CHILDHOOD CONDITIONS, EDUCATION, AND LIFE EXPECTANCY WITH AND WITHOUT DEMENTIA

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DISCLOSURES

• No Conflicts of Interest to Report
Because early-life conditions set in motion adult achievement processes and exposures to AD risk factors, largely through education, we seek to assess how early-life conditions and education combine to influence the expected years of life with and without dementia.
A CONCEPTUAL MODEL OF THE LIFE COURSE AND DEMENTIA STATUS LIFE EXPECTANCY
COGNITIVE RESERVE: MODERATING THE EFFECTS OF PATHOLOGY

• Two Main Components
  • more efficient brain networks
  • building of alternate networks
• These components allow brain to compensate for disruptions from cognitive aging or pathology
• Primarily established in early life, cognitive reserve is maintained or diminished throughout the life course.
RESEARCH QUESTION

HOW DOES EDUCATION COMBINE WITH CHILD ADVERSITY TO SHAPE EXPECTED YEARS OF LIFE WITH AND WITHOUT DEMENTIA AT 65?
DATA

• Health and Retirement Study (2000-2014), 7 waves of data

• Limited sample to 65+, non-Hispanic blacks and non-Hispanic Whites

• Cognitive status scores dichotomized: with or without dementia (obtained from proxy and self-respondents)
DEMENTIA CLASSIFICATION

**Self Respondents**
- Memory
  - Immediate recall of 10 words
  - Delayed recall of 10 words
- Working memory:
  - 5 trials of serial 7s,
- Processing speed
  - Backward counting
- Range from 0 to 27
- Dementia indicated by score of 6 or lower

**Proxy respondents**
- 5 IADLS to assess limitations (Physical Functioning Component), interviewer assessment, direct assessment of memory
- Range from 0 to 11
- Dementia indicated by score of 6 or greater
CHILD CONDITIONS

• Child Adversity
  • 0-5 Scale:
    • Father’s Occupation at age 16
      • Blue Collar [1]
    • Mother’s Education
      • Less than 8 Years [1]
    • Father’s Education
      • Less than 8 Years [1]
    • Childhood perception of SES
  • Poor SES [1]
  • Never lived with their father
    • Yes [1]

• Categorized into:
  • No Adversity [0]
  • Low Adversity [1-2]
  • High Adversity [3-5]
METHODS

• We create incidence-based multi-state life table using a specialty software called IMaCh (interpolated Markov Estimation Chain)
  • Estimate transition probabilities between state space

  • Generates Life Tables based on estimated transition probabilities
How are Childhood Conditions and Education associated with Dementia Risk?
### Transition Parameters from Cognitively Normal To Having Dementia

**Education** (reference group: less than HS or GED)

<table>
<thead>
<tr>
<th>Education</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS</td>
<td>-.64</td>
</tr>
<tr>
<td>Some College or More</td>
<td>-.93</td>
</tr>
</tbody>
</table>

**Childhood Adversity** (reference: no adversity)

<table>
<thead>
<tr>
<th>Adversity</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Adversity</td>
<td>.23</td>
</tr>
<tr>
<td>High Adversity</td>
<td>.46</td>
</tr>
</tbody>
</table>
How do education and childhood conditions combine to shape dementia-free life expectancy?
Dementia Free Life Expectancy at 65 Years By Childhood Adversity and Education (HRS, 2000-2014)

Years with Dementia-Free Life

<table>
<thead>
<tr>
<th></th>
<th>Less than HS</th>
<th>HS</th>
<th>Some College+</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Adversity</td>
<td>14.77</td>
<td>17.58</td>
<td>18.67</td>
</tr>
<tr>
<td>Low Adversity</td>
<td>14.48</td>
<td>17.29</td>
<td>18.38</td>
</tr>
<tr>
<td>High Adversity</td>
<td>13.86</td>
<td>16.62</td>
<td>17.7</td>
</tr>
</tbody>
</table>

