

Assessment Scales on Behavioral Disturbances in Dementia

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- **BPSD?**
- **SCALES**
 - **BEHAVE-AD**
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BPSD

90% of patients affected by dementia will experience Behavioral and Psychological Symptoms of Dementia (BPSD) that are severe enough to be labeled a problem at some time during the course of their illness.

(Mega et al. 1996)

Causes of BPSD

- **Intellectual and cognitive changes**

- amnesia, agnosia, apraxia, aphasia, apathy

- **Neurotransmitter dysfunction**

- dopamine, 5-HT, cholinergic, adrenergic, GABA

- **Instinctual behaviors under stress**

- territoriality - defensiveness

Estimated frequency of common BPSD

| | |
|----------------------|-----------|
| Agitation | up to 75% |
| Wandering | up to 60% |
| Depression | up to 50% |
| Psychosis | up to 30% |
| Screaming | up to 25% |
| Aggression | up to 20% |
| Sexual Disinhibition | up to 10% |

(Mega, Cumming et al. 1996)

BPSD

- 50 – 90% of caregivers considered physical aggression as the most serious problem they encountered and a factor leading to institutionalization (Rabins et al. 1982)
- Front-line staff working in LTC report that physical assault contributes to significant work related stress (Wimo et al. 1997)

Course of BPSD

- 50% of patients may have resolution of some symptoms but may develop new ones
- Activity disturbance is common and persistent in early Alzheimer's disease
- Verbal aggression is the most common and longest lasting
- Aggressive resistance most likely to persist until death

(Keene et al. 1999)

BPSD that will not respond to medication

1. Wandering
2. Inappropriate urination/defecation
3. Inappropriate dressing/undressing
4. Annoying repetitive activities (perseveration) or vocalization
5. Hiding/hoarding
6. Eating inedibles
7. Tugging at/removal of restraints
8. Pushing wheelchair bound co-residents

Problems that may respond to medication

1. Anxiety
2. Depressive symptoms
3. Sleep disturbance
4. Manic-like symptoms
5. Persistent and distressing delusions or hallucinations
6. Persistent verbal and physical aggression
7. Sexually inappropriate behavior

The Behavioral Pathology in Alzheimer's Disease Rating Scale

BEHAVE-AD

**Behavioral symptoms in Alzheimer's
disease: phenomenology and treatment**

Reisberg *et al. J Clin Psychiatry* 1987; 48 (S5): 9–15

BEHAVE-AD

- 알쯔하이머 병의 경과 중에 나타나는 정신병리를 측정하는 도구로서, 약물치료에 반응할 수 있는 증상만으로 구성되어 있다.
- 약물치료 전후의 정신병리의 변화를 민감하게 측정할 수 있다.
- 가장 널리 사용되고 있는 **BPSD**의 측정도구이다

BEHAVE-AD의 특징

- 모든 측정항목들은 AD 환자에게서 공통적으로 발생하는 특징적인 행동증상이다.
- 모든 측정항목들은 AD 환자에게서 공통적으로 존재하는 난치성 인지적 증상들과는 관련이 없다
- 모든 측정항목들은 AD 환자의 간병인을 괴롭히는 증상들로 구성되어 있다
- 모든 측정항목들은 임상적 경험에 따라 AD 환자에서 치료가능한 증상들로 구성되어 있다

BEHAVE-AD

제 1 부: 증상군 – 평가방법

- 간병인에게서 얻은 정보로 4 점 척도로 평가한다
 - 0: 없다
 - 1: 있다
 - 2: 있고, 감정적인 요소가 보편적으로 존재한다
 - 3: 있고, 감정적인 요소와 신체적인 요소가 보편적으로 존재한다
- 면담 시작 2 주일 전부터 면담 직전까지의 2 주일 이내에 있었던 증상만이 평가의 대상이다.
- 증상이 짧은 기간 동안 존재했다가 이내 사라지기도 하므로, 면담 도중 종종 2 주일 이내에 있었던 증상인지를 확인할 필요가 있다.

