The Overt Agitation Severity Scale for the Objective Rating of Agitation

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Two studies tested the reliability and validity of the Overt Agitation Severity Scale (OASS), a new instrument developed to define and objectively rate the severity of agitated behavior. The authors postulate that agitation should be conceptualized as vocal and motor behaviors on a continuum of expressions that extends from anxiety to aggression. Content validity through expert agreement was achieved in the development of test items, scaling methods, and the process of test construction over a 2-year period. Results of two pilot studies (n = 25 and n = 14 subjects) established the reliability and validity of the OASS to measure agitation severity. The OASS differs from other agitation scales in that it confines its rating exclusively to observable behavioral manifestations of agitation.

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Agitation, as conventionally conceptualized by physicians and other health care professionals, is a commonly occurring, highly disabling set of emotions and behaviors.[1–18] Among elderly persons in skilled nursing facilities and among patients with Alzheimer's disease, the reported incidences of agitation range from 32% to 85%.[19–24] This broad range of incidences may be accounted for by inconsistencies in the nosology, measurement, and definitions of agitation. A regrettable result of the inconsistencies in terminology is the misinterpretation of data, and consequently, ineffective and variable treatment practices. Multiple reports,[25–37] including a recent study by Willcox et al.,[38] have shown that physicians prescribe inappropriate medications for nearly 25% of elderly patients. Prominent among these misused medications are benzodiazepines, barbiturates, neuroleptics, and other psychoactive, sedating drugs. According to an Institute of Medicine report,[39] many of these medications, which may be addicting and/or have deleterious central nervous system and cardiovascular side effects, were misprescribed and overprescribed to sedate or calm the agitated aged person.

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Widely discrepant definitions (Table 1)[1–18,40] and varying standardized rating scales (Table 2) of agitation[2,6–10,12–23,42–46] blur its boundaries with psychiatric diagnoses such as anxiety, mood, and other disorders that may or may not be secondary to general medical conditions. A sampling of the range of cognitive and behavioral attributes in the varying definitions of agitation includes the following:

1. Hoarding or hiding things, inappropriate dressing or undressing, eating/drinking inappropriate substances, and making verbal or physical sexual advances—all components of perhaps the most widely used rating instrument to measure agitation, The Cohen-Mansfield Agitation Inventory[8] (CMAI).
2. Aggressiveness and resisting care—two of the four behavior groups of the Pittsburgh Agitation Scale[50] (PAS).
3. Hostility/aggression, destruction of property, uncooperativeness, noncompliance, and attention-seeking behavior—"target behaviors" of the Behavioral and Emotional Activities Manifested in Dementia[51] (BEAM-D), which is self-described as a scale for "assessing behavioral agitation in dementia."

Because the many definitions of agitation are so broad as to encompass key DSM-IV criteria[52] for specific diagnoses, the clinician may incorrectly conclude that agitation itself is a disorder. When this occurs, therapeutic emphasis is placed on "managing" the agitation generically (for instance, with sedatives), as opposed to diagnosing and treating the underlying disorder that leads to agitation. We have proposed that agitation be conceptualized nondiagnostically by using the observable behaviors outlined in the Overt Agitation Severity Scale (OASS), which, if present, alert the clinician to search for the specific underlying disorders that elicit the agitation.

This article presents the reliability and validity testing of the Overt Agitation Severity Scale, a new instrument for the identification and operational measurement of the severity of agitated behavior (Figure 1). The OASS contains 47 observable characteristics of agitation, which are subcategorized into 12 behaviorally related units. The characteristics were identified as representative of the full content domain of agitation from the clinical and theoretical literature. Further subcategorizations to enhance the instrument's ease of use were anatomically based: 1) vocalizations and oral/facial movements; 2) upper torso and upper extremity movements; and 3) lower extremity movements. Each behavioral subgroup is rated with a Likert-type frequency score from 1, indicating mild symptoms, to 4, indicating

TABLE 1. Examples from published literature of diverse symptoms and behavior designated as agitation

