Epidemiology of Psychiatric Disorders in the Elderly

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Brown University

Review in Geriatric Psychiatry: Preparation for Subspecialty Examinations
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Disclosures

- **Speakers bureau**
  - Eisai
  - Forest Pharmaceuticals
  - Pfizer

- **Grants**
  - Health Resources and Services Administration (HRSA)
  - National Institute of Aging (NIA)
  - NARSAD
  - Pan American Health Organization (PAHO/WHO)
Pre-Test
Question 1.

Which of the following is FALSE about the demographics of the aging population in the USA

- A. By 2030 the population is expected to double
- B. Less than 5% of the elderly reside in nursing homes
- C. More elderly males than females live alone
- D. Slightly more than 12.0% of the population is over the age of 65
- E. The percentage of individuals living alone decreases with increasing age
Question 2.

Which of the following is FALSE about major depression in the elderly

- A. Depression is under diagnosed in nursing homes
- B. Elderly persons have the highest rates
- C. Late onset depression has more vascular risk factors
- D. Rates in nursing homes are higher than in the community
- E. There are no predictors for recovery or relapse for the elderly
Question 3.

Which of the following is FALSE about anxiety disorders among elderly community respondents

- A. Elderly persons have a worse outcome and more symptoms than younger individuals
- B. Generalized anxiety disorder is the most prevalent of the anxiety disorders
- C. Incident cases of obsessive compulsive disorder after the age of 50 is rare
- D. Somatic disorders and anxiety disorders are highly comorbid
- E. There is a high comorbidity between major depression and the anxiety disorders
Which of the following is FALSE about late onset schizophrenia

- A. Does not necessarily progress to dementia
- B. More than 6% of all schizophrenia cases occur after the age of 45
- C. Positive symptoms respond to treatment better in older patients
- D. Structural abnormalities that are present in early onset schizophrenia are not seen
- E. The prevalence is higher in females than males
Question 5.

Which of the following is FALSE about the epidemiology of dementias

- A. Alzheimer’s disease accounts for 2/3 of all dementias
- B. APO-ε4 is a susceptibility marker for only early onset Alzheimer’s disease
- C. Education may be a protective factor for Alzheimer’s disease
- D. Less than 10% of individuals over age 65 have dementia
- E. The prevalence of dementia in a study may vary by the instruments used to measure the disorder
Demographics of the Aging Population
Percent Elderly by Age in U.S.: 2000 to 2030

- 65+ Age Group
- 75+ Age Group
- 85+ Age Group

<table>
<thead>
<tr>
<th>Year</th>
<th>65+</th>
<th>75+</th>
<th>85+</th>
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<tr>
<td>2030</td>
<td>19.3</td>
<td>8.9</td>
<td>2.3</td>
</tr>
</tbody>
</table>
Projections of the United States Population Aged 85 and Over (in Millions)

U.S. Census Bureau projections
Percent of Elderly Living Alone the United States by Available Age Groups

- Male
- Female

- 65-74: 14 males, 32 females
- 75-84: 20 males, 51 females
- 85+: 36 males, 61 females
Census notes: Females compromise 70% nursing population; 3 in 4 residents are 75 or older; median age 83.2; more likely to be white compared to the total population 84% vs 75%, equally black 13%, and less likely to be Hispanic 4% vs. 15%
Epidemiology of Affective Disorders in the Elderly
Is Depression More Prevalent in Old Age

“Old people are physically fragile. Socially they are outcasts, and this has serious effects upon their mental state. Both their existential situation and their sexual state are favourable to the development of neuroses and psychoses.”

De Beauvoir S: Old Age, 1977
Common Symptoms in the Elderly

- Depressed or sad mood
- Loss of interest or apathy
- Loss of appetite or weight
- Not sleeping
- Anxiety
- Somatization or physical complaints
- Suicidal or not care if lives
Symptoms in the Elderly versus Younger Patients

- Little evidence to suggest that there are major symptom differences in presentation
  - Not a reference to late-onset major depression
  - ECA study
    - Elderly report less suicidal ideations
    - Elderly report more weight loss
Prevalence of Major Depressive Episode I.

