Measuring Medical Burden Using CIRS in Older Veterans Enrolled in UPBEAT, a Psychogeriatric Treatment Program: A Pilot Study

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Background. A quantitative measure of medical burden is needed to assess medical comorbidities in psychogeriatric patients. The Cumulative Illness Rating Scale (CIRS) is the most widely used instrument for measuring medical burden in psychogeriatric research. Many clinicians, however, are discouraged by the requirement to project the persistence of acute conditions and therefore do not use the scale. The goal of this pilot study was to determine whether the inclusion of acute medical conditions undermines the usefulness of the CIRS. No such comparison was found in the existing literature.

Methods. Included in this study were 95 patients previously enrolled in the Unified Psychogeriatric Biopsychosocial Evaluation and Treatment (UPBEAT) demonstration program. All were male veterans of the U.S. armed forces who were admitted to acute medical or surgical inpatient units and who had positive screening results for anxiety, depression, or alcohol abuse. Two types of retrospective CIRS ratings were made for each patient: one included (CIRS-IP) and the other excluded (CIRS-PH) acute conditions. For each type of rating (CIRS-IP and CIRS-PH), 7 CIRS scores were computed according to methods reported in the literature. Survival time during 24 months of follow-up was used as a measure of health outcome indicating medical burden.

Results. With 1 exception, CIRS-IP and corresponding CIRS-PH scores were highly correlated (\( r < .99; p < .05 \)). And, for 5 of 7 scores, both CIRS-IP and CIRS-PH were significantly associated with survival time (\( p < .05 \)).

Conclusions. Results suggest that the CIRS can be used as an indicator of medical burden even with the inclusion of acute conditions. If replicated, these findings may increase CIRS use and thus aid the effort to encourage clinicians working with psychogeriatric patients to use standardized instruments to document medical burden.

Although the CIRS is the most frequently used scale in geriatric psychiatry, few clinicians have incorporated it, or any other validated rating scale that measures medical burden, into their routine clinical practice. Furthermore, even when the CIRS has been used, generally in the setting of research or demonstration projects, not all raters followed instructions (13,33) to exclude from their ratings acute medical conditions not expected to persist chronically. We encountered this discrepancy among CIRS raters in the Unified Psychogeriatric Biopsychosocial Evaluation and Treatment (UPBEAT) demonstration program (described in detail elsewhere [9,11,34–37]). Raters often voiced dissatisfaction with the requirement to project future chronic medical burden, and it was unclear how many raters had actually deviated from the protocol and included acute conditions when scoring the CIRS. This uncertainty prompted us to consider the effects of including and excluding acute conditions on the relationship between...
CIRS scores and health outcome (using mortality as the outcome measure) in the pilot study described below.

**Methods**

**Participants**

The participants constitute a convenience sample of 100 UPBEAT Care patients drawn from the Greater Los Angeles Veterans Affairs Health Care System, West Los Angeles, California, one of the 9 participating UPBEAT sites. Details concerning the UPBEAT sample are provided elsewhere (9,11,34,36,37). The patients had been admitted to acute medical or surgical inpatient units between 1995 and 1998 and had positive screening results for symptoms of anxiety, depression [Mental Health Inventory (38) subscales: Anxiety: ≥ 17; Depression: ≥ 7], or alcohol abuse [Alcohol Use Disorder Identification Test (39); ≥ 16]. Patients were excluded from the program if they were unlikely to benefit from the UPBEAT psychogeriatric intervention because they were already receiving the treatment they needed (e.g., they had psychiatric appointments in the preceding or subsequent 6 months), were unlikely to survive the 24-month follow-up period (e.g., they were receiving hospice care), or were unlikely to maintain contact throughout the study (e.g., they resided outside the catchment area). Four of the 100 patients died during the UPBEAT enrollment hospitalization and were excluded from the current pilot study for that reason. In addition, the only woman in the group was excluded to maintain sample homogeneity.

The remaining 95 men were aged 68.4 years (SD [standard deviation] = 6.4) on average (range, 60 to 88 years) at the time of UPBEAT enrollment. Most (83.1%) were retired or unemployed; 37.9% were married, 30.6% were divorced or separated, 22.1% were single or never married, and 9.5% were widowed; and 59% had a high school diploma or fewer years of education. All participants were veterans of the United States armed forces. The convenience sample for this pilot study was similar to the total national UPBEAT Care sample (n = 814) in terms of demographic characteristics except for race (38.9% white and 50.5% black in the current study, compared with 68.4% white and 20.6% black in the national UPBEAT Care sample) (36). All participants gave informed consent.

