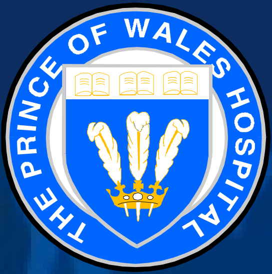
# Behavioural Problems Following Stroke
## Is There a Relationship with Cognitive Impairment?

Adrienne Withall[1,3]
Henry Brodaty[1,3]
Perminder Sachdev[2,3]
Annette Altendorf[1,3]

Academic Department for Old Age Psychiatry[1]
& Neuropsychiatric Institute[2]
Prince of Wales Hospital & UNSW[3]




http://www.med.unsw.edu.au/adfoap

# Stroke in Australia

- Crude annual event rate for all strokes 258 / 100,000
- Third most common cause of death
- Fatality rate 24% @ 4 wks & 38% @ 1 yr
- Steady reduction in mortality from stroke over past 25 years
- Increased longevity → more dementia

# Sequelae of stroke

- Dementia 6 - 32%; 9-fold ↑[1,2]
- By end of first year, half survivors are dependent on others for ADLs[3]
- HR QoL 2 years after stroke is reduced for most survivors; very poor for many[4]

[1]Tatemichi TK 1993; [2]Pohjasvaara T 1998; [3]Bennett DA, Stroke 2006; [4]Hankey et al, 1998

# Post-stroke Psychiatric Morbidity

| Disorder | Prevalence |
|---|---|
| Depression | 35% |
| Anxiety | 25% |
| Apathy | 20% |
| Pathological Affect | 20% |
| Catastrophic Reaction | 20% |
| Mania | rare |
| Bipolar Disorder | rare |
| Psychotic Disorder | rare |

[1]Chemerinski E, Robertson RG *Psychosomatics* 2000;41:5-14

# Cognitive Function & Neuropsychiatric Sx After Stroke

- Many studies have examined psychiatric illness *or* cognitive impairment following stroke.
- Few have examined their interaction.
- Patients with psych Sx after stroke are at ↑ risk of cog deficits and decline in cog functioning over 2 years[1]

[1]Rasquin et al, 2005

# Aims of This Study

- To examine rates of cognitive impairment and neuropsychiatric sx after stroke
- To determine the contribution of cognitive impairment to behavioural disturbance

# Sydney Stroke Study

Longitudinal study:

- Clinical and psychiatric assessments
  - SCID interview: DSM-IV
  - Hamilton Depress$^{n}$ Rating Scale (HDRS-17) (cut 10/11)
  - Geriatric Depression Scale (GDS-15) (cut 5/6)
  - Apathy Evaluation Scale (AES,Marin,1991) (cut 36/37)
  - Neuropsychiatric Inventory (NPI)
- Neuropsychological testing
- Neuroimaging (MRI)