- **ECA Study**
  - Conducted in the 1980’s
  - Diagnostic Interview Schedule (DIS)
  - Diagnostic Criteria - DSM-III
  - Conducted in 5 Catchment Areas in USA
  - 18+ N = 19,182
  - 65+ N = 5,723

Robins & Regier, 1991
<table>
<thead>
<tr>
<th></th>
<th>Major Depression</th>
<th>Dysthymia</th>
<th>Manic Episode</th>
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<td><strong>12-Month</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65+</td>
<td>1.4</td>
<td>2.0</td>
<td>1.7</td>
</tr>
<tr>
<td>18+</td>
<td>3.7</td>
<td>6.3</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Lifetime</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65+</td>
<td>2.0</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>18+</td>
<td>6.3</td>
<td></td>
<td>0.6</td>
</tr>
</tbody>
</table>
Prevalence of Major Depressive Episode II.

- Cache County Study, Utah
  - Conducted in the 1990s
  - Diagnostic Interview Schedule (DIS)
  - Diagnostic Criteria DSM-IV
  - 65+ N = 4,559

Steffens et al. 2000
### Cache County DSM-IV (%)

<table>
<thead>
<tr>
<th></th>
<th>Major Depression</th>
<th>Dysthymia</th>
</tr>
</thead>
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<tr>
<td></td>
<td>Current</td>
<td>Lifetime</td>
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<tr>
<td>Total</td>
<td>3.7</td>
<td>15.8</td>
</tr>
<tr>
<td>Female</td>
<td>4.4</td>
<td>20.4</td>
</tr>
<tr>
<td>Male</td>
<td>2.7</td>
<td>9.6</td>
</tr>
</tbody>
</table>
Prevalence of Major Depressive Episode III.

NCS-R

- Conducted 2000
- Composite International Diagnostic Interview (CIDI)
- DSM-IV
- 48 States in USA
- 18+ N = 9,090
- 65+ N = 1,461

Kessler et al. 2003
# NCS-R DSM-IV

## 12-Month Prevalence (%)

<table>
<thead>
<tr>
<th></th>
<th>18 - 44</th>
<th>45 - 64</th>
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<th>65 - 74</th>
<th>75+</th>
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</thead>
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<tr>
<td>Major Depression</td>
<td>8.2</td>
<td>6.5</td>
<td>2.3</td>
<td>3.1</td>
<td>1.3</td>
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<tr>
<td>Dysthymia</td>
<td>1.5</td>
<td>1.9</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
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<tr>
<td>Bipolar I &amp; II</td>
<td>1.9</td>
<td>1.2</td>
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<td>0.4</td>
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</tr>
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Gum, King-Kallimanis, Kohn (submitted)
### NCS-R DSM-IV

#### Lifetime Prevalence (%)

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<tr>
<td>Major Depression</td>
<td>17.4</td>
<td>19.0</td>
<td>9.3</td>
<td>11.7</td>
<td>6.1</td>
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<td>3.9</td>
<td>5.5</td>
<td>1.8</td>
<td>2.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Bipolar I &amp; Bipolar II</td>
<td>2.7</td>
<td>1.8</td>
<td>0.4</td>
<td>0.4</td>
<td>0.5</td>
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Gum, King-Kallimanis, Kohn (submitted)
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<th>Condition</th>
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</thead>
<tbody>
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<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td><strong>Major Depression</strong></td>
<td>3.4</td>
<td>0.9</td>
<td>4.5</td>
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<td><strong>Dysthymia</strong></td>
<td>0.9</td>
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<td>0.9</td>
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<tr>
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Why Rates in Elderly are Low I.

- Older persons may have greater difficulty remembering past symptoms
- They may be less psychologically oriented
- Persons with past episodes of affective disorders may be less likely to live to old age
- There may be a real increase risk of depression in younger generations - a cohort effect.
- Failure to obtain a proper sample from nursing homes and the nature of the interview schedule would tend to diagnose individuals with somatic complaints as not having a depressive disorder.
Why Rates in Elderly are Low II.