The Behavioral Pathology in Alzheimer's Disease Rating Scale

BEHAVE-AD

**Behavioral symptoms in Alzheimer's
disease: phenomenology and treatment**

Reisberg *et al.* *J Clin Psychiatry* 1987; 48 (S5): 9–15

알츠하이머병의 행동적 정신병리 평가척도 한국어판
(BEHAVE-AD-K)의 신뢰도 및 증상군별 점수 분석*

서국희¹ · 손현균¹ · 신형주¹ · 김인명¹ · 홍상의²
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**Reliability and Analysis of Symptom Category Scores of
the Behavior Pathology in Alzheimer's Disease Rating Scale,
Korean Version(BEHAVE-AD-K)**

알츠하이머병의 행동적 정신병리 평가척도 한국어판
(BEHAVE-AD-K) :
알츠하이머병 입원 환자에서의 요인 구조*

서 국 희¹ · 박 종 한²

**The Behavior Pathology in Alzheimer's Disease Rating Scale,
Korean Version (BEHAVE-AD-K) :
Factor Structure among Alzheimer's Disease Inpatients**

BEHAVE-AD

Part 1: Symptomatology

- **Assesses 25 symptoms in 7 categories or clusters**
 - **A. Paranoid and delusional ideation**
 - **B. Hallucinations**
 - **C. Activity disturbances**
 - **D. Aggressiveness**
 - **E. Diurnal rhythm disturbances**
 - **F. Affective disturbances**
 - **G. Anxieties and phobias**

BEHAVE-AD Categories

- **A. Paranoid and delusional ideation**
 - 1. People are stealing things
 - 2. One's house is not one's home
 - 3. Spouse (or other caregiver) is an imposter
 - 4. Delusion of abandonment
 - 5. Delusion of infidelity
 - 6. Suspiciousness/paranoia (other than above)
 - 7. Delusions (other than above)



BEHAVE-AD

Part 1: Symptomatology – Rating

- **Caregivers rate each symptom on a 4-point scale:**
 - **0: not present**
 - **1: present**
 - **2: present, generally with an emotional component**
 - **3: present, generally with an emotional and physical component**
- **Reference is to 2 weeks prior to the interview**

BEHAVE-AD Categories

A. Paranoid and delusional ideation

e.g.

- **2. One's house is not one's home**
 - **0: not present**
 - **1: conviction that the place in which one is residing is not one's home**
 - **2: attempt to leave domicile to go home**
 - **3: violence in response to attempts to forcibly restrict exit**



BEHAVE-AD Categories

- **A. Paranoid and delusional ideation**
- **Maximal score: $7 \times 3 = 21$**

BEHAVE-AD Categories

- **B. Hallucinations**
 - 8. **Visual hallucinations**
 - 9. **Auditory hallucinations**
 - 10. **Olfactory hallucinations**
 - 11. **Haptic hallucinations**
 - 12. **Other hallucinations**



- **Maximal score: 15**

BEHAVE-AD Categories

- **C. Activity disturbances**
 - 13. Wandering: away from home or caregiver
 - 14. Purposeless activity
 - 15. Inappropriate activity
- **Maximal score: 9**



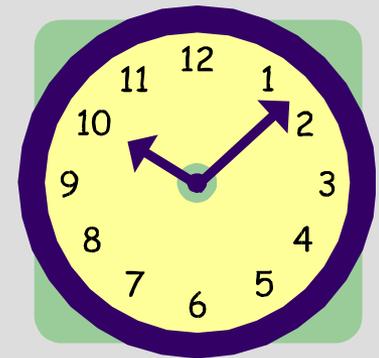
BEHAVE-AD Categories

- **D. Aggressiveness**
 - 16. Verbal outbursts
 - 17. Physical threats and/or violence
 - 18. Agitation (other than above)
- **Maximal score: 9**



BEHAVE-AD Categories

- **E. Diurnal rhythm disturbances**
 - **19. Day/night disturbance**
- **Maximal score: 3**



BEHAVE-AD Categories

- **F. Affective disturbance**
 - **20. Tearfulness**
 - **21. Depressed mood: other**
- **Maximal score: 6**

BEHAVE-AD Categories

- **G. Anxieties and phobias**
 - 22. Anxiety regarding upcoming events (Godot syndrome)
 - 23. Other anxieties
 - 24. Fear of being left alone
 - 25. Other phobias
- **Maximal score: 12**