# Study Design

## Stroke Group

27 withdrew
3 died
6 uncontact.
1 dementia

168 3m Ax
First-ep 69.7%

## Control Group

108 eligible &
given baseline
assessment

# Clinical Scales

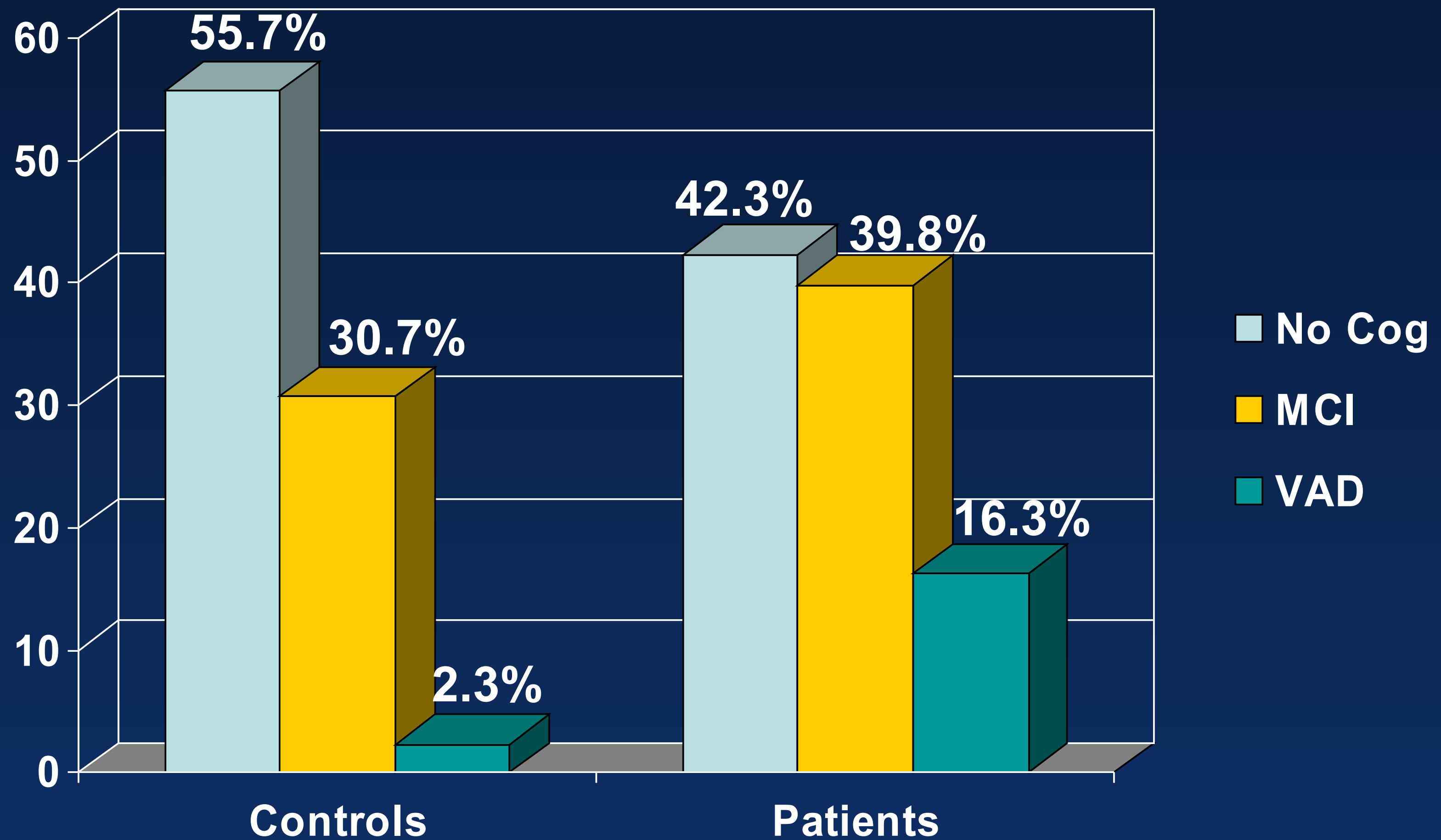
| | Patients n=168 | Controls n=108 |
|---|---|---|
| Age | 72.4 (8.7) | 71.2 (6.0) |
| Gender (m) | 56.9% | 48.1% |
| Nart-R IQ | 104.2 (10.3) | 114.1 (7.7)*** |
| IQCODE | 3.1 (0.3) | 3.1 (0.1) |
| ADL+IADL | 11.7 (3.3) | 13.9 (0.3)*** |
| MMSE | 27.7 (2.6) | 28.8 (1.4)*** |
| ESS | 93.8 (9.5) | |

