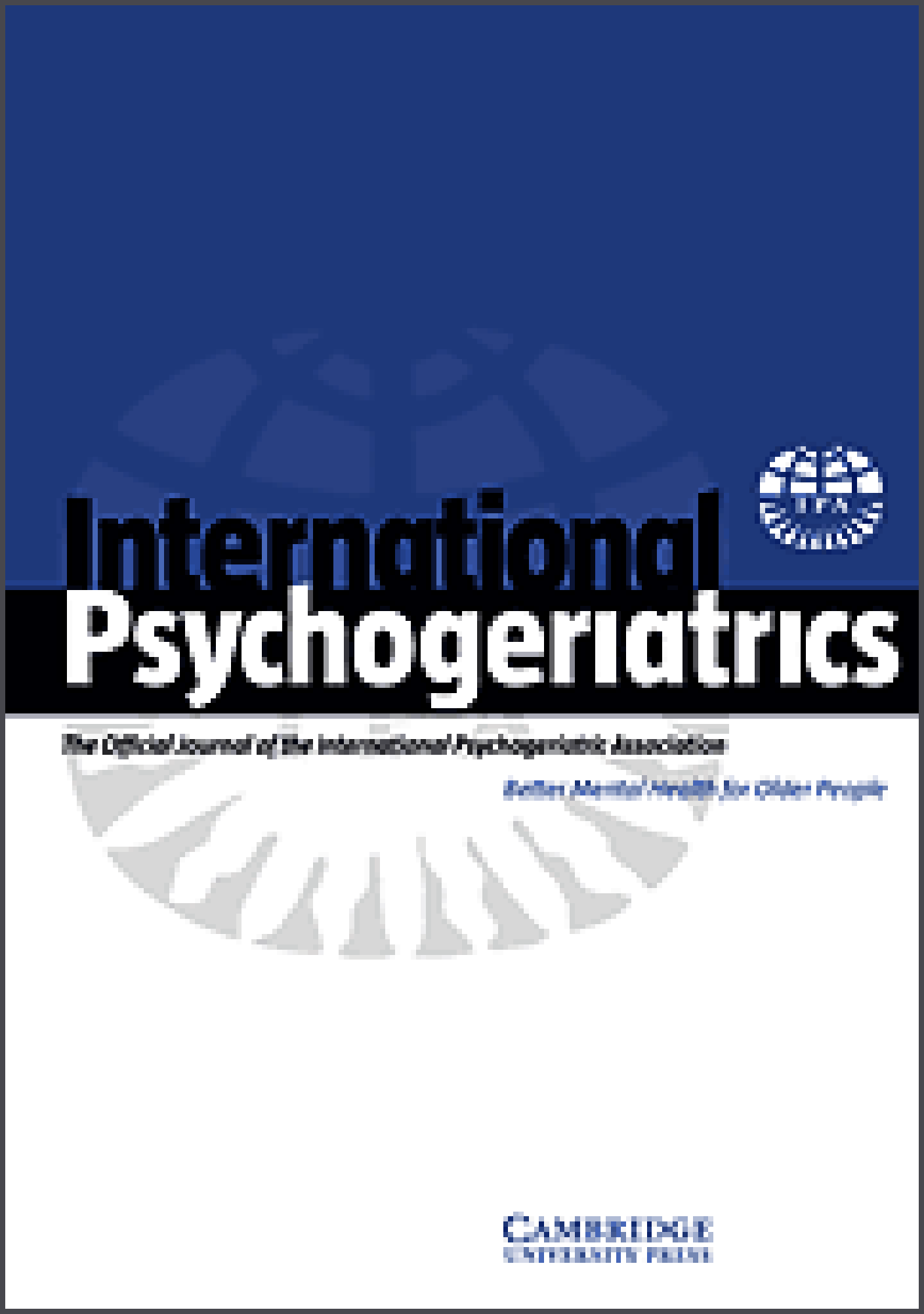
International
Psychogeriatrics
The Official Journal of the International Psychogeriatric Association
Better Mental Health for Older People
CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE JOURNALS

International Psychogeriatrics, Volume 10 - Issue 03

International Psychogeriatrics, Volume 10 - Issue 03

Broken Connections: Alzheimer's Disease Liduin Souren & Emile Franssen. Royersford, PA: Swets & Zeitlinger, 1994. Part 1, Origin and Course, 172 pp., $US 24.00, Part 2, Practical Guidelines for Caring for the Alzheimer Patient, 330 pp., $US 30.00.
Dina LoGiudice