- Mortality rates are higher among those with major depression. They die before reaching old age.
- Depression presents differently in old age. DSM-IV-TR criteria for major depression are not fulfilled even in cases of severe mood disturbance.
Do the Elderly Need Different Criteria?

<table>
<thead>
<tr>
<th>Diagnostic Criteria</th>
<th>Prevalence</th>
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<tr>
<td>Major Depression</td>
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<tr>
<td>AGECAT</td>
<td>11.4%</td>
</tr>
<tr>
<td>DSM-IV</td>
<td>4.5%</td>
</tr>
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</table>

Newman et al. 1998; Edmonton, Canada 65+
Major Depression versus Other Diagnoses

- Major depression is not even the most common psychiatric disorder among the elderly.
  - Cognitive impairment is more common problems.
  - Some studies have suggested phobias are also more common but not the NCS-R

- However, this is not to de-emphasize the devastation that this treatable disorder depression creates in elderly individuals.
Depressive Symptoms are Very Common

- A history of dysphoric or depressed mood is very common among the elderly.
  - A quarter of elderly individuals in the community report having had a dysphoric mood.
  - The next most common symptoms of depression found in the elderly are thoughts of death followed by sleep and appetite changes.
Other Causes of Dysphoric Mood

In the elderly with a dysphoric mood other diagnoses need to be entertained.

- Dysthymic disorder, bereavement, adjustment disorder with depressed mood, organic affective and mental disorders, paranoid disorders, sleep disorders, and hypochondriasis.

A number of medical problems can also present with depressive symptoms

- hypothyroidism, cancer, cardiovascular disease, hypertension, stroke, chronic pain syndromes, and Parkinson's disease.
Rates in Clinical Settings

Although the rates of depression in the community are lower for the elderly compared to other age groups in the clinical settings in which we work, this is not the case.

- The rate in primary care clinics is estimated to be 5%
- In nursing homes 15 to 25%
  - 13% will develop a new episode in one year
  - 18% will develop new depressive symptoms
- In acute care hospitals 12%
One-year prevalence rates; Adapted from Weissman et al., 1991
Differences in Older versus Younger Individuals with Depression

- Elderly more likely to endorse
  - Somatic items
- Elderly less likely to endorse
  - Cognitive items
  - Suicide items

Data is from NESARC study that included 1808 adults over age 65 and 3734 adults between ages 18-34

Balsis & Cully, 2008
For the elderly actual and perceived losses are frequent stressors.

Stressors associated with late life include: physical illness, surgery, limited mobility, sensory deprivation from deafness or blindness, retirement, economic deprivation, poor living conditions, social isolation, loss of spouse and rejection by children.
It also has been hypothesized that the elderly may have specific physiologic changes that place them at particular risk.

- Aging may result in reduction of acetylcholine, dopamine and norepinephrine.
- The amount of the enzyme monoamine oxidase (MAO) increases with age.
Risk Factors for Major Depression III.

- Neuroendocrine changes also occur with aging.
  - Both in normal and in depressed elderly individuals there are changes in the hypothalamic-pituitary-adrenal axis with increased cortisol levels being found and an increased nonsuppression in the dexamethasone suppression test.

- A prior history of depression places one at a substantial risk
  - 40% of those with a previous episode will have a reoccurrence.
Another risk factor for depression in the elderly are structural changes in the brain's subcortical structures.

- Patchy, deep white matter lesions known as leukoencephalopathy are seen at higher rates in depressed elderly individuals.
Risk Factors for Major Depression V.

- Vascular Depression Hypothesis
  - Related to cardiovascular risk factors
  - Clinical presentation
    - Reduced depressive ideation
    - Greater psychomotor disturbance
    - Apathy
    - Executive dysfunction on neuropsychological testing
    - Neuroimaging abnormalities in the basal ganglia and white matter
Risk Factors for Major Depression VI.