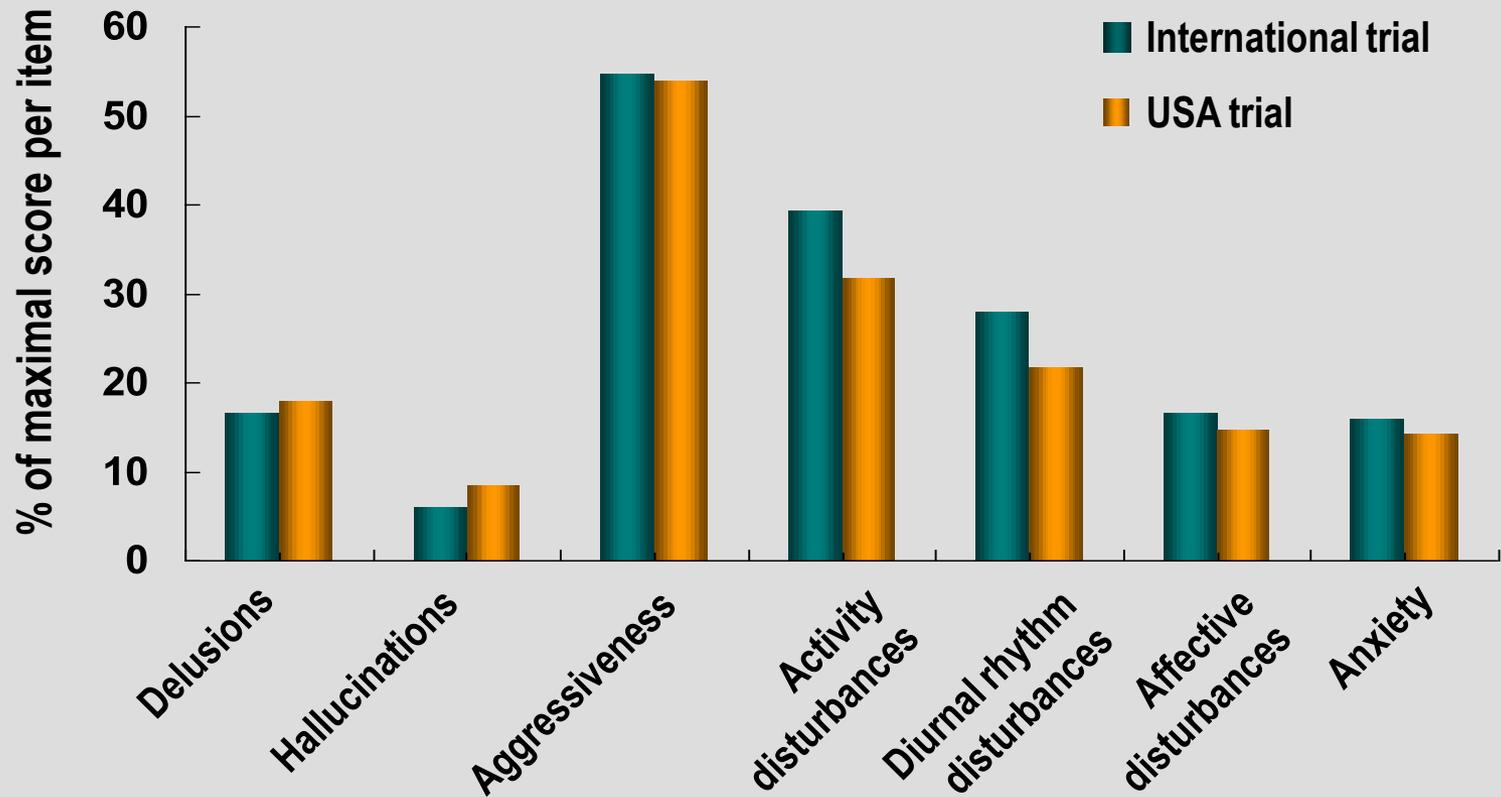


BEHAVE-AD

Part 2: Global Rating = global measure of the severity of the disturbance

- 0 = not at all troubling to the caregiver or dangerous to the patient**
- 1 = mildly troubling to the caregiver or dangerous to the patient**
- 2 = moderately troubling to the caregiver or dangerous to the patient**
- 3 = severely troubling or intolerable to the caregiver or dangerous to the patient**

BEHAVE-AD Clusters: Baseline Scores



Neuropsychiatric Inventory

NPI

**The Neuropsychiatric Inventory:
comprehensive assessment of
psychology in dementia**

Cummings *et al. Neurology* 1994; 44: 2308 - 14

12 behavioral areas of NPI

- delusions
- hallucinations
- agitation
- depression
- anxiety
- euphoria
- apathy
- disinhibition
- irritability
- aberrant motor behavior
- night-time behaviors
- appetite & eating disorders

Scoring

- For each domain there are 4 scores; Frequency, severity, total (freq X sev) and caregiver distress.
- The possible highest score is 144 (i.e., A maximum of 4 in the frequency rating X 3 in the severity rating X 12 remaining domains).
- This relates to changes, usually over the 4 weeks prior to completion.