Study	Symptoms and Behavior
Barnes & Raskind 1980[42]	Belligerency Hostility Internal tension
Zimmer et al. 1984[20]	Scratching Refusing to eat Head banging Suicidal behavior Spitting Noisy verbalizations
Cohen-Mansfield 1986[22]	Constant unwarranted requests
Struble & Sivertsen 1987[43]	Increased general movement Climbing out of bed Talking loudly Refusing to cooperate
Thomas 1988[2]	Anxiety Restless walking Sleep disturbance Confusion Inappropriate behavior
Mungas et al. 1989[46]	Hyperactivity Rapid speech Crying
Roper et al. 1991[4]	Tension Assaultiveness Sexual impulsiveness Uncooperativeness Disruptiveness
Billig et al. 1991[21]; Cohen-Mansfield & Marx 1992[6]	Irritability Cursing Biting Inappropriate behavior Repeated questions
Sinha et al. 1992[51]	Noncompliance Attention seeking Sexually inappropriate behavior Hoarding
Pies 1993[45]	Subjective distress
Aronson et al. 1993[7]	Wandering Hitting Kicking Shouting
Sandel et al. 1995[47]	Fluctuating levels of awareness and cognition Akathisia Mood disturbances Disinhibition
Bogner & Corrigan 1995[49]	Excessive behavior Altered state of consciousness
Brooke et al. 1992[1]	Episodic motor/verbal behavior
Fawcett et al. 1995[40]	Wringing hands Pacing
Finkel et al. 1995[48]	Severe discomfort Disruptive behavior
Gallop et al. 1993[16]	Self-harmful behavior
Stewart 1995[17]	Tearfulness Screaming Accusatory behavior
Zayas & Grossberg 1996[18]	Spitting Belligerence Aimlessness Pacing Screaming

TABLE 2. An overview of current instruments that measure agitation

Rating Scale	Type	Content	Reliability and Validity	Author
Cohen-Mansfield Agitation Inventory (CMAI)	Observational rating or interview rating	Agitated behavior	Interrater reliability, $r=0.92$ Factor analysis revealed 3 factors: aggressive behavior, physically nonaggressive behavior, and verbally agitated behavior	Cohen-Mansfield 1986[22]
Disruptive Behavior Rating Scale (DBRS)	Observational rating	Physical aggression Verbal aggression Agitation Wandering	Agitation correlations between the DBRS and Nurse's Assessment Ratings: severity, $r=0.73$, $P<0.001$; distress, $r=0.51$, $P<0.05$ Interrater reliability, $r=0.70$	Mungas et al. 1989[46]
Behavioral and Emotional Activities Manifested in Dementia (BEAM-D)	Observational rating	Hostility Aggression Destruction Disruption Uncooperativeness Noncompliance Attention-seeking Sexually inappropriate behavior Wandering Hoarding	Interrater reliability, $r=0.90$	Sinha et al. 1992[51]
Brief Agitation Rating Scale (BARS)	Observational rating	Physical aggression Physical (nonaggressive) Verbal agitation	Interitem correlations between CMAI and BARS, $r=+0.74$, -0.82 Interrater reliability, $r=0.73$	Finkel et al. 1993[41]
Pittsburgh Agitation Scale (PAS)	Observational rating	Agitated behavior	Intraclass correlation for the total PAS, $r=0.82$ Interrater reliability, $r=0.61$, $P<0.01$	Rosen et al. 1994[50]

very severe symptoms. For each subgroup, a corresponding 5-point Likert-type frequency is selected by the rater from 0, indicating the behavior is not present, to 4, indicating the behavior is always present. The total OASS score is obtained by multiplying each item's frequency response by a weight that corresponds to the intensity of the symptom being measured. These weighted responses are then added to summarize the severity of agitation. For patients with neuromuscular disorders (Parkinson's disease, akathisia, tardive dyskinesia), in which impaired motor activity can mimic agitation, a baseline nonagitated OASS score is obtained and subtracted from the score obtained during an agitated state to determine the revised OASS score.