- Genetic contributions or familial risk as in younger patients is a potential risk factor, however this may not be as important in the elderly.
- Recent report suggests that low cholesterol, LDL
- Commonly prescribed medications can also and other drugs can lead to depression.
  - Alcohol, analgesics, antihypertensive medications, antibacterials, antiparkinsonian drugs, cancer treatments, cardiovascular medications, estrogens, hypoglycemic agents, progestational agents, sedatives and steroids.
Risk Factors for Major Depression VII.

- Medical conditions frequently associated with depression
  - Stroke (Left frontal) – men but not women
  - Alzheimer’s Disease
  - Parkinson’s Disease
  - Other neurodegenerative disorders
  - Cancer
  - Cardiac disease
  - Endocrine disorders
  - End organ failure
  - Vitamin B12 deficiency
  - Fibromyalgia
  - Chronic fatigue syndrome
  - Irritable bowel syndrome
  - Chronic pain
  - Sleep disturbance
Risk Factors for Major Depression VIII.

- Risk factors more often seen in Early versus Late onset depression
  - Personality abnormalities
  - Positive family history
  - Family dysfunction
  - More guilt
  - Less anxiety, apathy, hypochondriasis, apathy, loss of interest, cognitive impairment, and psychosis

- Most elderly with major depression have Early onset disorder
Risk Factors for Major Depression IX.

The most important risk factors for depression in the elderly

- being female
- lack of satisfaction with life
- feelings of loneliness
- bereavement in the last six months
- smoking
Risk of Non-detection

- Nondetection of major depression in the elderly carries significant consequences.
  - increased risk of nursing home placement
  - increased burden on care takers
  - increased visits to physicians
  - increased risk for physical disability
  - Some investigators argue that it may cause an increased risk of mortality
    - others have rejected this; but a recent meta-analysis confirms this finding
Rate of Non-detection

- Nursing home staff recognize depression in only 37% - 45% of patients
- PCPs fail to diagnose over half
  - Less than half identified are treated
Course of Major Depression in the Elderly I.

- Median time for recovery
  - Similar for the two groups
    - 22.8 weeks elderly group
    - 24.8 weeks younger group
  - No Clinical Predictors for Elderly

- Other studies suggest that comorbid dysthymia has a poorer outcome

Mueller et al. 2004; Hybels et al. 2008
Course of Major Depression in the Elderly II.

- Median time to first recurrence
  - Elderly developed recurrence sooner
    - 78.8 weeks elderly group
    - 136.5 weeks younger group
  - No Clinical Predictors for Elderly

Mueller et al. 2004
Prevalence of Panic Episode

■ ECA Study

■ Lifetime Prevalence 65+: 0.4%
  ■ Total population 1.6% (> 18 years old)

■ One-Year Prevalence 65+: 0.2%
  ■ Total population 0.9% (> 18 years old)

Robins & Regier, 1991
Characteristics of Panic Disorders in the Elderly

Patients with Panic Disorder: Young (< age 60) versus Older (≥ age 60)

- Younger patients had
  - More severe depressive symptoms
  - Greater number of panic symptoms
  - More severe anxiety symptoms
  - More severe panic attacks

- Older patients had
  - Better global functioning

Sheikh et al, 2004
## NCS-R DSM-IV 12-Month Prevalence (%)

<table>
<thead>
<tr>
<th></th>
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<th>65+</th>
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</thead>
<tbody>
<tr>
<td>Panic</td>
<td>3.2</td>
<td>2.8</td>
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<td>0.9</td>
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<td>Agoraphobia</td>
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<td>0.4</td>
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<td>0.2</td>
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<tr>
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<td>4.7</td>
<td>4.9</td>
<td>4.5</td>
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<tr>
<td>Social phobia</td>
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<td>6.1</td>
<td>2.3</td>
<td>3.1</td>
<td>1.3</td>
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<tr>
<td>GAD</td>
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<td>1.2</td>
<td>1.4</td>
<td>1.0</td>
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<tr>
<td>PTSD</td>
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<td>5.1</td>
<td>0.4</td>
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Gum, King-Kallimanis, Kohn (submitted)
# NCS-R DSM-IV Lifetime Prevalence (%)