International Psychogeriatrics, Volume 10, Issue 03, pp 341-341
doi: 10.1017/S1041610298235423, Published online by Cambridge University Press 10 Jan 2005

Counseling Troubled Older Adults: A Handbook for Pastors and Religious Caregivers Harold G. Koenig & Andrew J. Weaver. Nashville, TN: Abingdon Press, 1997, 256 pp., Price not stated.
Vahid Payman

International Psychogeriatrics, Volume 10, Issue 03, pp 342-342
doi: 10.1017/S104161029824542X, Published online by Cambridge University Press 10 Jan 2005

Concise Guide to Geriatric Psychiatry, 2nd ed. James E. Spar & Asenath La Rue. Washington, DC: American Psychiatric Press, 1997, 326 pp., $US 21.00.
David Ames

International Psychogeriatrics, Volume 10, Issue 03, pp 343-343
doi: 10.1017/S1041610298255426, Published online by Cambridge University Press 10 Jan 2005

Remembering Well Delys Sargeant & Anne Unkenstein. St. Leonards, NSW, Australia: Allen & Unwin, 1998, 132 pp., Paperback, $Aust 16.95.
James Warner

International Psychogeriatrics, Volume 10, Issue 03, pp 343-344
doi: 10.1017/S1041610298265422, Published online by Cambridge University Press 10 Jan 2005

International Psychogeriatrics, Vol. 10, No. 3, 1998, pp. 303-308

Delirium: Detection and Diagnosis

Detection and Diagnosis of Delirium in the Elderly: Psychiatrist Diagnosis, Confusion Assessment Method, or Consensus Diagnosis?

YIZHUANG ZOU, MARTIN G. COLE, FRANCOIS J. PRIMEAU, JANE MCCUSKER, FRANCOIS BELLAVANCE, AND JOHANNE LAPLANTE

ABSTRACT. The clinical diagnosis of delirium has traditionally been based on an assessment by one or more physicians. Because of the transient, ubiquitous, and fluctuating nature of the symptoms of delirium, however, this approach may be flawed. Therefore, we decided to compare diagnosis based on one assessment by a psychiatrist, diagnosis by a nurse clinician (using the Confusion Assessment Method [CAM] and multiple observation points), and diagnosis by consensus. The study subjects were 87 patients aged 65 and over who were admitted consecutively from the emergency department to the medical wards, and who scored 3 or more on the Short Portable Mental Status Questionnaire. All subjects were assessed independently by one of three psychiatrists (a chart review and clinical examination) and a nurse clinician (using the CAM and multiple observation points). A consensus conference, attended by the three psychiatrists and the nurse clinician, used all available information to reach a consensus diagnosis. Compared to the consensus diagnosis, the clinical diagnosis by a psychiatrist had a sensitivity of .73 (95% confidence interval [CI]: .61-.85), a specificity of .93 (95% CI: .79-1.0), and an agreement kappa coefficient of .58 (95% CI: .41-.74). The nurse clinician diagnosis had a sensitivity of .89 (95% CI: .81-.97), a specificity of 1.00, and an agreement kappa coefficient of .86 (95% CI: .75-.97). These results suggest that one clinical assessment by a psychiatrist may not be the best method for detecting and diagnosing delirium in the elderly. A consensus diagnosis or diagnosis by a trained rater (using the CAM and multiple observation points) may be more sensitive approaches.

Delirium is a mental disorder characterized by acute onset, altered level of consciousness, fluctuating course, and disturbances in orientation, memory, attention, thought, and behavior (Lipowski,

From Beijing Huillonguan Hospital, Beijing, People's Republic of China (Y. Zou, MD, PhD), Department of Psychiatry (M. G. Cole, MD; and F. J. Primeau, MD) and Department of Epidemiology and Biostatistics (J. McCusker, MD, DrPH; and F. Bellavance, PhD), McGill University, Montreal, Canada, and St. Mary's Hospital Center (M. G. Cole, MD; F. J. Primeau, MD; J. McCusker, MD, DrPH; F. Bellavance, PhD; and J. Laplante, MSc), Montreal, Canada.

Received April 9, 1998
Accepted June 23, 1998

Offprints. Requests for offprints should be directed to Martin G. Cole, MD, Department of Psychiatry, St. Mary's Hospital Center, 3830 Avenue Lacombe, Montreal, Quebec, H3T-1M5, Canada.