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

# Sample For This Study

- Participants with full ratings at 15-mths
  - 123 patients
  - 88 controls

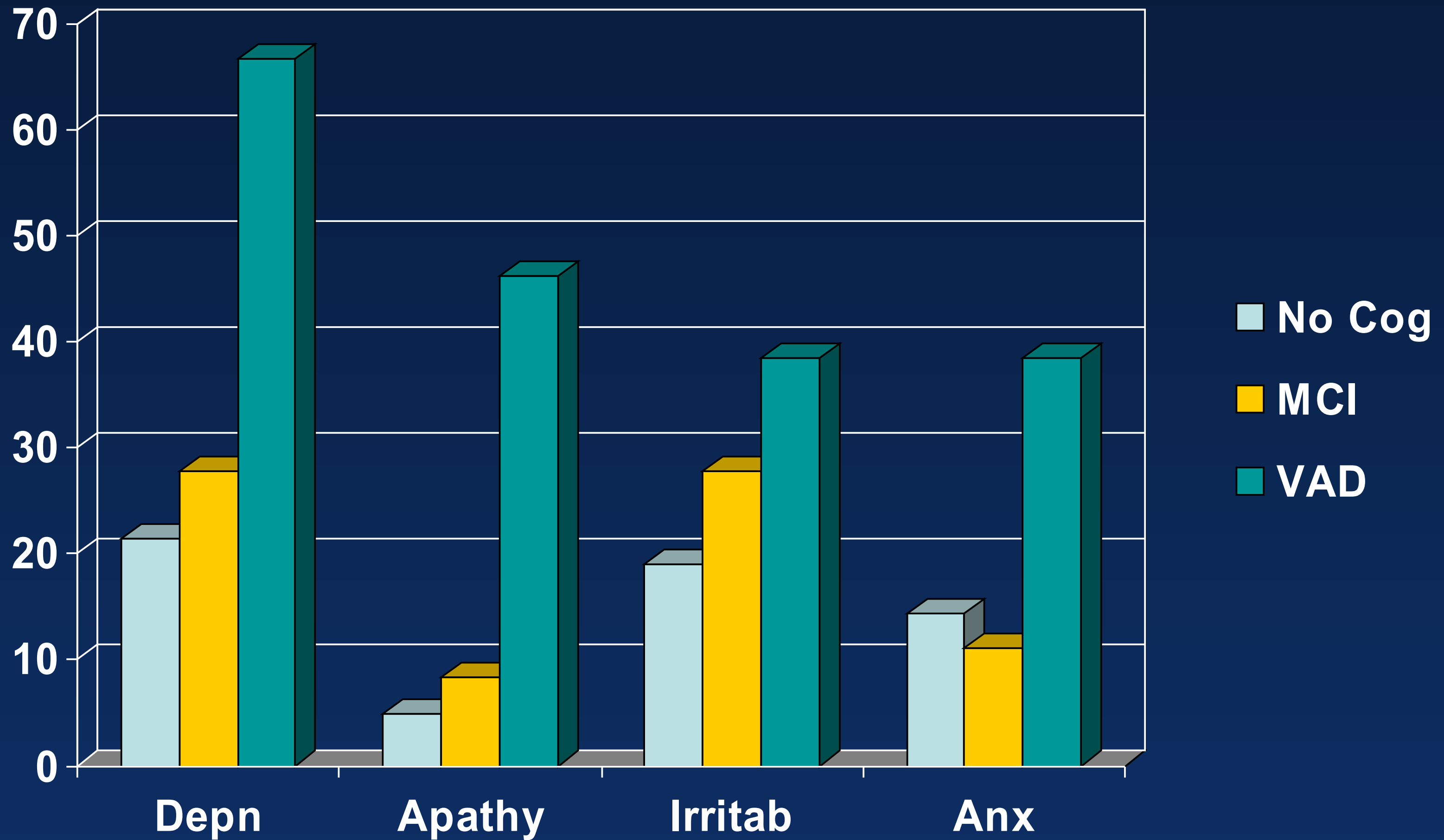
# Rates of MCI & VaD at 15-mths



# Rates of MCI & VaD at 15-mths

- Stroke group had significantly higher rates than the control group of dementia (OR=8.35, 95% CI 1.90, 36.73) but not of MCI (OR=1.71, 95% CI 0.93, 3.15)