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<tr>
<td>Specific phobia</td>
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<tr>
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Gum, King-Kallimanis, Kohn (submitted)
## NCS-R DSM-IV
### 12-Month Prevalence (%)

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<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Panic</td>
<td>1.3</td>
<td>0</td>
<td>1.1</td>
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<tr>
<td>Agoraphobia</td>
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Gum, King-Kallimanis, Kohn (submitted)
LASA Study

- 3107 random community sample age 55-85
- Diagnosis made by DIS
- Two stage design
  - Screen CES-D
  - HADS-A (Hospital Anxiety and Depression Scale)

Beekman et al. 1998
LASA Prevalence Rates

- 10.2% Overall prevalence of anxiety disorders
- 7.3% Generalized Anxiety
- 3.1% Phobic Disorders
- 1.0% Panic Disorder
- 0.6% OCD
LASA Stress Related Risk Factors for Anxiety

**Related**
- Recent life events
  - Weak association
- Suffering functional limitations (GAD, Phobic)
  - Most consistent association with anxiety
- Chronic physical illness
- Subjective health (GAD, Phobic, Panic)

**Unrelated**
- Cognitive decline
- Partner loss
LASA Vulnerability Factors for Anxiety

**Related**
- Female sex (GAD, Phobic)
- Low level education (GAD, Phobic)
- External locus of control (GAD, Phobic, Panic)
- Family history (OCD)
- WWII events (GAD, Phobic, Panic)

**Unrelated**
- Not married (Phobic yes)
- Events early in life (Panic yes)
- Living in urban center
LASA Network Related Anxiety Factors

- Related
  - Smaller contact networks (Phobic)
  - Loneliness (GAD, Phobic, Panic, OCD)

- Unrelated
  - Receives less instrumental support
  - Provided less instrumental support
  - Receives less emotional support (Phobic, yes)
  - Provided less emotional support (Phobic, yes)
LASA Comorbidity

- Those with MDD 36% have an Anxiety Disorder
- Those with Anxiety Disorder 13% have MDD
- Comorbid cases have greater severity of illness
- Comorbid anxiety is associated with somatic diseases
  - Diseases joint, heart, incontinence, lung, atherosclerosis, stroke
Prevalence of Obsessive Compulsive Disorder

ECA Study

- Lifetime Prevalence 65+: 1.2%
  - Total population 2.6% (> 18 years old)
- One-Year Prevalence 65+: 0.9%
  - Total population 1.7% (> 18 years old)

Robins & Regier, 1991
Presentation of OCD in the Elderly

- Mean age of onset in the elderly 33.6 years
- 1.7% had onset after age 50

Clinical Features of Obsessive-Compulsive Disorder in Elderly Patients

Robert Kohn, M.D., Robert J. Westlake, M.D., Steven A. Rasmussen, M.D., Richard T. Marsland, R.N., William H. Norman, Ph.D.

There has been no systematic study of the clinical features of obsessive-compulsive disorder (OCD) in elderly patients. This study describes the symptoms and characteristics of OCD among 32 outpatients age 60 or older and 601 younger patients meeting DSM-III-R criteria and given the Yale-Brown Obsessive-Compulsive Scale (YBOCS), NIMH scale, and a 41-item symptom questionnaire. Elderly patients had a later age at onset compared with younger patients. No differences were found in severity of symptoms on the YBOCS. Elderly patients had fewer concerns about symmetry, need to know, and counting rituals. Handwashing and fear of having sinned were more common. There were few differences in clinical features of OCD among the elderly patients compared with younger OCD patients. (Am J Geriatr Psychiatry 1997; 5:211-215)