**Measures**

**Cumulative Illness Rating Scale (CIRS).—**One clinician (I.G.) did a retrospective chart review between 1 and 4 years after the enrollment episode and provided 2 sets of CIRS ratings for each of the 95 patients: an inpatient rating (CIRS-IP), which included both acute and chronic conditions, and a posthospitalization rating (CIRS-PH), which included only chronic conditions, as described in the Manual of Guidelines for Scoring the Cumulative Illness Rating Scale for Geriatrics (33). Both ratings were based on medical records describing patients’ conditions as of the day of enrollment into the UPBEAT program. For most patients, both ratings were done on the same day. The ratings were used to calculate 7 summary scores reported in the literature (13,18,21,29). A total of 14 summary scores (7 for CIRS-IP and 7 for CIRS-PH) were calculated for each study participant. The CIRS and procedures describing the calculation of summary scores are presented in the Appendix.

**Mortality and survival time.**—Mortality and survival time were used as proxies for overall physical health. Mortality was ascertained at the end of the 24-month period. Survival time was measured as the number of days patients survived between the date of UPBEAT enrollment and the end of the 24-month follow-up.

**Statistical Analyses**

We used Cox proportional hazards regression to estimate the association of CIRS summary scores (which were standardized using z-score transformation) with days of survival (40). In addition, we used logistic regression to estimate the association of the standardized CIRS summary scores with mortality (alive or dead) at the 24-month follow-up. Each model contained as predictors 1 of the 7 standardized CIRS summary scores and age at UPBEAT enrollment.

We used paired t tests to identify significant differences in means between each CIRS-IP and CIRS-PH summary score, and Spearman’s rank-order method to calculate correlations between CIRS-IP and CIRS-PH scores.

**Results**

Age-adjusted Cox proportional hazards regressions showed that for 5 of the 7 CIRS summary scores, both CIRS-IP and CIRS-PH were significantly associated with the number of days of survival (Table 1). Two summary scores that were not significantly associated with survival time were the severity index (SV) and the number of severe categories (#SV). The SV was significantly associated with survival time for CIRS-PH, but not CIRS-IP, and neither #SV-IP nor #SV-PH was significantly associated with survival time. Logistic regression analyses showed similar patterns of associations between CIRS-IP and CIRS-PH summary scores and mortality (data not shown); that is, those CIRS-IP and CIRS-PH scores that were significantly associated with survival days were also associated with mortality.

Means for CIRS-IP were greater than those for CIRS-PH for 5 of the 7 summary scores (Figure 1), and 4 of these 5 were significantly associated with survival time and mortality at the 24-month follow-up for both CIRS-IP and CIRS-PH. The exception was that SV-PH was significantly associated with survival time but SV-IP was not (Table 1).

The CIRS-IP scores were highly correlated with corresponding CIRS-PH scores (Table 2). The number of extremely severe categories (#EX) showed the lowest correlation between CIRS-IP and CIRS-PH ratings, yet both were significantly associated with survival time and mortality (Table 1).

Seventy-five of the 95 participants survived throughout the 24-month follow-up period (i.e., at least 731 days). The remaining 20 patients lived for an average of 268 ± 200 days (median, 238; range, 25 to 627).
DISCUSSION

The results of the current pilot study suggest that the CIRS can be a useful indicator of medical burden as measured by survival time (and mortality) during a 24-month period, even with the inclusion of acute conditions. This is supported by the facts that CIRS-IP and CIRS-PH scores were generally highly correlated and most CIRS-IP and CIRS-PH scores were significantly associated with both survival time and mortality.

It was not our goal to determine whether one summary score is better or worse than another in terms of measuring medical burden. We report findings with respect to the 7 CIRS summary scores found in the literature (Table 3) to determine whether the inclusion of acute medical conditions in CIRS ratings influenced measurement of medical burden based on the various ways used to summarize the CIRS ratings. It is possible, perhaps even likely, that different summary scores will be optimal for different patient groups and for answering different questions such as those concerning daily functioning, treatment effects, rehabilitation efficiency, and mortality.