Frequency rating

1 = occasionally – less than once per week

2 = often – about once per week

3 = frequently – several times a week but less than every day

4 = very frequently – daily or essentially continuously present

Severity rating

- 1 = mild – produce little distress in the patient**
- 2 = moderate – more disturbing to the patient but can be redirected by the caregiver**
- 3 = severe – very disturbing to the patient and difficult to redirect**

Caregiver distress rating

0 = no distress

1 = minimal

2 = mild

3 = moderate

4 = moderate severe

5 = very severe or extreme

Cohen-Mansfield Agitation Inventory

CMAI

**Agitated behaviors in the elderly. II.
Preliminary results in the cognitively
deteriorated.**

Cohen-Mansfield. *JAGS* 1986; 34: 722 - 7

Agitated behaviours among the institutionalized elderly with dementia: validation of the Korean version of the Cohen-Mansfield Agitation Inventory

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SUMMARY

Objectives To analyze the factor structure, the criterion validity, the internal consistency, inter-rater reliability and test-retest reliability of the Korean version of Cohen-Mansfield Agitation Inventory, to provide data on the frequency and distribution of agitated behaviours, and to compare patterns of agitated behaviours among the institutionalized elderly with Alzheimer's disease (AD) or Vascular dementia (VaD).

Methods The Korean version of the Cohen-Mansfield Agitation Inventory (CMAI-K) was administered to a total of 257 elderly with AD or VaD in a nursing home in Seoul, Korea. Three kinds of reliability and criterion validity were tested. Factor analysis using principal component analysis with the varimax rotation was performed. To identify different patterns of agitated behaviours, multiple logistic regression analysis was used.

Results This study demonstrated satisfactory reliability and validity for the CMAI-K as an instrument measuring agitation in Korean dementia sufferers in nursing homes. Eighty-three percent of the subjects manifested one or more agitated behaviours at least once a week. Factor analysis yielded four subtypes of agitation: physically aggressive behaviours, physically nonaggressive behaviours, verbally agitated behaviours, and hiding/hoarding behaviours.

Conclusion These results indicate that the CMAI-K is a reliable and valid instrument to measure agitated behaviours in Korean elderly with AD or VaD. These results validate and expand previous research on the agitation in dementia, and guide in the development of interventions. Copyright © 2004 John Wiley & Sons, Ltd.

Overview of CMAI

- **time taken 10 – 15 minutes**
- **rating by carers (rater training is essential)**
- **7-point rating scale assessig the frequency with which patients manifest up to 29 agitated behaviors**

Definition of agitation in CMAI

- **inappropriate verbal, vocal, or motor activity that is not judged by an outside observer to result directly from the needs or confusion of the agitated individual**
- **agitation is not a diagnostic term, but rather a term used by clinicians for a group of symptoms that may reflect an underlying disorder.**

Definition of agitation in CMAI

- **agitated behavior is always socially inappropriate, and can be manifested in three ways**
 - It may be abusive or aggressive toward self or other
 - It may be appropriate behavior performed with inappropriate frequency, such as constantly asking questions.
 - It may be inappropriate according to social standards for the specific situation, as in taking off clothes in the activity room.

Scoring the CMAI

- 1 – never**
- 2 – less than once a week but still occurring**
- 3 – once or twice a week**
- 4 – several times a week**
- 5 – once or twice a day**
- 6 – several times a day**
- 7 – several times an hour**

Detailed description of behavior

- **pacing and aimless wandering – constantly walking back and forth, including wandering when done in a wheelchair. Does not include normal purposeful walking**
- **spitting (including while feeding) – spitting onto floor, other people, etc.; does not include uncontrollable salivating, or spitting into tissue, toilet, or onto ground outside**

Detailed description of behavior

- **cursing or verbal aggression – only when using words; swearing, use of obscenity, profanity, unkind speech or criticism, verbal anger, verbal combativeness. Does not include unintelligible noises (rated under screaming or strange noises)**