Kohn et al. 1997
Characteristics of OCD In the Elderly

- First contact for treatment is later in the elderly
  - Age 42.8 vs. 25.0
- Older patients seem to have a more deteriorating course
  - Fewer periods of waxing and waning or remission
- Severity based on YBOCS is similar to younger patients
- 41.2% comorbidity with other Axis I disorders
Symptom Presentation of OCD

- **Older patients greater**
  - Fears of having sinned
  - Hand washing rituals

- **Older patients have less**
  - Obsessions of symmetry
  - Concerns about paper work
  - Preoccupation of need to know or remember
  - Counting rituals
  - Systems of good and bad numbers

Kohn et al. 2007
Hoarding Not an Uncommon Subtype

- Is it OCD?
- Often brings elderly to attention of authorities
PTSD in the Elderly

- Acutely the Elderly are at as much risk as younger cohorts
- Example, Hurricane Mitch
  - 10.7% Young
  - 11.8% Old

Kohn et al. 2005
Hurricane Mitch PTSD 2-Years

- Rates longitudinally don’t differ between young and elderly
- 20.1% Young
- 14.6% Elderly
Hurricane Mitch PTSD New Cases

- 15.8% Young
- 7.1% Elderly
Hurricane Mitch PTSD Recovered Cases

- 52.5% Young
- 33.3% Elderly
Epidemiology of Schizophrenia in the Elderly
Prevalence of Schizophrenia

**ECA Study**

- **Lifetime Prevalence 65+: 0.3%**
  - Total population 1.5% (> 18 years old)
- **One-Year Prevalence 65+: 0.1%**
  - Total population 1.0% (> 18 years old)

Robins & Regier, 1991
Incidence of Late Life Schizophrenia

- 6% - 30% of all cases of schizophrenia develop after the age of 45
# Early versus Very-Late Onset (> 60 years) Schizophrenia I.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Early Onset</th>
<th>Very Late Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Males &gt; Females</td>
<td>Females &gt; Males</td>
</tr>
<tr>
<td>Phenomenology</td>
<td>Positive, negative and disorganized symptoms often prominent. Formal thought disorder common</td>
<td>Florid persecutory delusions; prominent hallucinations; negative symptoms and formal thought disorder rare</td>
</tr>
</tbody>
</table>
### Early versus Very-Late Onset (> 60 years) Schizophrenia II.

<table>
<thead>
<tr>
<th></th>
<th>Early Onset</th>
<th>Very Late Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premorbid functioning</td>
<td>Impairment across multiple domains, including social and educational</td>
<td>Poor social adjustment common, but premorbid occupational functioning usually unimpaired</td>
</tr>
<tr>
<td>Longitudinal course</td>
<td>Poor social and occupational outcome</td>
<td>Good preservation of affect and personality. Social outcome often impaired; few progress to dementia</td>
</tr>
<tr>
<td>Response to antipsychotic</td>
<td>Positive symptoms respond but often partially. Treatment resistance common</td>
<td>Positive symptoms usually respond</td>
</tr>
<tr>
<td>medication</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Early versus Very-Late Onset (> 60 years) Schizophrenia III.

<table>
<thead>
<tr>
<th>Putative Risk Factor</th>
<th>Early Onset</th>
<th>Very Late Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics</td>
<td>Very positive family history of schizophrenia</td>
<td>Positive family history of schizophrenia. Positive family history of depression in some studies</td>
</tr>
<tr>
<td>Sensory impairment</td>
<td>Positive, often consequent upon prodrome or illness itself</td>
<td>Positive unadjusted visual and hearing impairment</td>
</tr>
<tr>
<td>Social isolation</td>
<td>Shy or withdrawn; schizotypal</td>
<td>Very positive, often antedates illness onset</td>
</tr>
<tr>
<td>Premorbid personality</td>
<td></td>
<td>Positive paranoid or schizoid traits</td>
</tr>
</tbody>
</table>

Orr & Castle, 2003
Early versus Very-Late Onset (> 60 years) Schizophrenia IV.