- Free Life

Dementia Free Life Expectancy at 65 Years By Childhood Adversity and Education (HRS, 2000-2014)
How does education and childhood conditions combine to affect dementia life expectancy?
Note:

Orientation for education groups is flipped. Colors remain the same.
Dementia Life Expectancy at 65 Years of Age by Childhood Health, Childhood Adversity, and Education (HRS, 2000-2014)
DISCUSSION

• Education has the greatest effects on dementia-free and dementia life expectancy

• Child conditions matter too, but not as much

• Education can mitigate the deleterious effects of a poor childhood, but cannot eliminate it (also found in other studies)

• Higher levels of education:
  • Increase DemFLE and decrease DemLE
    • Reduce dementia prevalence
    • Reduce disparities in dementia
    • Improve quality of life
CONCLUSION

• Dementia burden can be reduced by focusing on improvements in early childhood and higher education

• While dementia manifests at later ages, life course perspectives should be utilized to understand its development

• Importance of education points to the importance of cognitive reserve and capacity to circumvent with cognitive aging and pathology
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WHY STUDY DEMENTIA-FREE LIFE EXPECTANCY AND DEMENTIA LIFE EXPECTANCY?

• Implications for trends in dementia prevalence
• Broader understanding of disparities in terms of the span of years lived with and without dementia
• Quality of life indicator:
  • “compression of morbidity”
  • “failure of success”
A CONCEPTUAL MODEL OF THE LIFE COURSE AND DEMENTIA STATUS

- Childhood
  - Childhood Conditions
  - Education

- Prime adulthood
  - Occupation and Health Behaviors

- Late adulthood
  - Health Conditions (especially cardiometabolic)
  - Dementia
DEMENTIA DEFINITION (NIA-AA CRITERIA, 2011)

1. IMPAIRMENT IN AT LEAST TWO OF: MEMORY; REASONING; VISUOSPATIAL ABILITIES; LANGUAGE; OR CHANGES IN PERSONALITY/BEHAVIOR; &

2. THE IMPAIRMENTS “INTERFERE WITH THE ABILITY TO FUNCTION AT WORK OR AT USUAL ACTIVITIES”; ARE A DECLINE FROM PREVIOUS LEVELS OF FUNCTIONING; & NOT EXPLAINED BY DELIRIUM OR PSYCHIATRIC DISORDER
Hypothetical: Total Life Expectancy, Dementia-Free Life Expectancy, and Life Expectancy with Dementia for Whites with a High School Degree aged 65 Years

\[ E(65) = 13 \text{ years} \]

DemFLE = 11.3 Years

DemLE = 1.7 years
EDUCATION

• Direct:
  • Building of Cognitive Reserve (discussed in next slide)

• Indirect BY CONTRIBUTION TO BUILDING COGNITIVE RESERVE THROUGH:
  • Occupational attainment
  • Lifestyle Choices
  • HEALTH BEHAVIORS
  • SOCIAL RELATIONSHIPS
LIFE COURSE

• Dementia risk tied to accumulation of risks across the life course
  • early life conditions important in developing cognitive reserve that protects against dementia—“long arm of childhood”
    • Brain development (critical and sensitive stage) in childhood
    • Early life conditions set foundation for trajectories of social exposures also linked to cognitive reserve (or chains of risk); indirect

• Education one of the strongest predictors of dementia (also achieved earlier in life)

• Adult conditions THAT ARE PARTLY DOWNSTREAM CONSEQUENCES OF EDUCATION such as health behaviors, OCCUPATION, income, wealth, and cardiometabolic conditions are also linked to cognitive reserve

• Here, educational attainment is a surrogate for the total influence of education encompassing both direct and indirect pathways
When someone has dementia, it's as if their brain can't drive their body well any more.

I am the source of consciousness!

COMMAND CENTER of the BODY!

Capable of storing a MILLION GIGABYTES of information!

And yet you still have to sing the alphabet song to remember the order of the letters.