Table 2. Means, standard deviations(SD) and frequency of agitated behaviours

| Agitated behaviour Frequency | Mean | SD | Never, n (%) | Less than once a week n (%) | Once or twice a week n (%) | A few times a week n (%) | Once or twice a day n (%) | Several times a day n (%) | A few times an hour n (%) |
|---------------------------------------|------|------|-----------------|-----------------------------------|----------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Hitting (including self) | 1.63 | 1.37 | 201 (78.2) | 10 (3.9) | 17 (6.6) | 7 (2.7) | 12 (4.7) | 10 (3.9) | 0 (0.0) |
| Kicking | 1.31 | 1.02 | 231 (89.9) | 3 (1.2) | 8 (3.1) | 4 (1.6) | 6 (2.3) | 5 (1.9) | 0 (0.0) |
| Grabbing onto people | 1.51 | 1.24 | 207 (80.5) | 14 (5.4) | 17 (6.6) | 4 (1.6) | 6 (2.3) | 7 (2.7) | 2 (0.8) |
| Pushing | 1.61 | 1.31 | 197 (76.7) | 18 (7.0) | 13 (5.1) | 9 (3.5) | 13 (5.1) | 7 (2.7) | 0 (0.0) |
| Throwing things | 1.33 | 0.96 | 223 (86.8) | 9 (3.5) | 12 (4.7) | 4 (1.6) | 6 (2.3) | 3 (1.2) | 0 (0.0) |
| Biting | 1.14 | 0.63 | 240 (93.4) | 8 (3.1) | 4 (1.6) | 2 (0.8) | 1 (0.4) | 2 (0.8) | 0 (0.0) |
| Scratching | 1.19 | 0.81 | 239 (93.0) | 3 (1.2) | 7 (2.7) | 1 (0.4) | 4 (1.6) | 3 (1.2) | 0 (0.0) |
| Spitting | 1.35 | 1.22 | 232 (90.3) | 2 (0.8) | 6 (2.3) | 2 (0.8) | 3 (1.2) | 7 (2.7) | 4 (1.6) |
| Hurt self or others | 1.27 | 0.86 | 224 (87.2) | 13 (5.1) | 9 (3.5) | 4 (1.6) | 3 (1.2) | 3 (1.2) | 0 (0.0) |
| Tearing things or destroying property | 1.18 | 0.84 | 241 (93.8) | 3 (1.2) | 3 (1.2) | 1 (0.4) | 5 (1.9) | 2 (0.8) | 1 (0.4) |
| Making physical sexual advances | 1.13 | 0.66 | 245 (85.3) | 3 (1.2) | 5 (1.9) | 0 (0.0) | 2 (0.8) | 1 (0.4) | 1 (0.4) |
| Paces, aimless wandering | 2.13 | 1.98 | 185 (72.0) | 5 (1.9) | 13 (5.1) | 4 (1.6) | 11 (4.3) | 31 (12.1) | 8 (3.1) |
| Inappropriate dress or disrobing | 1.49 | 1.29 | 216 (84.0) | 9 (3.5) | 9 (3.5) | 5 (1.9) | 8 (3.1) | 8 (3.1) | 2 (0.8) |