METHODS

The testing periods for the OASS comprised a 15-minute observation period from a distance of 20 feet or greater in an open area on the treatment unit. Two pilot studies were conducted to examine the reliability and validity of the OASS. A total of 39 subjects, ages 60 years or older, identified by trained psychiatric nursing staff as "agitated," were selected through consecutive sampling from a 32-bed general psychiatric inpatient unit of an acute care teaching hospital in Houston, TX. Agitated behaviors were determined by staff working within the shift where 1) subjects were noted to have symptoms disabling enough to interfere with their daily routine or 2) the symptoms led to the administration of medication on more than one occasion. Approval of the use of human subjects in these studies was obtained from the Affiliates Review Board of Baylor College of Medicine, Houston, TX.

Reliability was assessed through estimates of internal consistency and equivalence based on Total OASS score. Equivalence reliability was calculated in study 1 between two independent sets of raters by using a corrected Pearson's correlation coefficient. In both study 1 and study 2, internal consistency was calculated by the split-half procedure corrected according to the Spearman-Brown formula.

Convergent validity was tested through correlating the OASS and the PAS.[50] Although a formal "gold standard" for measuring agitation does not exist, the PAS is a commonly used instrument administered in much the same way as the OASS. The PAS is a 4-item observer-scored scale in which behavior groups are ranked by intensity from 0, indicating not present, to 4, indicating the most severe behavior. The behavior groups include aberrant vocalizations, motor agitation, aggressiveness, and resisting care. A corrected Pearson's product-

FIGURE 1. The Overt Agitation Severity Scale (OASS).

OVERT AGITATION SEVERITY SCALE (OASS)

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INTENSITY (I)	BEHAVIOR	FREQUENCY (F)					SEVERITY SCORE (SS) (IxF=SS)
A.	**Vocalizations & Oral/Facial Movements**	NOT PRESENT	RARELY	SOME OF THE TIME	MOST OF THE TIME	ALWAYS PRESENT	
1	Whimpering, whining, moaning, grunting, crying	0	1	2	3	4	=
2	Smacking or licking of lips, chewing, clenching jaw; licking, grimacing, spitting	0	1	2	3	4	=
3	Rocking, twisting, banging of head	0	1	2	3	4	=
4	Vocal perseverating, screaming, cursing, threatening, wailing	0	1	2	3	4	=
B.	**Upper Torso & Upper Extremity Movements**						
1	Tapping fingers, fidgeting, or wringing of hands, swinging or flailing arms	0	1	2	3	4	=
2	Task perseverating (e.g., opening and closing drawers, folding and unfolding clothes, picking at objects, clothes, or self, pulling at own hair)	0	1	2	3	4	=
3	Rocking (back & forth), bobbing (up and down), twisting, writhing of torso; rubbing or masturbating self	0	1	2	3	4	=
4	Slapping, swatting, hitting at objects or others	0	1	2	3	4	=
C.	**Lower Extremity Movements**						
1	Tapping toes, clenching toes, tapping heel, extending, flexing or twisting foot	0	1	2	3	4	=
2	Shaking legs, tapping knees and/or thighs, thrusting pelvis, stomping	0	1	2	3	4	=
3	Pacing, wandering	0	1	2	3	4	=
4	Thrashing legs, kicking at objects or others	0	1	2	3	4	=

Total OASS ☐

Subtract Baseline OASS ☐

Revised OASS ☐

Instructions for Completing Form

Step One: For each behavior, circle the corresponding frequency after 15 minutes of observation.

Step Two: For every behavior exhibited, multiply the Intensity score (I) by the Frequency (F) and record as the Severity Score (SS).

Step Three: For the OVERT AGITATION SEVERITY SCORE (OASS), total all severity scores and record as Total OASS.