CIRS-IP ratings provide an advantage over CIRS-PH ratings because including acute conditions from which the patient suffers at the time the CIRS ratings are made is simpler, for the rater, than projecting the chronic sequelae of the acute conditions. In addition, it is less time consuming.

How do our results compare with those reported in the literature? We found no other studies comparing the effect of inclusion and exclusion of acute medical conditions on the usefulness of the CIRS.

Table 1. Age-Adjusted* Associations Between Days of Survival and Each Z-Transformed Inpatient (CIRS-IP) as Well as Posthospitalization (CIRS-PH) CIRS Summary Score: Cox Proportional Hazards Regression (N = 95)

<table>
<thead>
<tr>
<th>CIRS SUMMARY SCORES</th>
<th>Standardized Beta (95% Confidence Interval)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSC(^1)</td>
<td>0.551 (0.144–0.959)</td>
<td>0.000</td>
</tr>
<tr>
<td>SV</td>
<td>0.371 (−0.072–0.814)</td>
<td>0.101</td>
</tr>
<tr>
<td>CM1</td>
<td>0.486 (0.033–0.940)</td>
<td>0.035</td>
</tr>
<tr>
<td>CM2</td>
<td>0.474 (0.042–0.905)</td>
<td>0.031</td>
</tr>
<tr>
<td>CM3</td>
<td>0.426 (0.037–0.816)</td>
<td>0.032</td>
</tr>
<tr>
<td>#SV</td>
<td>0.215 (−0.202–0.631)</td>
<td>0.313</td>
</tr>
<tr>
<td>#EX</td>
<td>0.617 (0.191–1.042)</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Notes:

*Age was not a significant factor in any model.

\(^1\)TSC is sometimes represented as TSC/13, which is the average severity across the 13 CIRS categories. The results are identical to TSC when TSC/13 is used.

TSC = Total Score; SV = Severity Index; CM = Comorbidity Index; #SV = Number of Severe Categories; #EX = Number of Extremely Severe Categories; CIRS = Cumulative Illness Rating Scale; IP = inpatient; PH = Posthospitalization.

See Appendix for details on CIRS summary scores.

Figure 1. Means with 95% confidence intervals for Cumulative Illness rating Scale (CIRS)-Inpatient and CIRS-Posthospitalization summary scores (n = 95). Unshaded bars = CIRS-Inpatient (CIRS-IP); shaded bars = CIRS-Posthospitalization (CIRS-PH). *Significant difference in mean scores (paired t test, \( p < .001 \)).

TSC = total score; SV = severity index; CM = comorbidity index; #SV = number of severe categories; #EX = number of extremely severe categories.
Table 2. Spearman Rank Correlations Between CIRS Inpatient (CIRS-IP) and Corresponding Posthospitalization (CIRS-PH) Summary Scores (N = 95)

<table>
<thead>
<tr>
<th>CIRS Summary Scores</th>
<th>Spearman's Rho</th>
<th>95% Confidence Interval</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSC</td>
<td>0.952</td>
<td>0.928–0.986</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>SV</td>
<td>0.789</td>
<td>0.698–0.854</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>CM1</td>
<td>0.839</td>
<td>0.768–0.890</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>CM2</td>
<td>0.956</td>
<td>0.935–0.971</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>CM3</td>
<td>0.992</td>
<td>0.988–0.995</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>#SV</td>
<td>0.695</td>
<td>0.574–0.786</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>#EX</td>
<td>0.354</td>
<td>0.165–0.519</td>
<td>0.0004</td>
</tr>
</tbody>
</table>

Note: TSC = Total Score; SV = Severity Index; CM = Comorbidity Index; #SV = Number of Severe Categories; #EX = Number of Extremely Severe Categories; CIRS = Cumulative Illness Rating Scale.

