

The Zarit Burden Interview: A New Short Version and Screening Version

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Purpose: The purpose of the study was to develop a short and a screening version of the Zarit Burden Interview (ZBI) that would be suitable across diagnostic groups of cognitively impaired older adults, and that could be used for cross-sectional, longitudinal, and intervention studies.

Design and Methods: We used data from 413 caregivers of cognitively impaired older adults referred to a memory clinic. We collected information on caregiver burden with the 22-item ZBI, and information about dependence in activities of daily living (ADLs) and the frequency of problem behaviors among care recipients. We used factor analysis and item-total correlations to reduce the number of items while taking into consideration diagnosis and change scores. **Results:** We produced a 12-item version (short) and a 4-item version (screening) of the ZBI. Correlations between the short and the full version ranged from 0.92 to 0.97, and from 0.83 to 0.93 for the screening version. Correlations between the three versions and ADL and problem behaviors were similar. We further investigated the behavior of the short version with a two-way analysis of variance and found that it produced identical results to the full version. **Implications:** The short and screening versions of the ZBI produced results comparable to those of the full version. Reducing the number of items did not affect the properties of the ZBI, and it may lead to easier administration of the instrument.

Key Words: Caregiver burden, Instrument, Screening dementia

The 22-item version of the Zarit Burden Interview (ZBI; Zarit, Orr, & Zarit, 1985) is the instrument

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most consistently used in dementia caregiving research (Bédard, Pedlar, Martin, Malott, & Stones, 2000). It has been used in a variety of research designs, to discriminate between study participants (e.g., Molloy, Lever, Bédard, Guyatt, & Burt, 1996), and to measure change over time, resulting from the progression of the care recipient's condition (e.g., Bédard, Molloy, Pedlar, Lever, & Stones, 1997), or from interventions aimed at reducing burden (e.g., Zarit, Antony, & Boutselis, 1987). A significant advantage of the popularity of the ZBI is that results obtained across studies can be easily compared and synthesized.

Most researchers use the full revised version (22 items) of the ZBI. This version evolved from the original 29-item version published in 1980 (Zarit, Reeve, & Bach Peterson, 1980). While the ZBI has excellent internal consistency ($\alpha = 0.83$ and 0.89 ; Majerovitz, 1995; Zarit et al., 1987), the length of the instrument may be a deterrent to its use in clinical and research environments. Whitlatch, Zarit, and von Eye (1991) presented a shorter 18-item version, but this version never enjoyed the widespread use of the full version.

Hébert and colleagues proposed a shorter version based on 12 items (Hébert, Bravo, & Prévile, 2000). Both their version and that of Whitlatch and colleagues were based on a two-factor solution incorporating items relevant to role strain and personal strain. However, Hébert and colleagues proposed 3 items for the personal strain section, whereas Whitlatch and colleagues proposed 12. The numbers of items for the role strain domain were, respectively, 9 and 6. Of the 12-item version, 9 were common to the 18-item version. Both groups of investigators reported internal consistencies greater than 0.80 for the shorter versions.

One important aspect that both teams were not able to investigate was the adequacy of their short versions for longitudinal studies (seeking to detect change). For instruments that will be used to detect change over time, it is not sufficient to document psychometric properties based on data collected at one point in time (Kirshner & Guyatt, 1985). Hence, the development of a shorter version of an existing instrument should take into consideration data ob-

ained over time if one of the projected uses of the shorter version is in studies evaluating change. Given that the ZBI is used in intervention and longitudinal studies, we must convince ourselves that shorter versions not only discriminate between individuals, but also are adequate to measure change over time. At present we have little information on the usefulness of the ZBI as a tool to measure change. Accordingly, we devised the present study to determine how well the ZBI items perform when stratified according to diagnosis, and when used in cross-sectional and longitudinal designs. Using this information, we devised a new short version and screening version of the ZBI.

