tr>
<td>Resting and maximum cardiac output</td>
<td>Venous leak syndrome</td>
</tr>
<tr>
<td>Stroke volume</td>
<td>Uterine fibroids and leiomyomas</td>
</tr>
<tr>
<td>Sense of balance</td>
<td>Uterine fibroids</td>
</tr>
<tr>
<td>Body water and sodium</td>
<td>Body mass index</td>
</tr>
<tr>
<td>Blood cell mass</td>
<td>Lean body mass</td>
</tr>
<tr>
<td>Lean body mass</td>
<td>Glucose tolerance test</td>
</tr>
<tr>
<td>Glucose tolerance test</td>
<td>Sympathetic activity and sympathetic tone</td>
</tr>
<tr>
<td>Sympathetic activity and sympathetic tone</td>
<td>Adaptability stress</td>
</tr>
<tr>
<td>Thermoregulation</td>
<td>Altered sleep</td>
</tr>
<tr>
<td>Altered sleep</td>
<td>Changes in specific senses</td>
</tr>
</tbody>
</table>
Cognitive Impairments

► Attention
  - More easily distracted by irrelevant material
  - Less ability to devote attention to multiple things.
► Memory
  - Story memory is impaired while semantic memory remains relatively intact
  - Language comprehension remains intact longer
  - Forgetting
  - Slower processing

Entrances

► Handrails both sides
► 5x5 standing space
► Resting chair
► Lighting
► Place to set things
► No-step entry
► Large stairs vs ramps

Doors and Keys

► Digital
► Large print
► Large print ring
► “talking”
► Automatic

Living areas - thermostats

► Digital

Mobility

Lighting

Touch on Automatic by timer or motion detector

► Entryways
► Garage
► Hallways
► Bathrooms
► Closets
Lifting and transfers

► Safety of person and caregiver
► Conserve energy of person and caregiver
► Keep independent as possible, for as long as possible

Patient Transfer Pivot Disk

Bathing
Grab bars

Toilets

Medication

Health monitors

- Thermometers
- Blood pressure
- Blood glucose
- Weight
- Digital
- Large print
- “talking”
Chores

Transportation

- Driver
- Passenger
- Transfer