| Trying to get to a different place | 1.58 | 1.43 | 212 (82.5) | 7 (2.7) | 12 (4.7) | 5 (1.9) | 5 (1.9) | 13 (5.1) | 3 (1.2) |
| Intentional falling | 1.05 | 0.36 | 250 (97.3) | 2 (0.8) | 4 (1.6) | 0 (0.0) | 1 (0.4) | 0 (0.0) | 0 (0.0) |
| Eating inappropriate substances | 1.17 | 0.81 | 243 (94.6) | 3 (1.2) | 4 (1.6) | 0 (0.0) | 2 (0.8) | 5 (1.9) | 0 (0.0) |
| Handling things inappropriately | 1.65 | 1.54 | 209 (81.3) | 7 (2.7) | 10 (3.9) | 6 (2.3) | 6 (2.3) | 15 (5.8) | 4 (1.6) |
| Hiding things | 1.79 | 1.66 | 203 (79.0) | 5 (1.9) | 6 (2.3) | 10 (3.9) | 10 (3.9) | 22 (8.6) | 1 (0.4) |
| Hoarding things | 1.79 | 1.63 | 201 (78.2) | 6 (2.3) | 7 (2.7) | 9 (3.5) | 15 (5.8) | 18 (7.0) | 1 (0.4) |
| Performing repetitious mannerisms | 2.02 | 2.03 | 199 (77.4) | 6 (2.3) | 2 (0.8) | 4 (1.6) | 5 (1.9) | 26 (10.1) | 15 (5.8) |
| General restlessness | 2.16 | 1.99 | 179 (69.6) | 13 (5.1) | 11 (4.3) | 4 (1.6) | 9 (3.5) | 32 (12.5) | 9 (3.5) |
| Screaming | 2.22 | 1.81 | 160 (62.3) | 14 (5.4) | 23 (8.9) | 14 (5.4) | 21 (8.2) | 22 (8.6) | 3 (1.2) |
| Making verbal sexual advances | 1.27 | 0.97 | 233 (90.7) | 6 (2.3) | 5 (1.9) | 2 (0.8) | 5 (1.9) | 4 (1.6) | 1 (0.4) |
| Cursing or verbal aggression | 2.13 | 1.71 | 160 (62.3) | 19 (7.4) | 26 (10.1) | 11 (4.3) | 21 (8.2) | 18 (7.0) | 2 (0.8) |
| Repetitive sentences or questions | 2.21 | 2.00 | 179 (69.6) | 6 (2.3) | 10 (3.9) | 8 (3.1) | 18 (7.0) | 27 (10.5) | 9 (3.5) |
| Strange noises | 1.60 | 1.57 | 218 (84.8) | 5 (1.9) | 4 (1.6) | 5 (1.9) | 5 (1.9) | 13 (5.1) | 7 (2.7) |
| Complaining | 2.10 | 1.71 | 164 (63.8) | 16 (6.2) | 29 (11.3) | 7 (2.7) | 20 (7.8) | 19 (7.4) | 2 (0.8) |
| Negativism | 1.92 | 1.63 | 178 (69.3) | 18 (7.0) | 19 (7.4) | 8 (3.1) | 17 (6.6) | 14 (5.4) | 3 (1.2) |
| Constant request for attention | 1.89 | 1.68 | 188 (73.2) | 13 (5.1) | 13 (5.1) | 5 (1.9) | 20 (7.8) | 14 (5.4) | 4 (1.6) |