Methods

The data were obtained between 1989 and 1999 (inclusive) from primary caregivers of community-dwelling older adults with cognitive impairment. All data were obtained on the first and second visits (approximately 6 months apart) to a memory clinic located in a university-affiliated teaching hospital in a large urban center. Family physicians and specialists referred individuals for the treatment of memory or behavior problems. Trained geriatricians gave a diagnosis of Alzheimer's disease (AD), using the NINCDS-ADRDA criteria (McKhann et al., 1984), or other type of dementia. Trained clinical nurse specialists collected relevant data for this report.

Caregiver information, obtained separately from the care recipient, included burden (ZBI), care recipient's dependence in activities of daily living (ADLs), and behavior problems. The ADL scale used was developed by Lawton and Brody (1969), and is further divided into a basic ADL (BADL) and instrumental ADL (IADL). The frequency of problem behaviors was recorded with the Dysfunctional Behaviour Rating Instrument (DBRI; Molloy, Bédard, Guyatt, & Lever, 1996; Molloy, McIlroy, Guyatt, & Lever, 1991). For all measures, scores were generated for baseline, follow-up, and the difference between baseline and follow-up, and for diagnostic subgroups (AD and others).

Burden data were factor analyzed with a principal component analysis and varimax rotation. Item 22 from the ZBI was omitted because it represents an overall burden item. Separate factor analyses were conducted for each combination of assessment (baseline, follow-up, change) and diagnosis (AD, others). The number of factors retained was determined by examination of scree plots (Streiner, 1994). The items for the short version were determined according to the highest factor loading and high item-total correlations for all six combinations of assessment and diagnosis. The four items composing the screening version were selected according to the highest ranking item-total correlations while respecting the factor weighting of the short version. Internal consistency was determined with Cronbach's alpha (Streiner & Norman, 1995). Correlation coefficients were obtained with Pearson's method (Howell, 1987). A two-way analysis of variance (ANOVA) was used to

compare the behavior of the short version to that of the full version. All analyses were performed using SPSS version 9.0.1 (SPSS, Inc, 1999).

Results

A total of 413 caregivers contributed data to the analyses. The average caregiver age was 61.01 ($SD = 13.85$), and 258 (62.5%) were spouses of care recipients. These caregivers supported 297 (72%) care recipients with AD, and 116 (28%) care recipients with other forms of cognitive impairment. The average age of care recipients was 73.13 ($SD = 8.14$), and the average score on the standardized Mini-Mental State Examination was 20.81 ($SD = 6.95$). The majority of care recipients were women (243; 58.8%). Overall, the mean reported burden was 20.59 ($SD = 15.64$) at baseline, and 20.97 ($SD = 17.35$) at follow-up. Change scores, available for 238 caregivers of AD referrals and for 91 caregivers of other referrals, were normally distributed around the mean. The average change between baseline and follow-up was 0.35 ($SD = 12.21$).

The factor analyses supported two-factor solutions (rotated factor loadings for each combination of assessment type and diagnosis are available from the corresponding author). Together, these factors explained approximately 50% of the variance for the baseline and follow-up assessments, and 30% for the change scores. In some situations, the factor loadings were good for all situations; in others they were more variable.

Item-total correlations were computed and are shown in Table 1 along with their ranking from the highest, and the scale's internal consistency. Generally, item-total correlations and internal consistencies were higher for baseline and follow-up data than for change data. For many items, the rank of the item-total correlations remained consistent across combinations of time and diagnosis (e.g., item 2). However, for some items there were serious discrepancies across combinations (e.g., item 14).

Items for the short version of the ZBI were selected through a combination of high factor loading and high item-total correlations across all six situations. This process was done blindly to the results of previous investigators. The items chosen were 2, 3, 5, 6, 9, 10, 11, 12, and 17 for factor one, and 19, 20, and 21 for factor two. The narrative equivalents of the item numbers are presented in the Appendix. The screening items were selected based on the item-total correlations while keeping the three-to-one item ratio between factors one and two. Accordingly, the top three items selected from factor one were 2, 3, and 9, and the top item selected from factor two was 19. Using baseline data, Cronbach's alphas for the short and screening versions were, respectively, 0.88 and 0.78. For the short version, Cronbach's alpha for the personal strain factor was 0.89, and it was 0.77 for the role strain factor. Burden values representing quartiles for the various versions are presented in Table 2. The cutoffs for the top 25% were 30, 17, and 8 for the full, short, and screening versions.

