Correlates of cognitive health among Filipino women

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Cognitive impairment (CI)

- Defined as “confusion or memory loss that is happening more often or getting worse in the past 12 months” (Centers for Disease Control and Prevention, BRFSS, 2009)
- CI influences physical and emotional health, quality of life, level of independence, quality of relationships with family and community
- Early detection plays an important role not only in treatment but in enabling affected individuals and their families to adequately prepare for and manage the cognitive decline
- Factors associated with impairment include age, educational status, health and lifestyle factors

In this presentation:

- Discuss results of the Mini-Mental State Examination Philippine-Cebuano (MMSE-PC) and the Clock Drawing Test (CDT) administered to a community-based sample of 1,540 women aged 46-79 of varying cognitive health status
- Describe co-morbidities of cognitive impairment

Examine precedent factors that are associated with current cognitive health status

Cebu Longitudinal Health and Nutrition Survey (CLHNS)

- Prospective community-based study in Metro Cebu; recruited 3327 ever-pregnant women at baseline (1983-84) and followed up over time
- MMSE-PC and CDT:
  2015 Wave (n=1568); 47% of baseline
  Mean age: 58.6 (range 46-79)
  37% ≥ 60
- Migration out of Metro Cebu main reason for attrition. Mortality as source of attrition rose from 5.2% in 2005 to 9.4% in 2015
- Compared to baseline sample: women retained in 2015 are younger, less urban and are of higher parity
Mini-Mental State Exam\(^1\) Philippines in Cebuano (MMSE-PC)

- Quantitative assessment of cognitive functioning, screens for dementia; Repeat measures document cognitive changes over time
- Correlated with vocabulary, reasoning and memory; culture-sensitive
- MMSE-P was validated among 60 and older Marikina residents\(^2\)
- In 2012, MMSE-P translated to Cebuano by the Dementia Society of the Philippines MMSE Harmonization Group


Cognitive domains tested in MMSE

- **Orientation**
  - **TIME** Date today, day of the week, season
  - **PLACE** Where are we now, name of the street

- **Registration**:
  - Repeating the words: PAPER, TABLE, APPLE

- **Recall**
  - Delayed recall of the words: PAPER, TABLE, APPLE

- **Attention** (spelling a word backwards: “KARNE or CARNE”)

- **Language**
  - Naming of objects (pencil, wristwatch)
  - Repetition of phrase NO IFS, ANDS, OR BUTS “Walay mga pero, ug, o apan”
  - 3-Step Command
  - Reading comprehension
  - Write a complete, sensible sentence
  - Copying a pentagon

*Administered at home by trained nurses, 30-item test takes 15-20 minutes

MMSE-PC results

**Scoring**: sum of correct responses out of 30 items

**Mean (± SD) score**: 23.8 (± 3.6)

**MMSE-P validation study**: Filipinos ≥ 60 with a score of ≤ 23 classified as cognitively impaired

Of the 576 (37%) women ≥ 60 about 46% were cognitively impaired

CLOCK DRAWING TEST (CDT)

- Screening tool for CI and dementia
- Measure of spatial dysfunction and neglect, assess visuo-constructive abilities

**Instructions**: “Draw a clock on this paper, put in all the numbers of the clock and set the hands of the clock at 10 minutes past eleven.”

Scoring (4 items): drawing of closed circle/square, all 12 numbers, numbers and in correct quadrants, correct position of hands of clock
**CDT results**

<table>
<thead>
<tr>
<th>Clock drawing test score, mean±SD</th>
<th>3.2±0.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>With correct responses:</td>
<td></td>
</tr>
<tr>
<td>Item 1 (Drawing closed circle),%</td>
<td>97.1</td>
</tr>
<tr>
<td>Item 2 (All 12 numbers present),%</td>
<td>93.6</td>
</tr>
<tr>
<td>Item 3 (Correct quadrant placement),%</td>
<td>79.9</td>
</tr>
<tr>
<td>Item 4 (Hands in correct position),%</td>
<td>54.8</td>
</tr>
</tbody>
</table>

**Memory capacity assessments**

Word list recall (WLR): recalling a set of 10 words, mean±SD:

<table>
<thead>
<tr>
<th></th>
<th>All women (n=1540)</th>
<th>≥ 60 (n=576)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLR trial 1</td>
<td>5.4±1.4</td>
<td>5.0±1.4</td>
</tr>
<tr>
<td>WLR trial 2</td>
<td>4.6±1.6</td>
<td>4.1±1.6</td>
</tr>
</tbody>
</table>

Self-reports of present memory capacity, %:

<table>
<thead>
<tr>
<th></th>
<th>All women</th>
<th>≥ 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad</td>
<td>20.1</td>
<td>22.1</td>
</tr>
<tr>
<td>Good/average</td>
<td>79.9</td>
<td>77.9</td>
</tr>
</tbody>
</table>

**Explored associations with cognitive health**

- Sociodemographic
- Psychosocial: depressive symptoms score
- Health: disability, cardiovascular disease, CRP
- Diet and BMI

**Sociodemographic correlates: MMSE-PC scores**

<table>
<thead>
<tr>
<th>Correlate</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥ 60</td>
<td>-1.10***</td>
</tr>
<tr>
<td>High school level education</td>
<td>2.75***</td>
</tr>
<tr>
<td>Assets score</td>
<td>0.25***</td>
</tr>
<tr>
<td>Household size</td>
<td>NS</td>
</tr>
<tr>
<td>Currently working</td>
<td>NS</td>
</tr>
<tr>
<td>Urban resident</td>
<td>NS</td>
</tr>
</tbody>
</table>

*** p<0.001 β-coefficients from linear regression model predicting MMSE-PC total score
Depressive symptoms

Depressive symptoms score (DSS):
12-item screening test
Modified from the Center for Epidemiologic Studies Depression Scale
Higher scores: more likely to be depressed

Current DSS and MMSE-PC scores
Not associated with MMSE-PC for all women BUT higher among cognitively impaired (aged ≥ 60; n=576)

Not impaired Impaired
mean±SD 15.8±3.1 16.6±3.4

Cognitive measures negatively associated with long-term DSS
(4 survey waves: 2002-2012)

Among (aged ≥ 60; n=576), risk of cognitive impairment doubled with any history of high DSS compared to never depressed:

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>hi DSS in 1 wave:</td>
<td>1.7</td>
<td>1.08, 2.78</td>
</tr>
<tr>
<td>hi DSS in 2-3 waves:</td>
<td>2.0</td>
<td>1.22, 3.14</td>
</tr>
</tbody>
</table>
**Measures of disability in the CLHNS**

Activities of daily living (ADL): 6 tasks
Instrumental activities of daily living (IADL): 4 tasks
Physical limitations (PL): 7 tasks (e.g., household chores, walking, climbing)

Proportion reporting having severe difficulty in doing any tasks:

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<tr>
<td>ADL</td>
<td>1.0%</td>
<td>1.7%</td>
</tr>
<tr>
<td>IADL</td>
<td>4.4%</td>
<td>7.8%</td>
</tr>
<tr>
<td>PL</td>
<td>14.0%</td>
<td>22.6%</td>
</tr>
</tbody>
</table>

**Current disability status negatively associated with MMSE-PC/CDT scores**

<table>
<thead>
<tr>
<th></th>
<th>MMSE-PC</th>
<th>CDT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe ADL (1=yes; 0=no)</td>
<td>-2.34**</td>
<td>-1.39***</td>
</tr>
<tr>
<td>Severe IADL (1=yes; 0=no)</td>
<td>-1.43***</td>
<td>-0.73***</td>
</tr>
<tr>
<td>Severe PL (1=yes; 0=no)</td>
<td>-0.62***</td>
<td>-0.18***</td>
</tr>
</tbody>
</table>

$^1$β-coefficients from separate linear regression models controlling for age, years in school and other relevant covariates

**Atherosclerotic risk profile and cognitive health**

- **Non-modifiable factors:**
  - Advanced age > 60
  - Relatives with heart disease

- **Modifiable factors:**
  - Smoking
  - Hypertension
  - Dyslipidemia
  - Abdominal obesity
  - Sedentary lifestyles

- **Target organ involvement:**
  - Diabetes Mellitus
Atherosclerotic risk scores by age (score range: 0-25)

All women (n=1531)
Mean±SD 8.8±5.1
High (>15) 10.4%

Atherosclerotic risk scores and MMSE-PC/CDT
- No significant associations
- Biomarker for inflammation (CRP) taken in 2005 and 2012 also not associated with cognitive measures

Cognitive health not significantly associated:
Diet and BMI

Summary:
- Cognitive function assessed in a large community-based sample: 46% of women aged ≥ 60 classified as impaired
- Cognitive function associated with age (-), educational status (+) and assets (+)

Cognitive impairment and disability found to co-exist

History of depressive symptoms associated with poor cognitive health

Increasing consumption trends:
- Meat/poultry
- Oils/fats
- Sweets

Decreasing consumption trends:
- Green leafy vegetables
- Fish/seafoods

Significant urban/rural differences (predicted probabilities shown):
- Except: 2015 meat/poultry, oils, sweets
Acknowledgments

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