Step Four: Does this patient have a Neuromuscular Disorder (i.e., Parkinson's Disease, tardive dyskinesia), affecting Total OASS? Yes No

Step Five: If yes, please establish a baseline OASS in non-agitated state and subtract from above Total OASS for Revised OASS.

COMMENTS:

DIAGNOSIS:_____ NAME OF RATER:_____

SEX OF PATIENT: MALE(1); FEMALE(2) TIME OF OBSERVATION:_____

AGE:_____ DATE:_____

CURRENT MEDICATION:		
Name:	Dose:	Frequency:
Name:	Dose:	Frequency:
Name:	Dose:	Frequency:
Name:	Dose:	Frequency:
Name:	Dose:	Frequency:

moment correlation statistic was used to test this association.

Discriminant validity was assessed through correlating the OASS and the Overt Aggression Scale[53] (OAS). The OAS is a one-page, 16-item objective behavioral rating scale used to measure four specific categories of aggressive behavior. These categories include verbal aggression, physical aggression against objects, physical aggression against self, and physical aggression against others. Each category of behavior contains four smaller units of behavior grouped by intensity. Further evaluation of discriminant validity was established through correlations between the total scores from an agitated and a nonagitated observation period. A corrected Pearson's product-moment correlation statistic was used for testing discriminant validity.

In the first study, two raters examined the same 25 subjects and completed the OASS, the OAS, and the PAS. In the second study, one rater examined another 14 subjects with the OASS during agitated periods of 15 minutes and 1 hour as well as subsequent nonagitated periods of 8 and 16 hours.

RESULTS

The subjects' mean age was 73 years (SD = 7). Forty-three percent were male and 57% were female. Thirty-six percent of the subjects were diagnosed with major depression, 29% dementia, 7% personality disorder, 7% atypical psychosis, and 21% alcohol abuse. The mean scores on the OASS for study 1 were 50.56 for rater 1 and 52.20 for rater 2. In study 2, the mean scores on the OASS changed from 56.21 at the 15-minute observation period, to 89.50 at 1 hour, 17.79 at 8 hours, and 43.29 at 16 hours.

Reliability

Evidence of internal consistency reliability in study 1 for the OASS was established through corrected split-half reliabilities of 0.88 for rater 1 and 0.91 for rater 2. In study 2, reliabilities revealed 0.97 (at 15 minutes), 0.91 (at 1 hour), − 0.10 (at 8 hours), and 0.69 (at 16 hours).

A corrected Pearson's correlation coefficient indicated a high positive degree of equivalence reliability ($r = 0.90$, $P < 0.01$) between the total scores of rater 1 and rater 2 on the OASS.

Validity

Assumptions of normality, linearity, and homoscedasticity (equal variance) for the Pearson's product-moment correlation coefficient were met. Evidence of convergent construct validity was established in study 1 with strong associations between the PAS and the OASS by rater 1 ($r = 0.81$, $P < 0.01$) and the PAS and the OASS by rater 2 ($r = 0.82$, $P < 0.01$). Discriminant validity between the OASS and the OAS was established through a low positive correlation in study 1 ($r = 0.28$, $P < 0.01$). Further discriminant validity was established through a low positive correlation between the 15-minute agitation rating and the 16-hour nonagitated rating ($r = 0.29$, $P < 0.01$).

DISCUSSION

The OASS was developed to obviate the ambiguity and lack of specificity that alloy the current conceptualizations of agitation. Results of initial testing of the OASS show it to have comparable reliability to the PAS. The unexpected finding of low reliability at the 8-hour observation likely resulted from changed symptom profiles after medication was administered, which may have affected the various items of the OASS. This finding warrants further consideration. Were the medications administered by nursing staff on the unit to "treat" agitation too sedating?

