Psychosocial Influences on Chronic Diseases and Aging

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What is Healthy Aging?

Two key components:

**Longevity**: Living longer

**Compression of morbidity**:
- Avoiding sequelae of chronic diseases
- Preserving independence, and quality of life
  - Avoiding physical disability
  - Minimizing cognitive decline
Age-adjusted Death Rates by Sex (1950-2007)

Source: National Vital Statistics, various reports
Age-specific death rates per 100,000. Standardized by age distribution of U.S. population in 2000
Trends in CV Risk Factor Count: NHANES

- Women
- Men

- 60-69y
- 40-49y

Percentage of people age 65 and over with moderate or severe memory impairment, by age group and sex, 2002

Note: The definition of "moderate or severe memory impairment" is four or fewer words recalled (out of 20) on combined immediate and delayed recall tests among self-respondents. Self-respondents who refused either the immediate or delayed word recall test were excluded from the analysis. Proxy respondents with an overall memory rating of "poor" were included as having moderate or severe memory impairment. Because of some changes in methods from the 2000 edition of Older Americans, no inference should be made about longitudinal trends.

Reference population: These data refer to the civilian noninstitutionalized population.

Source: Health and Retirement Study.
Disability Trends: NHANES

ADL disability

IADL disability

Mobility limitations

Functional limitations

Seeman, Merkin, Crimmins, & Karlamangla, AJPH 2010
Psychosocial Factors / Stressors

- Social status; financial stresses
- Daily stresses: job strain, inter-personal
- Discrimination
- Psychological ill-health
Stress Response System

Catecholamines
- Adrenalin (epinephrine)
- Noradrenalin (norepinephrine)

Glucocorticoids
- Cortisol
- Blood glucose
- Lipids (cholesterol)
- Fat deposition

Cardiovascular
- Blood pressure
- Heart rate

Inflammation (?)
- C reactive protein
Psychosocial Stress: Good or Bad?

The Good: Promotes adaptive response and improves efficiency in the face of a threat.

The Bad: Heightened ‘tension’ which ultimately results in deleterious health outcomes.
Price paid for chronic stress

Allostatic Load: Dysregulation of stress hormones

E.g.: Altered resting levels
     Altered reactivity
     Sluggish return to resting level

McEwen and Stellar 1993
Dysregulated Stress Biology

Chronically stressed

Good response to challenge

Biomarker Level

Challenge

Time
Childhood Poverty and Stress Hormones

Overnight hormone levels in rural dwelling 8 to 10 yr. olds:

** $p < .01$ Evans & English, 2002
Education level and Catecholamines
Young Adults, CARDIA

**Epinephrine**

- HS or less: 4.50 ug/g creat.
- College: 4.50 ug/g creat.
- Graduate work: 3.50 ug/g creat.

**Norepinephrine**

- HS or less: 38.00 ug/g creat.
- College: 34.00 ug/g creat.
- Graduate work: 32.00 ug/g creat.
Caregiving and Cortisol

• Caregiving of older disabled adults and of disabled children are known stressors

• Older adult caregivers have higher levels of cortisol in their saliva than non-caregivers
  – Vedhara et al., 1999

• Parents of children with cancer have flatter cortisol rhythms (blunted peaks, higher nadirs)
  – Miller et al., 2002
SES and Immunity to the Cold Virus

![Graph showing the percentage of infected people across different community ladder quintiles.]

- People

<table>
<thead>
<tr>
<th>Community Ladder (Quintiles)</th>
<th>% Infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (low)</td>
<td>(n=21)</td>
</tr>
<tr>
<td>2</td>
<td>(n=30)</td>
</tr>
<tr>
<td>3</td>
<td>(n=19)</td>
</tr>
<tr>
<td>4</td>
<td>(n=23)</td>
</tr>
<tr>
<td>5 (high)</td>
<td>(n=13)</td>
</tr>
</tbody>
</table>
Psychosocial Influences on Chronic Diseases

Psychosocial factors (both *individual* and *neighborhood*) have been implicated in the development and progression of

- Depression
- Diabetes and Pre-diabetes (metabolic syndrome)
- Cardiovascular disease (heart attacks, strokes)
- Osteoporosis
Stressors and Depression

Cutrona C E et al. J. Abnormal Psych 2005
Neighborhood Influences on Depression

- Residents in *low SES neighborhoods* are twice as likely to develop depression as residents of *high SES areas*
  - Galea et al. 2007

- People who live in neighborhoods with *less residential stability* endorse more depressive symptoms
Pathways from neighborhood characteristics to depression.

Neighborhood Characteristics

- Level of Daily Stress
- Vulnerability to Negative Events
- Disrupted Social Ties

Depression

Cutrona C E et al. Current Directions in Psychological Science 2006;15:188-192
Fig 1b. SES Differences in Metabolic Risk in the United States, 2001-2006

Percentage

Metabolic Syndrome or Diabetes

Diabetes

Low SES
Middle SES
High SES
Parents’ Education and Young Adult CV Risk

Black Men* | White Men** | Black Women** | White Women**


2.39 | 2.15 2.09 1.91 | 2.73 | 2.41 2.62 2.24 | 1.64 | 1.31 1.44 1.28 | 1.38 | 1.07 0.89 0.77

Parents' Education and Young Adult CV Risk
SES Life Profiles and Osteoporosis

Low bone density is the hallmark of osteoporosis, and the major risk factor for hip and spine fractures in older ages.

<table>
<thead>
<tr>
<th>SES</th>
<th>Bone density in the spine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childhood Advantage Score</td>
<td>.011*</td>
</tr>
<tr>
<td>College Education</td>
<td>.047*</td>
</tr>
<tr>
<td>Adult Financial Adv Score</td>
<td>.001</td>
</tr>
</tbody>
</table>
Maternal Nurturance as Buffer

Miller, Lachman, Chen, Gruenewald, Karlamangla, & Seeman. Psych Sci. In press
Those who are able to delay physical decline have:

- High levels of emotional support
- High perception of usefulness
- High levels of self efficacy belief
  (i.e., in ability to manage life situations, finances)

MacArthur Successful Aging Study
Social support and physical decline

Odds Ratio for Physical Decline
(High vs. low emotional support)

Population age 65 and over living alone, by age group and sex, selected years 1970-2003

Percent

Women 75 and over

Women 65–74

Men 75 and over

Men 65–74

Reference population: These data refer to the civilian noninstitutionalized population.
Perceived Usefulness and Physical Disability

Odds Ratios for Incident Disability
(Reference group: Never/rarely feel useful)

- Gruenewald, Karlamangla et al. J Gerontol. 2007
Psychosocial Influences on Cognitive Aging

Those who are able to slow cognitive decline have
- High level of emotional support
- Large social network
- Strong self efficacy belief
- Few depressive symptoms

MacArthur Successful Aging Study
Depression and Cognitive Decline

Mean 7-year Change in Summary Cognitive Score

Quartiles of baseline depressive symptoms score

Chodosh, Kado, Karlamangla Amer J Ger Psych. 2007
Depressive Symptoms During the Menopause Transition and Processing Speed

Testing Occasions

SDMT Score (0-110)

0 1 2 3 4

Non-depressed
Depressed
Anxiety Symptoms during the Menopause Transition and Learning

Immediate Recall Score (0-12)

Testing Occasions

- Non-anxious
- Anxious
Summary

Psychosocial stressors influence biology, chronic diseases, and how well we age

Social support and good lifestyle choices can offset the health effects of stressors