Table 1. Item-Total Correlations and Rankings

Item	AD Visit 1		Other Visit 1		AD Visit 2		Other Visit 2		AD Change		Other Change	
	r	Rank	r	Rank	r	Rank	r	Rank	r	Rank	r	Rank
1	.32	21	.44	18	.38	21	.50	16	.34	18	.19	36
2	.70	2	.67	3	.73	2	.72	2	.50	4	.52	2
3	.70	1	.62	10	.75	1	.67	5	.53	1	.37	8
4	.47	16	.51	14	.50	17	.44	18	.32	18	.17	37
5	.56	11	.66	5	.62	13	.64	8	.44	10	.36	9
6	.63	4	.63	9	.66	7	.60	12	.49	7	.42	5
7	.41	19	.47	17	.53	16	.61	11	.54	6	.35	12
8	.52	13	.62	11	.57	14	.66	6	.39	12	.31	13
9	.64	3	.71	1	.72	3	.68	4	.51	2	.47	4
10	.62	5	.66	4	.65	8	.62	9	.46	8	.13	39
11	.53	12	.68	2	.67	6	.64	7	.42	11	.24	33
12	.61	6	.63	8	.69	5	.58	14	.48	9	.42	6
13	.50	15	.50	15	.55	13	.55	20	.20	20	.06	20
14	.52	14	.61	12	.64	10	.61	10	.18	21	.14	18
15	.39	20	.21	21	.44	20	.25	21	.25	19	-.12	21
16	.59	9	.48	16	.64	9	.55	15	.49	6	.36	10
17	.58	10	.65	6	.69	4	.68	3	.50	5	.26	14
18	.59	8	.53	13	.64	11	.59	13	.51	3	.37	7
19	.61	7	.65	7	.63	12	.73	1	.33	17	.63	1
20	.42	17	.40	19	.49	18	.43	19	.38	15	.47	3
21	.41	18	.35	20	.49	19	.48	17	.35	14	.35	11
Alpha	.90		.94		.93		.92		.83		.75	

Notes. AD = Alzheimer's disease; r represents the Pearson correlation coefficient. Alpha represents internal consistency as measured by Cronbach's alpha. The top 12 correlation coefficients are in bold.

As a first step to investigate the validity of the short and screening versions, we correlated these scores to the full version data. The correlation ratios and probability values are presented in Table 3. Correlations between the short version and the full version varied from 0.92 to 0.97 depending on the combination of diagnosis and time. Correlations between the screening version and the full version varied from 0.83 to 0.93.

We then examined if the short, and screening versions behaved similarly to the full version when predicting burden according to care recipient ADL and behavior problems, and also according to the overall burden item (item 22). These correlations are presented in Table 4. In general, correlations between the burden score and other scales were higher for baseline and follow-up measurements than change scores. However, the magnitude of the correlations obtained for the full, short, and screening versions of the ZBI was similar.

To further examine if the short and screening versions of the ZBI would lead to similar conclusions in future research, we examined congruence between

findings obtained with a diagnosis by time ANOVA using the full ZBI and the short version. Specifically, we examined (a) if a main effect of diagnosis was present (i.e., caregivers of patients with AD had higher or lower burden than others), (b) a main effect of time was present (i.e., burden changed over time), or (c) a Diagnosis by Time interaction was present (i.e., the change observed over time depended on the diagnosis). Mean burden scores at baseline and follow-up, and according to diagnosis, were comparable given the maximum possible scores. Percent change scores reflected similar changes over time (upper section of Table 5). The actual statistical results also provided similar results. With the full scale, we found no diagnosis main effect, no time effect, and a marginally significant ($p < .10$) interaction effect. The ANOVA with the short version confirmed the pattern found with the full version (bottom section of Table 5).