Critical in the evaluation of the OASS was the validity assessment, which tested the relationship between the behavioral domains of agitation and aggression. It is this distinguishing finding that separates the OASS from other instruments purporting to measure agitation. The conceptual approach of the OASS to defining agitation differs from those of the PAS and other agitation scales. Unlike the other scales, OASS confines its ratings exclusively to observable behavioral manifestations representative of the content domain of agitation. In this fashion, the OASS minimizes inference and subjective clinical judgments such as whether or not a particular behavior is "resisting care" (PAS behavior group). Additionally, the OASS is constructed to rate agitation, specifically, as opposed to rating a large range of problem behaviors.

Among the differences between the OASS and the CMAI is that the latter is a retrospective rating instrument that uses data collected over a 2-week period and represents the content domains of agitation, aggression, and other problem behaviors. The OASS is based on one 15-minute observation period, and it was conceptualized in a way that would remove etiological or inferential considerations from the rating of agitation and thus make the scale as objective as possible. Efforts were also made in the conceptualization and design of the OASS to minimize the overlap of agitation with other behavioral or cognitive conditions such as aggression or psychosis. Ideally, if the levels of agitation severity are equivalent in different patients whose agitation stems

from different sources (delirium, paranoid psychosis, mania), their OASS scores will be the same. The brief observation requirements for the OASS would enable the use of this instrument in acute care settings such as a general hospital's intensive care or psychiatric unit, where average lengths of stay are considerably briefer than 2 weeks.

CLINICAL RELEVANCE OF THE OASS

A clinical consequence of not clearly defining and identifying the severity of agitation is that underlying conditions go undiagnosed and untreated; at the same time, symptomatic treatment leads to increased use of physical restraints[54–56] and to improper pharmacotherapy with dangerous and debilitating side effects, toxic effects, and dependencies.[30] Harrington et al.[57] reviewed 19 studies of psychotropic drug use in residents of long-term care facilities. This review found that the class of psychotropics most commonly used was antipsychotics, followed by sedatives/hypnotics, antidepressants, and antianxiety drugs, and that the rates of use ranged from 33% to 90%. Buck[58] reviewed 33,351 Medicaid-eligible elderly persons and documented that 44% were receiving antipsychotic medication. Importantly, the Omnibus Reconciliation Act (OBRA) of 1987 was designed to establish guidelines for the use of antipsychotics for elderly patients and others in intermediate and skilled nursing homes and specifically prohibited the use of neuroleptics for agitation. Semla et al.[59] conducted a retrospective cohort study of residents of a 485-bed intermediate care facility and determined that agitation was the most frequently reported target symptom for which antipsychotics were prescribed prior to OBRA regulations. Although this and other studies document a reduced level of antipsychotic use in elderly persons in institutionalized populations,[60–63] inappropriate use of psychotropics remains high for elderly persons in all environments.[42] There is also evidence that other classes of psychotropics—particularly benzodiazepines—are now being used and misused to "treat" agitation in elderly persons and that there is a high prevalence of side effects, including oversedation, mental confusion, and memory impairment, as well as dependency.[22,30,31,64–68]

The OASS defines and rates the severity of agitation as a distinct entity from the underlying disorders that elicit the agitation. This scale thus facilitates the conduct of outcome research on medications and behavioral management techniques to treat agitation. Presently, there is no FDA-approved medication to treat agitation.[68,69] It is possible that pharmacological agents may exist or may be developed that directly treat this condition, as opposed to treating the underlying disorder and secondarily affecting agitation. The OASS, because it rates only agitation and not underlying disorders, could be helpful in testing such medications. In contrast, a rating scale that encompassed, for example, psychotic ideation as a criterion for agitation might not have the capacity to differentiate whether a medication was directly affecting agitation or was, instead, treating psychosis and only secondarily affecting agitation.

CONCLUSION

The OASS is a new scale that is a reliable and valid measure of agitation severity based on objectifiable vocalizations and motoric upper and lower body behaviors. The OASS has demonstrated sensitivity to rate agitation severity during agitated and nonagitated periods. Required in the future will be continued testing of the OASS through factor analysis and further validation of its use in agitated adults and children with traumatic brain injuries, deliria, mental retardation, and other neuropsychiatric conditions.

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