A comparison of diagnosis of dementia using GMS AGECAT algorithm and DSM-III-R criteria

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1. Background

- Challenges in dementia diagnosis

- Dementia diagnostic criteria
  - ICD
  - DSM
  - CAMDEX
  - GMS-AGECAT

- Chose a diagnostic approach: a balance between sensitivity, specificity, affordability and practicality
Diagnostic approach: GMS-AGECAT

- The Geriatric Mental State – B3 (GMS-B3) Schedule:
  - a standardised semi-structured interview community version
  - Suitable for using by non-psychiatrist on population based study
  - 15 -20 minute to administer

- Computer diagnosis (AGECAT)

Overview of GMS-AGECAT

<table>
<thead>
<tr>
<th>Stage</th>
<th>Input</th>
<th>Processing</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>The GMS Schedule</td>
<td>Questions and responses</td>
<td>Interviewer</td>
<td>Ratings on 541 symptoms</td>
</tr>
<tr>
<td>Preliminary stage</td>
<td>Symptoms</td>
<td>Summation of symptoms or maximum in a group of symptoms</td>
<td>157 symptom components each in range [0 - 2]</td>
</tr>
<tr>
<td>Stage I</td>
<td>Symptom components</td>
<td>Further aggregation followed by logical decision tree</td>
<td>Levels of confidence in range [0 -5] on 8 syndrome cluster</td>
</tr>
<tr>
<td>Stage II</td>
<td>Level of confidence</td>
<td>Hierarchical comparison of levels</td>
<td>List of decisions made at each comparison and a diagnosis</td>
</tr>
</tbody>
</table>

*M. E. Dewey and J. R. M. Copeland

MRC Biostatistics Unit

Include organic brain syndrome: organicity level 3 (O3) and above are classified as dementia
Aims and Objectives

- Aim: To compare GMS-AGECAT as a diagnostic approach for dementia in populations with those diagnoses made according to DSM Third Revised (DSM-III-R) edition criteria
- The objectives:
  - estimate the diagnostic agreement
  - examine the factors associated with different type of disagreement of diagnosis
MRC Cognitive Function and Ageing Study (MRC CFAS)

http://www.cfas.ac.uk/

A multi-centre longitudinal population based study, participants aged 65 +.

GMS-AGECAT used as main diagnostic approach

A subset of 256 CFAS participants:
119: AGECAT organicity O3 and above
157: AGECAT organicity O0, O1 or O2
2 : Methods

Extra clinical assessment comprising the following:

i. A brief general medical examination

ii. A neurological examination.

iii. An extensive neuropsychological examination
DSM-III-R diagnosis:

• **DSM III R criteria for dementia checklist**
  - Impairment of both of short and long term memory
  - Impairment of at least one of abstract thinking/Judgement/Aphasia/Apraxia/Agnosia/Constructional/Personality change
  - Significantly interferes with work or social activities
  - Not occurring in course of delirium
  - Evidence of organic factor(s) / absence of other major psychiatric illness

• **Degree of severity**
  - Mild: Capacity for independent living remains with adequate personal hygiene and relatively intact judgement
  - Moderate: Independent living is hazardous, some supervision is required
  - Severe: ADL so impaired that continual supervision is required; largely incoherent or mute
DSM-III-R diagnosis

A diagnosis of dementia according DSM-III- R criteria

- No dementia
  - Normal
  - borderline to the case/ isolated memory loss

- With dementia
  - mild dementia
  - moderate dementia
  - severe dementia

- Unable to determine
## Results

Gender: Men 32% Women 68%
Age: median 84 years, range 67 - 103 years

### Agreements

<table>
<thead>
<tr>
<th>DSM-III-R</th>
<th>With dementia</th>
<th>No dementia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>With dementia</td>
<td>108 (88.5)</td>
<td>14 (11.5)</td>
</tr>
<tr>
<td>No dementia</td>
<td>9 (6.0)</td>
<td>140 (94.0)</td>
</tr>
</tbody>
</table>

- **Cohen’s Kappa (κ)**: 0.84 (0.71 – 0.95)
- **Sensitivity**: 88.5 (81.5 – 93.6)
- **Specificity**: 94.0 (88.8 – 97.2)
- **Positive predictive value (PPV)**: 92.3 (85.9 – 96.4)
- **Negative predictive value (NPV)**: 90.9 (85.2 – 94.9)
## Results – cont.

<table>
<thead>
<tr>
<th>DSM-III-R</th>
<th>Without dementia</th>
<th>With dementia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O0</td>
<td>O1</td>
<td>O2</td>
</tr>
<tr>
<td>Without dementia</td>
<td>O0</td>
<td>O1</td>
<td>O2</td>
</tr>
<tr>
<td>Normal</td>
<td>94</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Borderline/Isolated</td>
<td>30</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>memory loss</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With dementia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Moderate</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Severe</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unable determine</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
<td>8</td>
<td>15</td>
</tr>
</tbody>
</table>

12 (86%) mild dementia
5 with depressive disorder
7 had CVD/stroke

6 (67%) Borderline/memory problem
2 with long term learning disability
4 had stroke
Conclusion

- AGECAT algorithm works well within a community setting with high sensitivity and specificity.

- Accuracy of diagnosis of dementia can be improved for several subgroups including people with memory problems/depressive order/history of stroke/cardiovascular diseases/borderline cases and/missing AGECAT outcome by assessing and combine all the information available.

- Cross sectional approach are limited.