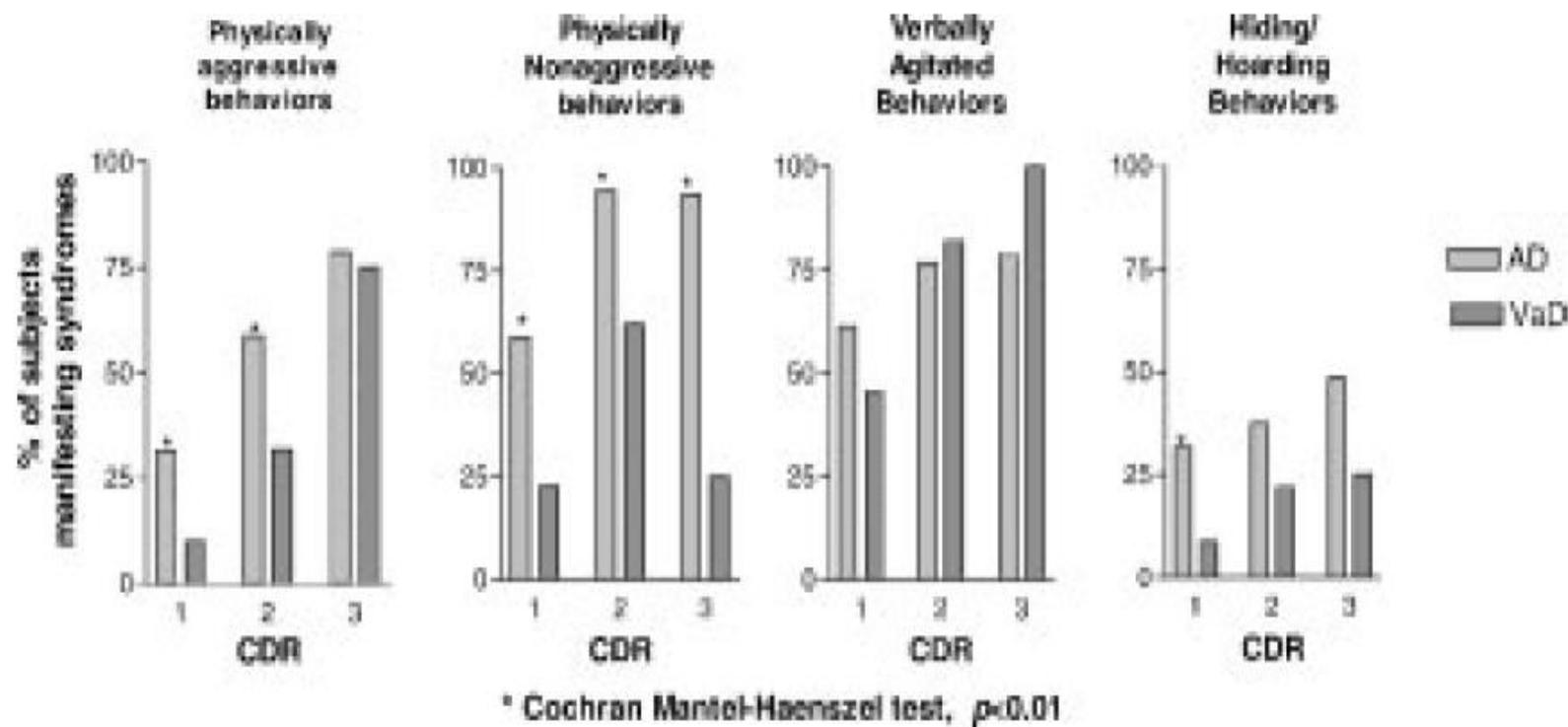


Figure 1. Prevalence of agitated behaviours of the CMAI-K at each Clinical Dementia Rating Scale (CDR) stage in Alzheimer's disease (AD) and vascular dementia (VaD)

Other assessment scales on behavioral disturbance

- CUSPAD
- MOUSEPAD
- PBE (Present Behavioral Examination)
- CERAD behavioral rating scale
- RAGE
- OAS
- NRS
- COBRA
- NOSIE
- DBRS

Table II. Efficacy outcomes in the study population after 16 weeks in patients receiving galantamine (n = 234) or no treatment (community control; n = 66). (Values are expressed as mean [SE] unless otherwise indicated.)

| Scale | Change from Baseline | | | | | | | |
|------------------------------------|----------------------|---------------------|---------------------|------------|---------------------------------|---------|---------|-----------------------------|
| | Galantamine | | | Control | Treatment Difference vs Control | | | F or z Score; P |
| | 8 mg/d (n = 76) | 16 mg/d (n = 78) | 24 mg/d (n = 80) | | 8 mg/d | 16 mg/d | 24 mg/d | |
| ADAS-cog/11-K*† | -3.7 (0.8) | -4.1 (0.7) | -5.6 (0.8) | 4.7 (0.5) | -8.4 | -8.8 | -10.3 | F (3,267) = 13.1; P < 0.001 |
| DAD-K*‡ | 1.4 (2.1) | 2.2 (1.5) | 7.1 (1.9) | -5.8 (0.7) | 7.2 | 8.5 | 12.9 | F (3,270) = 4.53; P < 0.005 |
| BEHAVE-AD-K*† | -2.9 (0.7) | -3.5 (0.6) | -3.2 (0.5) | 2.5 (0.5) | -5.4 | -6.0 | -5.7 | F (3,270) = 12.7; P < 0.001 |
| CIBIC-plus-K: improved patients | 33 (43.4%) | 34 (43.6%) | 43 (53.8%) | 7 (10.6%) | 32.8% | 33.0% | 43.2% | z = -2.91; P < 0.004 |

ADAS-cog/11-K = Korean version of the Alzheimer's Disease Assessment Scale-11-item cognitive subscale¹⁵; DAD-K = Korean version of the Disability Assessment for Dementia Scale¹⁹; BEHAVE-AD-K = Korean version of the Behavior Pathology in Alzheimer's Disease Rating Scale^{20,21}; CIBIC-plus-K = Korean version of the Clinician's Interview-Based Impression of Change plus Caregiver Input.¹⁸

*Mixed-model and generalized estimating equations were used to test statistical significance of change from baseline at 16 weeks among the 4 groups, using statistically different baseline characteristics as covariates (ie, age, sex, and duration of formal education). F (3,267) means the F value for mixed model with numerator degree of freedom (ie, 3) and denominator degree of freedom (ie, 267) in parentheses.

†Negative changes indicate improvement.

‡Positive changes indicate improvement.