<table>
<thead>
<tr>
<th>Putative Risk Factor</th>
<th>Early Onset</th>
<th>Very Late Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy and birth complications</td>
<td>Positively associated with early onset, especially in males; limited data in childhood onset</td>
<td>No unequivocal evidence of an association</td>
</tr>
<tr>
<td>Structural brain abnormalities</td>
<td>Very positive, grey matter reduction, generally considered to antedate illness onset; some evidence of progressive changes</td>
<td>± white matter changes (probably artifactual); Positive, grey matter volume reduction, similar to those in early-onset schizophrenia</td>
</tr>
</tbody>
</table>

Orr & Castle, 2003
## Early versus Very-Late Onset (> 60 years) Schizophrenia V.

<table>
<thead>
<tr>
<th>Putative Risk Factor</th>
<th>Early Onset</th>
<th>Very Late Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuropsychological impairment</td>
<td>Diffuse impairment; possibly more pronounced in attention, memory and executive function</td>
<td>Diffuse impairment; nonspecific</td>
</tr>
</tbody>
</table>

Orr & Castle, 2003
Epidemiology of Dementia
Epidemiologic Studies of Cognitive Function

Test selection

- Mental status screening tests
- Neuropsychological battery
  - Lengthy
- Specialized batteries
  - Memory batteries
  - Dementia scales
## Comparison of Mental Status Screening Examinations

<table>
<thead>
<tr>
<th>Domain</th>
<th>MMSE</th>
<th>SPMSO</th>
<th>MSQ</th>
<th>OMC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Orientation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Time</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Memory</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Concentration</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

MMSE = Mini Mental State Examination; SPMSQ = Short Portable Mental Status Examination; MSQ = Mental Status Questionnaire; OMC = Orientation-Memory-Concentration
Comparison of Memory Batteries

<table>
<thead>
<tr>
<th>Domain</th>
<th>WMS</th>
<th>C-M</th>
<th>Randt</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Information</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Orientation</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory Span</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Memory Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prose</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Visual</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Paired Association</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Word List</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Incidental Memory</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

WMS = Wechslesr Memory Scale; C-M = Csronholm and Molander Memory Test Battery; Randt = Randt Memory Test Battery
### Comparison of Dementia Scales

<table>
<thead>
<tr>
<th>Measure</th>
<th>Blessed</th>
<th>Hach</th>
<th>ADAS</th>
<th>BCRS</th>
<th>GDS</th>
<th>SCAG</th>
<th>Iowa</th>
<th>CDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Information</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Concentration</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>VISO-Spatial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affective</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>Delusions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>ADL</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IADL</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Cognitive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Motor Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Appetite</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>History</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Problems in Dementia Prevalence Studies

- Size of sample
- Sample composition
- Age range
- Proportion of very old
- Education
- Method for case identification
- Content of Interview
- Supplementary diagnostic information
- Diagnostic criteria (NINCDS-ADRDA v DSM)
- Prevalence Estimate
Prevalence of Alzheimer Disease

- Incidence exponential after age 60
  - 1 per 1000 age 60 - 64
  - 70 per 1000 age 90+

- Prevalence of dementia is approximately 3 – 10% in subjects 65 years and over

- Alzheimer disease accounts for 2/3 of these cases

- If milder cases are included, prevalence rates more than double

- It represents a major burden for all societies
  [U.S. Economic costs in excess of $100 billion per year]
Annual Incidence Rates of Alzheimer’s Disease
### Age Specific Prevalence Jorm’s (1987) Baseline Model

<table>
<thead>
<tr>
<th>Age</th>
<th>Prevalence Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-64</td>
<td>0.7</td>
</tr>
<tr>
<td>65-69</td>
<td>1.4</td>
</tr>
<tr>
<td>70-74</td>
<td>2.8</td>
</tr>
<tr>
<td>75-79</td>
<td>5.6</td>
</tr>
<tr>
<td>80-84</td>
<td>10.5</td>
</tr>
<tr>
<td>85-89</td>
<td>20.8</td>
</tr>
<tr>
<td>90-95</td>
<td>38.6</td>
</tr>
</tbody>
</table>
# Gender as a Risk Factor for Dementia and Alzheimer’s Disease