Table 3. Summary of Results of Studies Relating CIRS Scores to Health Outcome

<table>
<thead>
<tr>
<th>Studies Showing Relation Between CIRS and:</th>
<th>TSC (13)</th>
<th>SV</th>
<th>CM1</th>
<th>CM2</th>
<th>CM3</th>
<th>#SV</th>
<th>#EX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Parmelee et al. (1995) (18)</td>
<td></td>
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<tr>
<td>Firat et al. (2002) (29)</td>
<td>NS</td>
<td>+ 18</td>
<td>NS</td>
<td>+ 18</td>
<td></td>
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<tr>
<td>Waern et al. (2002) (28)</td>
<td></td>
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<tr>
<td>Current Study</td>
<td>Inpatient</td>
<td>+ 1</td>
<td>NS</td>
<td>+ 1</td>
<td>NS</td>
<td>+ 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Posthospitalization</td>
<td>+ 1</td>
<td>+ 1</td>
<td>+ 1</td>
<td>+ 1</td>
<td>+ 1</td>
<td></td>
</tr>
</tbody>
</table>

Functional Status

<table>
<thead>
<tr>
<th>External (1998) (21)</th>
<th>ADL</th>
<th>NS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>IADL</td>
<td></td>
</tr>
<tr>
<td>Giaquinto et al. (2000) (25)</td>
<td>Neurological patients</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>Hip fracture patients</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>Stroke patients</td>
<td>-1</td>
</tr>
<tr>
<td>Di Libero et al. (2001) (23)</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Patrick et al. (2001) (27)</td>
<td>-1</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- + Indicates positive association with outcome; - Indicates negative association with outcome; *p < .05; **p < .01; ***p < .001; NS = not significant; CI = 95% Confidence Intervals indicate significance; authors dichotomized SV (≤2 vs 3 ≤) and #EX (0 vs 1 ≤); TSC = Total Score; SV = Severity Index; CM = Comorbidity Index; #SV = Number of Severe Categories; #EX = Number of Extremely Severe Categories; ADL = Activities of Daily Living; IADL = Instrumental Activities of Daily Living; CIRS = Cumulative Illness Rating Scale.

However, further research is needed to determine whether binary ratings done without 5-point ratings are as useful as suggested by collapsing the 5-point ratings, as we did in the current study and as reported in the literature.

In addition to being user friendly, CM2, CM3, and #EX offer an advantage over TSC and SV by minimizing the possibility of under-representing serious medical problems. For example, Miller and colleagues (13) state that “a patient with end-stage cardiac failure could be very seriously impaired, but would score a maximum of 4 in the [cardiac] category of the CIRS(G)” (p. 246). If such a patient had no other impairments, TSC would be 4, far below the average indicating (incorrectly) low overall illness severity, whereas CM2, CM3, and #EX would indicate the serious illness. Indeed, TSC, unlike #EX, which is a score based on binary ratings, failed to predict survival in the lung cancer study cited in Table 4 (29). It must be noted, however, that making only binary ratings instead of those on a 5-point scale precludes the computation of the TSC and SV.