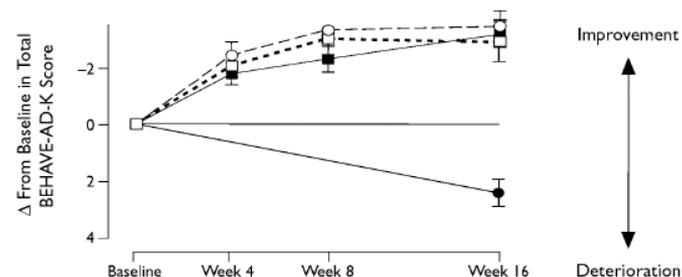


Figure 2. Mean (SE) changes from baseline in total scores of (A) cognitive abilities, as assessed with the Korean version of the Alzheimer's Disease Assessment Scale-11-item cognitive subscale (ADAS-cog/11-K)¹⁵ (P < 0.001 for all galantamine groups combined versus controls at week 16); (B) activities of daily living, as assessed with the Korean version of the Disability Assessment for Dementia Scale (DAD-K)¹⁹ (P < 0.005 for all galantamine groups combined versus controls at week 16); and (C) behavioral symptoms, as assessed with the Korean version of the Behavior Pathology in Alzheimer's Disease Rating Scale (BEHAVE-AD-K) (P < 0.001 for all galantamine groups combined versus controls at week 16).^{20,21} *P = 0.035 versus 8-mg/d group; †P = 0.021 versus 16-mg/d group.

Suh et al. *Dement Geriatr Cogn Disord* 2006; 21: 33-39

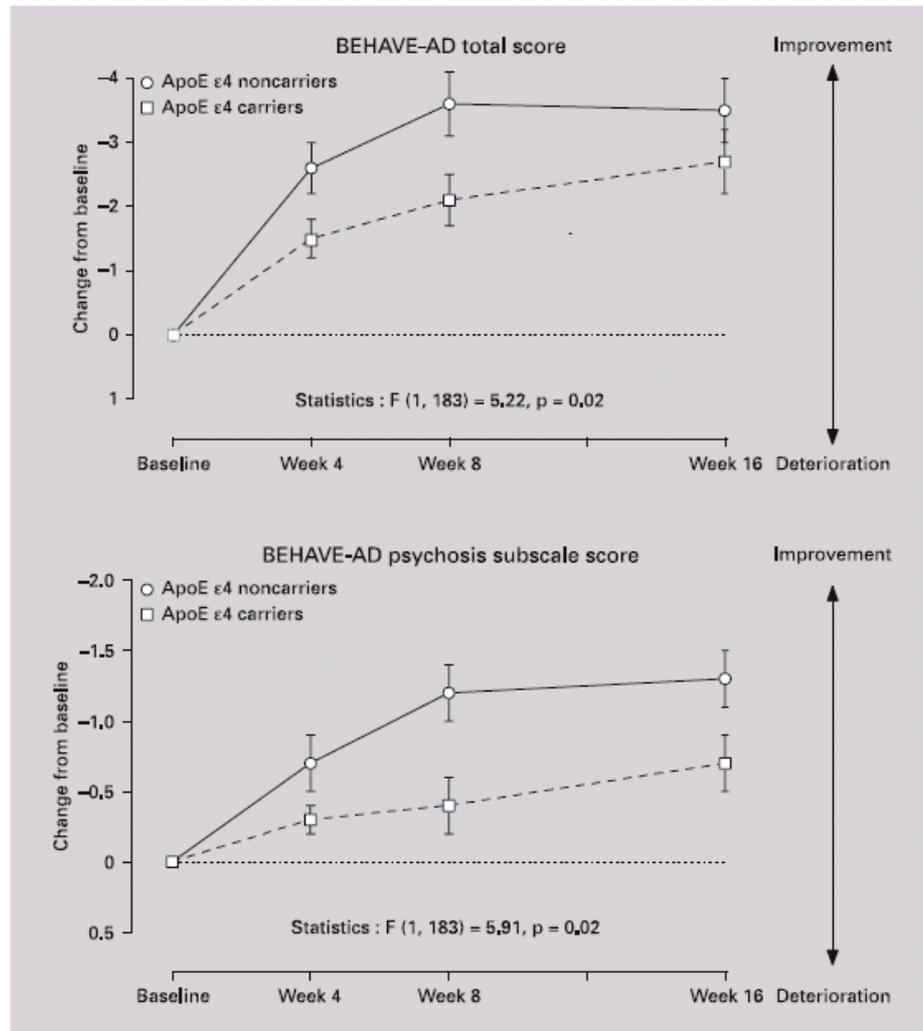


Fig. 1. Mean change (standard error) in ApoE ε4 carriers and ApoE ε4 noncarriers over time from baseline in behavioral symptoms (as assessed with the BEHAVE-AD). F(1, 183) means F value for mixed model with numerator degree of freedom (i.e. 1) and denominator degree of freedom (i.e. 183) in parentheses.

Thank You