Discussion

We developed a short version of the ZBI using data that combined several diagnostic groups and considerable caregiver heterogeneity (e.g., gender, relationship) to provide us with a generic instrument that could be used for all caregivers of cognitively impaired older adults. Furthermore, our goal was to produce a short version that would work well in cross-sectional and longitudinal situations.

Our results show that strong factor loadings and item-total correlations at baseline do not necessarily

Table 2. Quartile Values for the Full, Short, and Screening Versions of the Zarit Burden Interview

Quartile (percentile)	Full	Short	Screening
First (25th)	8	3	1
Second (50th)	18	9	4
Third (75th)	30	17	8

Table 3. Correlations Between the Full Zarit Burden Interview and the Short and Screening Versions

Change Rank	Version	AD			Others		
		Baseline (n = 284)	2nd Visit (n = 261)	Change (n = 222)	Baseline (n = 112)	2nd Visit (n = 100)	Change (n = 83)
16	Short Screening	.96	.97	.95	.97	.97	.92
2		.91	.93	.83	.92	.92	.83

Notes: AD = Alzheimer's disease. All correlations $p < .001$.

translate into similar statistics for change scores. The ZBI versions proposed include items with acceptable values for both scores at specific time points and change scores. Correlations between the short and full versions proved excellent for both situations. When used at baseline, the correlations between the short and full versions were 0.96 for caregivers of individuals with AD, and 0.97 for others. Hébert's correlation between the short and long versions was 0.96. Our overall Cronbach's alpha of 0.88 at baseline is comparable to that of others (0.83 to 0.91; Hébert et al., 2000; Majerovitz, 1995; Zarit et al., 1987). The Cronbach alphas for the personal strain factor (0.89) and role strain factor (0.77) were equivalent to those reported by Whitlatch and colleagues (0.80 and 0.81). Our short version may be a compromise between the short versions proposed by previous investigators (Hébert et al., 2000; Whitlatch et al., 1991). It has 7 items in common with Hébert's. Hébert's has 9 in common with Whitlatch's, and we have 11 in common with the latter.

We tested the behavior of the new versions to ensure that their use in research would provide simi-

lar results to those obtained with the full version, whether we used the instruments as cross-sectional or longitudinal tools. The pattern and magnitude of correlations between the short and screening versions and ADL and behavior problems mirrored those obtained with the full version. Furthermore, when the short version was used with a two-way ANOVA, we obtained results identical to those produced with the full version, ensuring that utilization of the short version will not lead to spurious findings. These data confirm that the short and screening versions are adequate substitutes for the longer version.

The results of our study are possibly generalizable to most caregivers of community-dwelling older adults with cognitive impairment. The mean ZBI in our sample was similar to Hébert's, which was obtained from a representative sample of Canadian caregivers, but less than Whitlatch's, which was based on a convenience sample. Further, our sample size was roughly 30% larger than Hébert's, and twice the size of Whitlatch's. Nonetheless, caution should be used when using the versions proposed here in substantially different settings. Instruments

Table 4. Correlations Between the Three Zarit Burden Interview Versions and Other Scales

Version	AD			Others		
	Baseline (n = 284)	2nd Visit (n = 261)	Change (n = 222)	Baseline (n = 112)	2nd Visit (n = 100)	Change (n = 83)
Full						
ADL	-.41	-.52	-.34	-.52	-.67	-.44
BADL	-.36	-.46	-.29	-.51	-.57	-.37
IADL	-.39	-.50	-.28	-.47	-.64	-.33***
DBRI	.64	.68	.57	.70	.68	.44
Item 22	.74	.77	.51	.66	.81	.44
Short						
ADL	-.40	-.49	-.31	-.48	-.63	-.36***
BADL	-.36	-.45	-.27	-.48	-.56	-.38
IADL	-.38	-.47	-.26	-.43	-.58	-.24**
DBRI	.62	.67	.54	.67	.66	.44
Item 22	.73	.76	.49	.67	.80	.42
Screening						
ADL	-.35	-.51	-.27	-.47	-.59	-.36***
BADL	-.33	-.48	-.26	-.47	-.53	-.43
IADL	-.34	-.48	-.22	-.42	-.55	-.19*
DBRI	.60	.64	.54	.65	.66	.42
Item 22	.74	.73	.45	.65	.79	.37

Note: AD = Alzheimer's disease; BADL = basic activity of daily living; IADL = instrumental activity of daily living; DBRI = Dysfunctional Behaviour Rating Instrument.