Clearly more data are needed, including CIRS ratings obtained during a hospital admission rather than retrospectively. More data are also needed to evaluate various modifications of the CIRS itself. For example, could
<table>
<thead>
<tr>
<th>Authors (y)</th>
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<th>Sample</th>
<th>Measures</th>
<th>Results</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miller et al. (1992) (13)</td>
<td>Development and validation of the CIRS-G</td>
<td>1. Five “contrast” groups: 2 from geriatric medical clinics (n = 20 each); recurrent depressed (45); spousal bereaved (21); healthy control (35) 2. Mean age: Med clinic 1 (79.4); Med clinic 2 (63.2); recurrent depressed (66.9); age was not reported for other groups</td>
<td>1. CIRS-G: 7  • 0–4 Likert-type rating scale  • TSC; SV; CM1; #SV; #EX 2. Outcomes: contrast groups, ADL, physician-rated GMB, and SRH</td>
<td>1. Medical clinic patients had higher mean TSC, SV, and CM1 scores than healthy controls, recurrent depressed, but not spously bereaved individuals 2. Significantly more medical clinic patients had level 3 (#SV) or level 4 severity (#EX) on CIRS than did other groups 3. In Medical clinic patients: TSC positively correlated with ADL and GMB 4. In depressed patients: TSC weakly correlated with SRH</td>
<td>The CIRS-G can be applied to medically and psychiatrically impaired elderly participants with satisfactory face validity</td>
</tr>
<tr>
<td>Parmelee et al. (1995) (18)</td>
<td>Validation of the CIRS</td>
<td>1. 439 residents of multilevel care facility 2. Mean age: 84.1 y 3. 27.6% male</td>
<td>1. CIRS-Modified: 7  • 1–5 Likert-type rating scale  • TSC/13; CM2 2. Outcome: 24-month survival (also medication usage, hospitalizations, functioning)</td>
<td>1. Both TSC/13 (mean ± SD: 1.6 ± 0.3) and CM2 (2.2 ± 1.9) are associated with 24-month survival</td>
<td>The CIRS is a valid indicator for health status in frail older institution residents.</td>
</tr>
<tr>
<td>Exterman et al. (1998) (21)</td>
<td>Test relationship between CIRS-G and functional status</td>
<td>1. 203 cancer patients 2. Median age in y range (75, 63–91) 3. 39.4% men</td>
<td>1. CIRS-G: 7  • 0–4 Likert-type rating scale  • TSC; SV; CM1; CM3 2. Outcomes: ADL and IADL</td>
<td>1. TSC, CM1, and CM3 have weak but significant positive correlation with both ADL and IADL, while SV with only IADL</td>
<td>Comorbidity and functional status are poorly correlated in older cancer patients.</td>
</tr>
<tr>
<td>Giaquinto et al. (2000) (25)</td>
<td>Evaluate relationship between comorbidity and disability in patients referred to a rehabilitation center</td>
<td>1. 413 patients (199 neurological; 73.6% stroke; and 214 orthopedic: 55.5% spondyloarthrosis, 31% hip fracture) enrolled in a rehabilitation center in Rome, Italy 2. Mean age (y): neurological (67.1), orthopedic (70.3)</td>
<td>1. CIRS-Modified: 7  • 1–5 Likert-type rating scale  • TSC/13; CM2 2. Outcome: FIM</td>
<td>1. Neurological (Mean): TSC/13 = 1.5 and CM2 = 2.6. Orthopedic: Mean TSC/13 = 1.4 and CM2 = 2.1</td>
<td>CIRS is a valid indicator of health status; it is sensitive to differences in orthopedic and neurological patients</td>
</tr>
<tr>
<td>Di Libero et al. (2001) (23)</td>
<td>Evaluate CIRS differences in both hip fracture and stroke patients in rehabilitation</td>
<td>1. 166 patients (83 hip fracture and 83 stroke) enrolled in rehabilitation center in Cassino, Italy 2. Mean age (y): men (66.5), women (73.5)</td>
<td>1. CIRS-Modified: 7  • 1–5 Likert-type rating scale  • TSC/13; CM2 2. Outcome: FIM</td>
<td>1. Stroke [Mean (range)]: TSC/13 = 1.5 (1.1–2.1) and CM2 = 2 (0–6); hip fracture: Mean TSC/13 = 1.4 (1.1–2.2) and CM2 = 1 (0–6) 2. TSC/13 and CM2: negatively correlated with FIM and highly positively correlated with each other</td>
<td>Authors conclude that CIRS measures health status in elderly patients because it was able to differentiate stroke from hip fracture patients, who were going through rehabilitation</td>
</tr>
<tr>
<td>Patrick et al. (2001) (27)</td>
<td>Describe comorbidity in geriatric rehabilitation patients and investigate relationship with rehabilitation efficiency</td>
<td>1. 110 patients admitted to rehabilitation inpatient service from acute care hospitals (&gt;80%), long-term care institutions, or from home 2. Orthopedic injury (55%), stroke (20%), functional deconditioning (11%), Parkinson’s (4%), other (11%) 3. Mean age 82.7 y; 71% women</td>
<td>1. CIRS: 7  • 0–4 Likert-type rating scale  • TSC; CM2 2. Outcomes: Geriatric Depression Scale; Mini-Mental Exam; FIM; and RER</td>
<td>1. TSC = 10.9 ± 3.4; CM2 = 3.5 ± 1.6 2. FIM negatively correlated with TSC and CM2 3. Mini-Mental negatively correlated with TSC 4. RER negatively correlated with CM2 5. FIM, TSC, and CM2 best predictors of RER</td>
<td>Cumulative illness profile, even when illness is mild, is important aspect of comorbidity in terms of impact on rehabilitation; comorbidity may help explain differences in rehabilitation efficiency</td>
</tr>
</tbody>
</table>

Table 4. Studies Reporting at Least 2 Types of CIRS Summary Scores*
removing the psychiatric category be advantageous for psychogeriatricians and others who include standardized measures of psychiatric disorders in their assessment? Does this modification improve the ability of the CIRS to measure nonpsychiatric medical burden? These are just two examples of questions awaiting answers, which will be important for research (particularly with regard to medical and psychiatric comorbidities) and clinical care.