1990). Diagnosis may be difficult because the symptoms are often transient, ubiquitous, and varying in intensity. Among the elderly, diagnosis may be especially difficult because delirium often presents with hypoactivity rather than with agitation and is superimposed on dementia. Given these clinical characteristics of delirium and the sometimes brief interactions between patients and medical staff, improved detection and diagnosis of delirium will probably require integration of input from everyone involved in caring for elderly patients (Pompei et al., 1995).

The Confusion Assessment Method (CAM) is a structured instrument that allows standardized recording of the nine symptom domains of delirium specified in the third edition, revised, of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III-R; American Psychiatric Association, 1987) (Inouye et al., 1990). The behavior and symptoms associated with each domain are described in explicit terms so that a trained interviewer can conduct the assessment.

The consensus diagnosis method involves assessment of patients by a panel of professionals, commonly multidisciplinary, and uses a structured meeting to exchange information and reach an agreement on diagnosis (Jones & Hunter, 1995). The advantage of this approach is that it allows sharing and discussion of diagnostic information in a structured format to reach a more accurate diagnosis.

The clinical diagnosis of delirium has traditionally been based on an assessment by one or more physicians, usually a psychiatrist, geriatrician, or neurologist (Albert et al., 1992; Inouye et al., 1990; Pompei et al., 1995; Rockwood, 1993; Thomas et al., 1988; Trzepacz et al., 1988). Because of the transient, ubiquitous, and fluctuating nature of the symptoms of delirium, however, this approach may be flawed. Therefore, we decided to compare diagnosis based on one assessment by a psychiatrist, diagnosis by a nurse clinician (using the CAM and multiple observation points), and diagnosis by consensus.

METHOD

Study Sample

The study subjects were 87 patients aged 65 and over who were admitted consecutively from the emergency department to the medical wards of a primary acute care hospital, and who scored 3 or more on the Short Portable Mental Status Questionnaire (SPMSQ; Pfeiffer, 1975).

Design

All subjects were assessed independently at admission by one of two geriatric psychiatrists (M. G. C., F. J. P.) or a research fellow in geriatric psychiatry (Y. Z., a psychiatrist) and a nurse clinician (J. L.). The psychiatrist reviewed the chart, examined each patient once, and completed a clinical diagnostic checklist based on the five criteria of delirium outlined in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994): disturbance of consciousness, inattention, cognitive or perceptual disturbance, acute mental status change, and fluctuation. The requirement for a specific organic etiology in DSM-IV was not included in the checklist because it was often not available at the time of examination. The nurse clinician (who had been trained by one of the

psychiatrists, M. G. C.) gathered demographic information, reviewed the chart, and assessed the patient; before completing the CAM, the nurse clinician would often re-review the chart and reassess the patient during the same day to not miss fluctuations of the symptoms of delirium; consequently, the nurse clinician also had more chance to talk to family members or staff because she spent more time on the wards. The time gap between psychiatrist and nurse clinician assessments varied between 30 minutes and 8 hours; all assessments were done from 8 a.m. to 6 p.m. As suggested by Lewis and colleagues (1995), patients who had five of five criteria were diagnosed with "definite" delirium, patients who had four of five criteria were diagnosed with "probable" delirium, and patients who had three or less of five criteria were diagnosed as "nondelirium." Both definite and probable delirium were recognized as delirium cases in this study to avoid overlooking patients with a partial but clinically significant syndrome. The study was approved by the hospital Research Ethics Committee.

Consensus Diagnosis

In our study, two geriatric psychiatrists, the research fellow, and the nurse clinician attended a biweekly consensus conference to arrive at a consensus diagnosis using a modified nominal group method (Jones & Hunter, 1995). The procedure included the following steps:

1. The nurse clinician reported the results from the SPMSQ, the CAM, and the chart review.
2. One of the psychiatrists reported findings from a chart review and clinical examination.
3. Questions about the clinical features were asked to clarify whether or not these features were present.
4. Each participant independently completed a form indicating the presence or absence of the five DSM-IV criteria for delirium.
5. The forms were compared. If there was any disagreement on diagnosis, discussion followed until a consensus diagnosis was made.

Measures

The SPMSQ is a widely used, observer-rated, 10-item questionnaire that evaluates orientation, memory, and concentration. Scale scores range from 0 (no impairment) to 10 (severe impairment). The test-retest reliability is reported to be .8 (Pfeiffer, 1975). At a cutoff point of three or more errors, the instrument is reported to have a sensitivity of .84 and a specificity of .89 in identifying medical inpatients with organic brain syndromes (Erkinjuntti et al., 1987).