*.10 > $p > .05$; **.05 > $p > .01$; ***.01 > $p > .001$. All other correlations $p < .001$.

Table 5. Results of the Two-way ANOVA With Time and Diagnosis as Main Factors

Mean Burden	Baseline	Follow-up	% Change
Full version			
AD	20.95 (24.9)	22.03 (26.2)	5.2
Others	19.46 (23.2)	17.87 (21.3)	-8.2
Short version			
AD	11.20 (23.3)	11.97 (24.9)	6.9
Others	10.45 (21.8)	9.55 (19.9)	-8.6
ANOVA	F	p	
Full version			
Time	0.11	.736	
Diagnosis	2.16	.143	
Time × Diagnosis	3.20	.075	
Short version			
Time	0.02	.885	
Diagnosis	2.03	.155	
Time × Diagnosis	3.42	.065	

Notes: ANOVA = analysis of variance; AD = Alzheimer's disease. Values in parentheses in the top portion of the table represent percentage of the maximum possible value for the version.

designed with specific types of populations may not be suitable for other populations. It is generally desirable to ascertain that the psychometric properties are maintained with other target groups (Streiner & Norman, 1995).

For most situations requiring the measurement of caregiver burden, we propose that clinicians and researchers use the short version. In situations where the rapid identification of burden is desirable, the screening version could be used. However, the cutoff where one may conclude that the caregiver is under considerable burden is less clear. Using the top quartiles as indicators, one may identify high burden with a score of 17 on the short version, and 8 on the screening version. However, our data cannot be assumed as normative.

Our work expands on prior work by considering diagnosis and change scores in the development of a shorter version of an existing popular instrument. Ensuring that the short and screening versions work well for different types of diagnoses is important. Furthermore, we believe the proposed instruments can be used for cross-sectional, longitudinal, and intervention studies. However, the longitudinal results were obtained with repeated measurements approximately 6 months apart, and with a sample consisting mostly of spouse caregivers. Confirmation of the suitability of the short form with longer intervals and other subgroups of caregivers is desirable.

As the quantity of research focusing on older adults increases, it is desirable to reduce the research burden we impose on study participants. Reducing the number of items in commonly used instruments is one strategy that has enjoyed considerable popularity. For example, the Geriatric Depression Scale (Yesavage, Brink, Rose, & Lum, 1983) has been shortened from a 30-item instrument to a 15-item instrument without major change in its psychometric

properties (Sheikh & Yesavage, 1986), and now into a 4-item screening instrument for the visually impaired (Galaria, Casten, & Rovner, 2000). The proposed 12- and 4-item versions of the ZBI give clinicians and researchers the opportunity to use an instrument that will reduce completion time without sacrificing validity.

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Appendix

Items retained from the Zarit Burden Interview for the short and screening versions (*). All questions are answered as "never" (0), "rarely" (1), "sometimes" (2), "quite frequently" (3), or "nearly always" (4).

DO YOU FEEL . . .

- *2. that because of the time you spend with your relative that you don't have enough time for yourself?
- *3. stressed between caring for your relative and trying to meet other responsibilities (work/family)?
5. angry when you are around your relative?
6. that your relative currently affects your relationship with family members or friends in a negative way?
- *9. strained when you are around your relative?
10. that your health has suffered because of your involvement with your relative?
11. that you don't have as much privacy as you would like because of your relative?
12. that your social life has suffered because you are caring for your relative?
17. that you have lost control of your life since your relative's illness?
- *19. uncertain about what to do about your relative?
20. you should be doing more for your relative?
21. you could do a better job in caring for your relative?

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