# NPI: Prevalence of Sx (%)




STROKE GROUP ONLY

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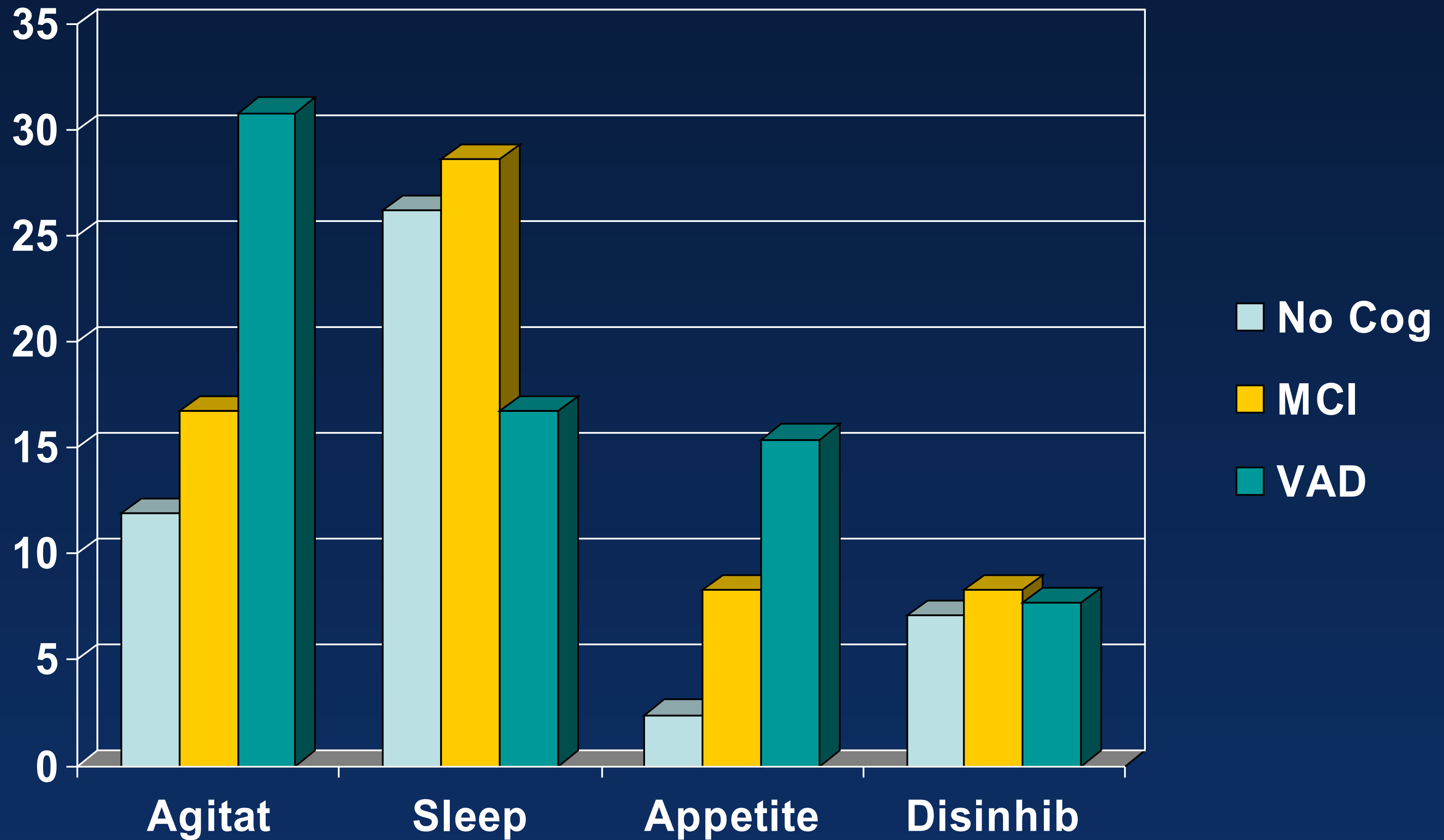
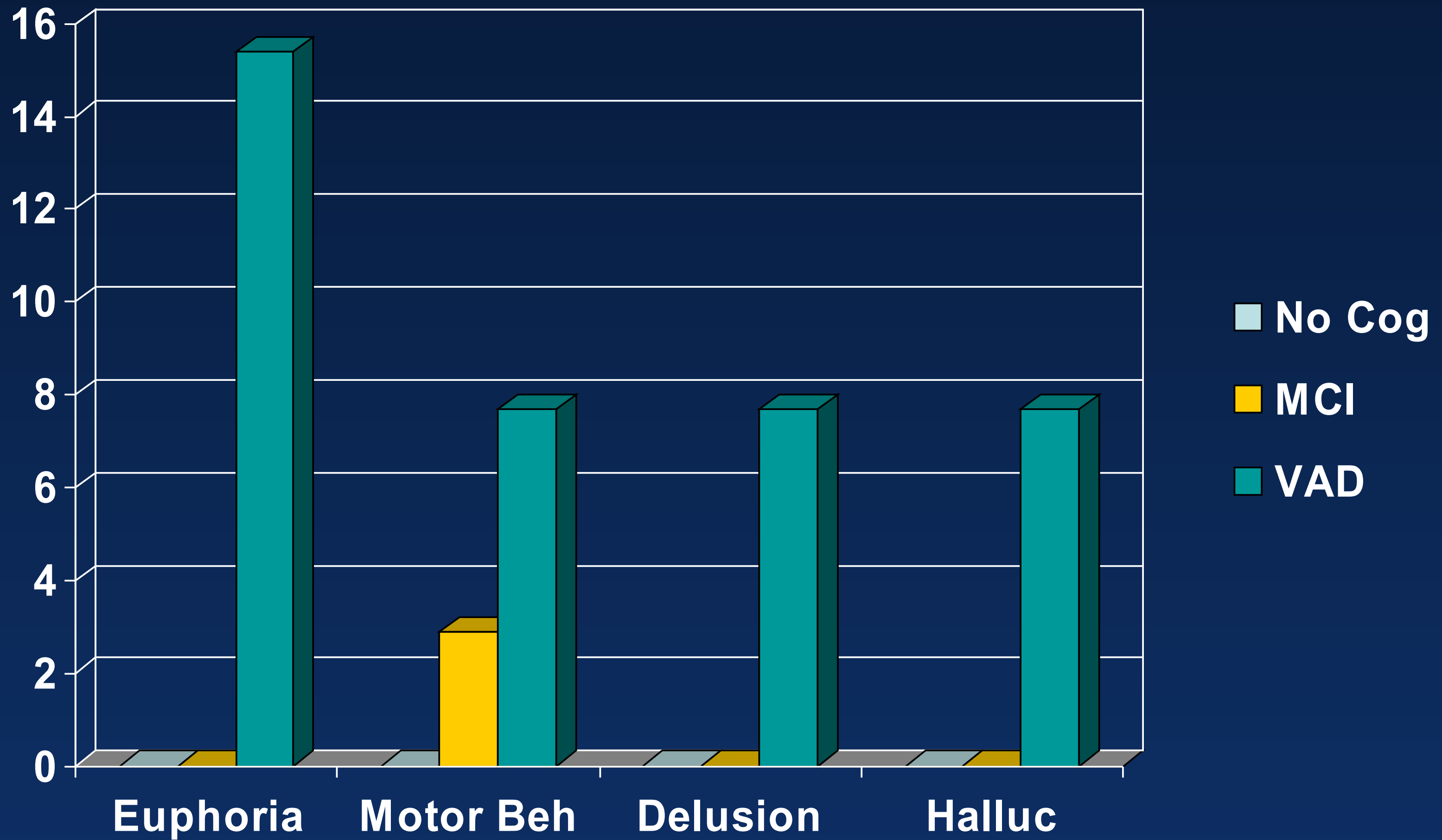