The CAM is a structured instrument that allows standardized recording of the nine symptom domains of delirium specified in the DSM-III-R: acute onset and fluctuating course, inattention, disorganized thinking, altered level of consciousness, disorientation, memory impairment, perceptual disturbance, psychomotor activity, and sleep/wake disturbance. In one study (Inouye et al., 1990), the CAM was validated against the clinical judgment of a psychiatrist and found to have a sensitivity of 97% and a specificity of 92%; the interrater agreement (kappa) with trained personnel was .81 to 1.0. In another study (Rockwood et al., 1994), sensitivity was 68% and specificity was 97%.

Analysis

The psychiatrist and nurse clinician diagnoses were compared to the consensus diagnosis. The combined estimate of the three psychiatrists was obtained using the meta-analytic method described by Cooper and Hedges (1994). The sensitivity, specificity, negative predictive value, positive predictive value, agreement kappa coefficient, and significance level of difference in diagnostic agreement using the sign test were calculated. The SPSS program was used for statistical analysis in this study (SPSS 7.5.1, SPSS, 1996).

RESULTS

Of the 87 subjects, 59 (67.8%) were female; the average age was 84.9 ± 6.97 years and 56 patients (64.4%) had delirium by consensus diagnosis. The results of the psychiatrists' and nurse clinician diagnoses are presented in Table 1.

Both the psychiatrist and nurse clinician diagnoses were compared with the consensus diagnosis. The sensitivity of the psychiatrist diagnosis was .73 (95% confidence interval [CI]: .61 to .85), the specificity was .93 (95% CI: .79 to 1.0), and the agreement kappa coefficient was .58 (95% CI: .41 to .74); the sensitivity of the nurse clinician diagnosis was .89 (95% CI: .81 to .97), the specificity was 1.00, and the agreement kappa coefficient was .86 (95% CI: .75 to .97). The nurse clinician had significantly higher agreement with the consensus diagnosis than the psychiatrists (sign test p value was .004).

The nurse clinician had six false-negative and no false-positive cases; the reasons for the false-negatives were related to fluctuations in mental state (three cases) or misinterpretation of symptoms (three cases). For the psychiatrists, there were 16 false-negative and 3 false-positive cases; the reasons for the false-negatives were related to missing symptoms or fluctuations of delirium because of only one assessment (14 cases) or absence of information in the medical record about the patient's cognitive baseline (2 cases). The false-positives were related to misinformation in the medical record about the patient's cognitive baseline (i.e., sudden change in mental status).

DISCUSSION

The clinical diagnosis of delirium has traditionally been based on one assessment by one or more physicians. Our results, however, indicate a large proportion of disagreement (21%) between the clinical diagnosis by a psychiatrist and the consensus diagnosis. Moreover, all of the psychiatrists ultimately agreed that they had more confidence in the consensus diagnosis than in their clinical diagnosis because more information was available from assessments at different time points.

The critical concerns were the relatively low sensitivity (.73) and low negative predictive value (.64) of the psychiatrist's diagnosis, probably because the psychiatrists examined the patients only once and missed some episodes of altered mental status. On the other hand, the nurse clinician's diagnosis, based on the CAM and multiple observation points, had a significantly higher agreement with the consensus diagnosis. The higher sensitivity of the nurse clinician's diagnosis likely resulted from the fact that the nurse clinician

TABLE 1. Clinical Diagnoses Compared to Consensus Diagnosis

	MD1		MD2		MD3		All MDs	NC	
Consensus diagnosis	D	N	D	N	D	N		D	N
Delirium	19	7	8	6	13	3		50	6
Nondelirium	0	16	1	8	2	4		0	31
Number of subjects	42		23		22		87	87	
Sensitivity	.73		.57		.81		.73	.89	
Specificity	1.00		.89		.67		.93	1.00	
Positive predictive value	1.00		.89		.87		.96	1.00	
Negative predictive value	.70		.57		.57		.64	.84	
Overall agreement	.83		.70		.77		.79	.93	
Overall agreement kappa	.67		.42		.46		.58	.86	

Note. MD1 and MD2 = the two geriatric psychiatrists; MD3 = research fellow in geriatric psychiatry; All MDs = combined estimate of the three psychiatrists obtained using a meta-analytic method; NC = nurse clinician; D = delirium; N = nondelirium.

used a structured instrument (CAM), reviewed the chart more often, assessed the patients more often, obtained more information from family members or ward staff, and thus had more chances to detect symptoms of delirium than the psychiatrists. Even so, the sensitivity of the nurse clinician diagnosis was not perfect (.89).