Limitations

First, we used a convenience sample of limited size consisting of only male veterans older than 60 years admitted to acute medical or surgical inpatient services at a single Veterans Affairs hospital who had positive screening results for symptoms of depression, anxiety, or alcohol abuse at the time of admission. Second, we excluded patients with dementia and other known mental health problems and patients not expected to be available throughout the 24-month follow-up period. Therefore, our findings cannot be generalized to other groups. Furthermore, rater bias could have influenced the results because a single rater performed both CIRS-IP and CIRS-PH ratings retrospectively, and most of the time, on the same day.

Although there is some indirect support in the literature and in the current study for the validity of CIRS scores based on binary ratings, studies that directly examine ratings made in a binary manner (which are not collapsed forms of

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**Table 4. Studies Reporting at Least 2 Types of CIRS Summary Scores**

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<tr>
<th>Authors (y) Study Question/Purpose</th>
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<th>Results</th>
<th>Conclusions</th>
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</thead>
<tbody>
<tr>
<td>Waern et al. (2002) (28) Purpose: Measure association between burden of physical illness and suicide</td>
<td>1. 85 suicide cases and 153 controls matched with cases on area of residence, sex, and birth year 2. Sample from Gothenburg, Sweden, and two surrounding counties 3. Suicide cases: 46 men and 39 women (mean age 75 y)</td>
<td>1. CIRS-G: 1° 0–4 Likert-type rating scale • TSC; serious illness: severe or extremely severe disability in any category 2. Outcome: suicide</td>
<td>1. Suicide cases (Mean ± SD): TSC; men (9.0 ± 5.0) women (6.8 ± 3.9); controls: men (8.0 ± 4.6) women (8.4 ± 4.5) 2. Serious physical illness in men but not in women (CIRS), serious mental illness (CIRS), impaired vision, neurological disorder, stroke, and malignant disease were risk factors for suicide</td>
<td>Serious physical illness is independently associated with suicide in men and serious mental illness in both.</td>
</tr>
<tr>
<td>Firat et al. (2002) (29) Purpose: Determine the prognostic role of comorbidity in non-small cell lung cancer patients</td>
<td>1. 112 patients with stage III non-small cell lung cancer 2. Median age 62 y 3. 86% white, 14% black</td>
<td>1. CIRS-G: 1° 0–4 Likert-type rating scale • TSC; SV; CM1; #EX 2. Outcome: survival over 5 years or more</td>
<td>1. Median (range): TSC 9 (2–21); CM1 4 (1–9) 2. TSC and CM1 not associated with survival 3. Those with 1 or more #EX, and those with 3 or more SV had lower survival 4. SV showed independent association with survival when controlling for clinical stage and KPS</td>
<td>Comorbidity (CIRS scores) influences survival; integration of comorbidity (CIRS) and KPS into staging improves ability to predict prognosis in these patients</td>
</tr>
<tr>
<td>Current Study Purpose: Determine whether modifying the CIRS rating system to increase user-friendliness will impact the scale’s validity</td>
<td>1. Convenience sample of 95 male veterans hospitalized in acute medical and surgical units, screened positive for depression, anxiety, and/or alcohol abuse, and enrolled in the treatment group of a psychogeriatric program 2. All men; mean age: 68.4 y 3. 50.5% black, 38.9% white</td>
<td>1. CIRS-Modified: 1° 0–4 Likert-type rating scale • Two ratings: IP ratings include and PH exclude acute conditions • TSC; TSC/13; SV; CM1; CM2; CM3; #SV; and #EX (separately for CIRS-IP and CIRS-PH ratings)</td>
<td>1. Summary scores (TSC, TSC/13, CM1-3, and #EX), were associated with survival 2. Scores based on CIRS-IP ratings highly correlated with those based on CIRS-PH ratings, except for #EX 3. TSC-PH: 12.9 ± 5.6; TSC/13-PH: 1.0 ± 0.4; CM1-PH: 6.3 ± 2.2; CM2-PH: 4.1 ± 2.1</td>
<td>The CIRS can measure medical burden in acutely hospitalized male patients with symptoms of depression, anxiety, and/or alcohol abuse, even when acute medical conditions are included and user-friendly rating systems are selected</td>
</tr>
</tbody>
</table>

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**Notes:**

*The two types of summary scores reported are those based on the 5-point Likert-type scale and those based on binary ratings.