STROKE GROUP ONLY

# NPI: Prevalence of Sx (%)




STROKE GROUP ONLY

# Relationship Between Psych Sx and Cog Impairment After Stroke

- In the total sample, total NPI score was sig correlated with cog impairment (Spearman’s rho=0.27, p=0.01).
- Separately, sig correlation for the stroke group (Spearman’s rho=0.26, p=0.02) but not the control sample (Spearman’s rho=0.17, p=0.18).

# Relationship Between Psych Sx and Cog Impairment After Stroke

- Significant predictors of total NPI score within the stroke sample
  - dementia at 15-mths ($p=0.04$)
- Non-significant
  - MMSE at 15-mths, initial stroke severity, more than 1 stroke, total stroke volume, total atrophy & deep white matter hyperintensities

# Relationship Between Psych Sx and Cog Impairment After Stroke

- Significant predictors of total NPI score within the whole sample
  - dementia at 15-mths
- Non-significant
  - having had a stroke

# Conclusions

- Neuropsychiat Sx common after stroke
- It seems that these Sx are related to cognitive impairment, esp VaD, rather than the stroke itself.

DEMENTIA

Behavioural Symptoms

# Conclusions

- Consistent with other results from the SSS (in press) that show that dementia causes depression and not the reverse after stroke

# Methodological Issues

- Relatively large sample
- Dementia was an exclusion criterion
- First & repeat stroke patients included but no sig differences on stroke variables

# Issues & Future Directions

**Behavioural disturbance as a marker of post-stroke dementia**

- Educate GPs to recognise that people with post-stroke behavioural symptoms are at a higher risk of dementia

**Follow-up analyses**

- More causal analyses and examine data at 3- and 5-yrs

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