<table>
<thead>
<tr>
<th></th>
<th>Dementia (odds ratio)</th>
<th>Alzheimer Disease (odds ratio)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>1.18 (0.95-1.46)</td>
<td>1.56 (1.16-2.10)</td>
</tr>
<tr>
<td>Men (Reference Group)</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>
# Genetic Classification of Alzheimer’s Disease

<table>
<thead>
<tr>
<th>Chromosome</th>
<th>Gene</th>
<th>Clinical Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>APO ε4</td>
<td>Late-onset familial and sporadic, dose-related, susceptibility gene</td>
</tr>
<tr>
<td>14</td>
<td>Presenilin 1</td>
<td>Early-onset familial, autosomal dominant</td>
</tr>
<tr>
<td>21</td>
<td>β amyloid precursor</td>
<td>Early-onset familial, autosomal dominant,</td>
</tr>
<tr>
<td>1</td>
<td>Presenilin 2</td>
<td>Early-onset familial, autosomal dominant</td>
</tr>
</tbody>
</table>
Effect of APO-ε4 on Alzheimer Disease

![Bar Graph](image)

- Risk of AD by Age 75
- Number of Copies of APoE-4

0 1 2

Height of bars indicate risk levels.
Risk Factors for Alzheimer’s Disease

**Genetic**
- Susceptibility
  - APO-ε4
- Probable
  - β amyloid precursor
  - Presenilin 1
  - Presenilin 2

**Susceptibility**
- Age
- Female
- Head Trauma
- Vascular Factors
- Cardiovascular
- HSV-1
- Hyperlipidemia
- Heavy Alcohol Use
- Obesity
- Illiteracy
- Poor Social Support

**Protective**
- Non-Steroidals
- Education
- Vitamin E and C
- Mentally Stimulation
- Physical Activity

**ALZHEIMER’S DISEASE**
Post-Test
Question 6.

Which of the following is TRUE about the demographics of the aging population in the USA

- A. As demographics change the number of persons over the age of 85 will outnumber those between 75 – 84.
- B. Hispanics are under-represented in nursing homes
- C. More than 50% of males over the age of 65 live alone
- D. The percentage of elderly persons in nursing homes is increasing
- E. There has been little change since 1960 in the number of persons over the age of 85 in our population
Question 7.

Which of the following is TRUE about major depression in the elderly

- A. Bipolar disorder is the more prevalent than major depression in old age
- B. Disability from major depression is not a major concern in the older individuals
- C. Elderly individuals have an existential state favorable for developing neurosis
- D. Elderly persons have the lowest rates
- E. Risk factors are similar for early and late onset depression
Question 8.

Which of the following is TRUE about anxiety disorders in among elderly individuals

- A. Hoarding is rarely seen among elders with OCD symptoms
- B. Panic disorder and PTSD are the most prevalent anxiety disorders
- C. Phobias or Generalized Anxiety Disorder are the most prevalent anxiety disorder
- D. The relationship between somatic disorders and anxiety disorders is a myth
- E. There is strong evidence that the course of PTSD is different from younger individuals
Question 9.

Which of the following is TRUE about late onset schizophrenia

A. As no cases seem to occur after age 45 DSM-V will revert back to DSM-III criteria
B. Late onset schizophrenia (dementia precox) is prodromal for development of dementia
C. Lifetime prevalence is over 1%
D. Like early onset schizophrenia males remain at higher risk for late onset disorder
E. Premorbid occupational functioning is often preserved in late onset schizophrenia
Question 10.

Which of the following is True about the epidemiology of dementias

- A. After the age of 60 the incidence of dementia is exponential
- B. Among those over age 75 having two copies of APO-ɛ2 posses the highest risk
- C. Risk factors for Alzheimer’s disease have yet to be identified
- D. The Mini-Mental Exam is the primary tool used to study the epidemiology of dementia
- E. The sunshine and natural beauty of Hawaii prevents Alzheimer’s disease in all its inhabitants but the tourists