1See Appendix for details.

TSC = Total Score; SV = Severity Index; CM = Comorbidity Index; #SV = Number of Severe Categories; #EX = Number of Extremely Severe Categories; GMB = global medical burden; SRH = self-related physical health; CIRS-G = Cumulative Illness Rating Scale-Geriatrics; ADL = activities of daily living; SD = standard deviation; IADL = instrumental activities of daily living; FIM = functional independence measure; RER = rehabilitation efficiency ratio; KPS = Karnofsky performance scores; IP = inpatient; PH = posthospitalization.

See Appendix for details on CIRS summary scores.
ratings made along the 5-point scale) are required to establish their validity.

Conclusions

Our results suggest that the CIRS can measure medical burden in acutely hospitalized medical or surgical inpatients with symptoms of depression, anxiety, or alcohol abuse, even when acute medical conditions are included in the ratings. Because we could find no reports in the literature comparing ratings that included and excluded acute conditions, further research is needed on representative samples of geriatric patients with medical and psychiatric comorbidities who are followed prospectively. We hope that the findings of this pilot study will lead to research on simplifying the CIRS while increasing consistency in the use of the scale. The results of such research could facilitate more widespread use of the CIRS, not only in research but also among clinicians who work with psychogeriatric patients but do not record their patients’ medical burdens in a quantitative way.

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References


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APPENDIX

Scoring Instructions for the UPBEAT CIRS

Degree of Impairment in Each Organ System Is Rated as Follows:
0 – None, no impairment to organ system
1 – Mild impairment, which does not interfere with normal activity; treatment may or may not be required
2 – Moderate impairment, which interferes with normal activity; “first line” therapy is needed
3 – Severe impairment, significantly disabling problem
4 – Extremely severe impairment, life-threatening problem; immediate treatment required or of no avail; end-organ failure

Rated Organ Systems (Categories):
1. Cardiac (heart only)
2. Hypertension (affected organs are scored separately)
3. Vascular (blood vessels; blood cells; lymphatic, marrow, spleen)
4. Respiratory (lungs, bronchi, trachea)
5. Eye-Ear-Nose-Throat (includes larynx)
6. Upper Gastrointestinal (esophagus, stomach, duodenum, pancreas)
7. Lower Gastrointestinal (large and small intestines; includes hernias)
8. Hepatic (liver, gall bladder, biliary tree)
9. Renal (kidneys only)
10. Other Genitourinary (bladder, prostate, urinary tract, genitals)
11. Musculoskeletal/Integumentary
12. Neurological (brain, spinal cord, peripheral nerves; does not include dementia and psychiatric disorders)
13. Endocrine/Metabolic (includes hormonal imbalances; morbid obesity, breast pathology, blood chemistry abnormalities; infections; intoxications)

Note: The original CIRS (12) includes Hypertension under Vascular, and includes Psychiatric, for a total of 13 categories. The CIRS-G (13) includes Hypertension under Vascular, and includes Psychiatric, but removes Hematopoetic from Vascular as a separate category, for a total of 14 categories. The CIRS-Modified (18) includes Hematopoetic under Vascular, and includes Psychiatric for a total of 14 categories. However, Parmelee and colleagues (18) exclude Psychiatric from their analyses (even though they list it as a category), for a total of 13 categories.

Summary Scores

Scores Based on a 5-Point Likert-Type Rating Scale:
1. TSC = Total score: sum of rating across 13 categories
2. SV = Severity index: TSC divided by the number of mild or worse ratings across all 13 categories.

Scores Based on Binary Ratings Derived From collapsing Ratings Made on the 5-Point Likert-Type Scale:
1. CM1 = Comorbidity index 1: number of mild or worse ratings across all 13 categories
2. CM2 = Comorbidity index 2: number of moderate or worse ratings across all 13 categories
3. CM3 = Comorbidity index 3: number of severe or extremely severe ratings across all 13 categories
4. #SV = Number of severe ratings
5. #EX = Number of extremely severe ratings.

CIRS MEASURES BURDEN, ACUTE ILLNESS