We restricted the study population to cognitively impaired elderly medical inpatients. This probably increased the rate of delirium; the prevalence was 64% by consensus diagnosis. Although this high prevalence is unlikely to have affected the sensitivity and specificity of the psychiatrist or nurse clinician assessments, it could be expected to raise the positive predictive value and lower the negative predictive value of both.

The consensus diagnosis is probably the best method for detecting and diagnosing delirium because it integrates input from different professionals. However, because of the time-consuming nature of this approach, a trained rater (psychiatrist nurse; other professional) using the CAM and multiple observation points could be an acceptable alternative. In our experience, four factors are important for the rater's CAM diagnosis: (a) training for the CAM; (b) thoroughness of clinical observations; (c) spending more time with patients (including reassessment of patients and charts); (d) talking to family members and staff who know the patient well. Of course, a study involving a larger number of clinicians and raters using the CAM would be necessary to confirm these results.

One limitation of our study should be noted. The psychiatrist/nurse clinician diagnoses and consensus diagnoses were not independent. This may have increased the measure of agreement. Although a preferable design might have compared the psychiatrist diagnosis and CAM ratings with an independent consensus diagnosis (Jaeschke et al., 1994), the logistics involved in having another consensus panel independently assess each patient within a brief period of time would have been prohibitive.

CONCLUSION

These results suggest that one clinical assessment by a psychiatrist may not be

the best method for detecting and diagnosing delirium in the elderly. A consensus diagnosis or diagnosis by a trained rater (using the CAM and multiple observation points) may be more sensitive approaches.

REFERENCES

Albert, M. S., Levkoff, S. E., Reilly, C. H., Liptzin, B., Pilgrim, D., et al. (1992). The delirium symptom interview: An interview for the detection of delirium symptoms in hospitalized patients. *Journal of Geriatric Psychiatry and Neurology, 5,* 14-21.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed.-rev.). Washington , DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed., pp. 124-133). Washington, DC: Author.

Cooper, H., & Hedges, L. V. (1994). *The handbook of research synthesis* (pp. 261-281). New York: Russell Sage Foundation.

Erkinjuntti, T., Sulkava, R., Wikstrom, J., & Autio, L. (1987). Short portable mental status questionnaire as a screening test for dementia and delirium among the elderly. *Journal of the American Geriatrics Society, 35,* 412-416.

Inouye, S. K., Van Dyck, C. H., Alessi, C. A., Balkin, S., Siegal, A. P., et al. (1990). Clarifying confusion: The Confusion Assessment Method. *Annals of Internal Medicine, 113,* 941-948.

Jaeschke, R., Guyatt, G., & Sackett, D. L. (1994). User's guide to the medical literature, III. How to use an article about a diagnostic test. *Journal of the American Medical Association, 271,* 389-391.

Jones, J., & Hunter, D. (1995). Consensus methods for medical and health services research. *British Medical Journal, 311,* 376-380.

Lewis, L. M., Miller, D. K., Morley, J. E., Nork, M. J., & Lasater, L. C. (1995). Unrecognized delirium in ED geriatric patients. *American Journal of Emergency Medicine, 13,* 142-145.

Lipowski, Z. J. (1990). *Delirium: Acute confusional states.* Oxford, England: Oxford University Press.

Pfeiffer, E. (1975). A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *Journal of the American Geriatrics Society, 23,* 433-441.

Pompei, P., Forman, M., Cassel, C. K., Alessi, C., & Cox, D. (1995). Detecting delirium among hospitalized older patients. *Archives of Internal Medicine, 155,* 301-307.

Rockwood, K. (1993). The occurrence and duration of symptoms in elderly patients with delirium. *Journal of Gerontology, 48,* M162-M164.

Rockwood, K., Cosway, S., Stolee, P., Kydd, D., Carver, D., et al. (1994). Increasing the recognition of delirium in elderly patients. *Journal of the American Geriatrics Society, 42,* 252-256.

SPSS. (1996). *SPSS 7.5.1 for Windows.* Chicago: Author.

Thomas, R. I., Cameron, D. J., & Fahs, M. C. (1988). A prospective study of delirium and prolonged hospital stay. *Archives of General Psychiatry, 45,* 937-940.

Trzepacz, P. T., Baker, R. W., & Greenhouse, J. (1988). A symptom rating scale for delirium. *Psychiatry Research, 23,* 89-97.

Acknowledgments. This work was partially supported by a research grant from St. Mary's Hospital Center (#9632), a National Health Research Development Program Grant (#6605-4686-403), and a McGill-Novartis Research Fellowship in Geriatric Psychiatry.