

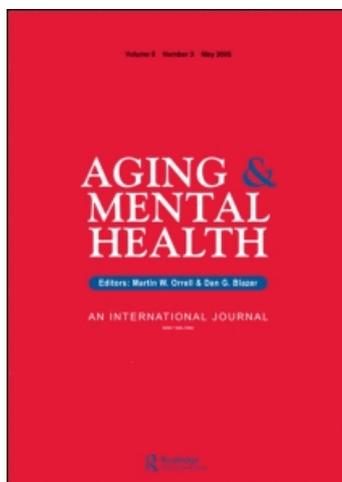
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Yaacov G. Bachner ^a; Liat Ayalon ^b

^a Department of Sociology of Health, Ben-Gurion University of the Negev, Be'er-Sheva 84105, Israel ^b Louis and Gabi Weisfeld School of Social Work, Bar-Ilan University, Ramat-Gan, 52900 Israel

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Initial examination of the psychometric properties of the short Hebrew version of the Zarit Burden Interview

Yaacov G. Bachner^{a*} and Liat Ayalon^b

^a*Department of Sociology of Health, Ben-Gurion University of the Negev, PO Box 653, Be'er-Sheva 84105, Israel;*

^b*Louis and Gabi Weisfeld School of Social Work, Bar-Ilan University, Ramat-Gan, 52900 Israel*

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Objectives: Given the sharp increase in individuals with cognitive and physical impairments, the evaluation of burden has become common in both caregiving research and clinical practice. The Zarit Burden Interview (ZBI) is the first and one of the most commonly used measures of caregiver burden. This study examines the psychometric properties and factor structure of a Hebrew version of Bédard et al.'s [Bédard, M., Molloy, D.W., Squire, L., Dubois, S., Lever, J.A., & O'Donnell, M. (2001). The Zarit Burden Interview: A new short version and screening version. *The Gerontologist*, 41, 652–657] short ZBI scale (ZBI-HS).

Methods: A total of 148 primary caregivers of individuals with cognitive and/or physical impairments completed the ZBI-HS. The factor structure of the ZBI-HS was assessed using exploratory factor analysis (EFA) and concurrent validity was examined.

Results: The EFA supported the two-factor structure as reported by Bédard et al. (2001). Concurrent validity was supported by the ZBI-HS negative association with caregivers' well-being and positive association with caregivers' distress over behavioral problems of care-recipients.

Conclusion: These findings suggest that the short version of the ZBI-HS can be used as an effective tool for measuring caregiving burden.

Keywords: dementia; caregivers; burden; Hebrew; exploratory factor analysis; Zarit Burden Interview

Introduction

Currently, more than 24 million people worldwide are living with dementia (Arango Lasprilla, Moreno, Rogers, & Francis, 2009) and about 13 million people aged 65 and over in the United States have a severe physical disability (US Census Bureau, 2005). Over the next 50 years, as the average lifespan continues to increase and birth rates decline, the proportion of the total population represented by these groups is expected to triple (Grossman, Bergmann, & Parker, 2006).

Individuals with cognitive or physical impairment, especially in the progressive stages, need intensive and constant care. The vast majority of this complex care is provided to patients in their homes by unpaid caregivers (most likely family members). These unrelenting care demands, which require time as well as material resources, and mental and physical exertion, often lead to a sense of burden (Bachner, O'Rourke, & Carmel, 2007). Caregiving burden is defined as a 'context-specific negative affective outcome occurring as a result of one's perceived inability to contend with role demands' (O'Rourke, Haverkamp, Tuokko, Hayden, & Beattie, 1996).

The evaluation of burden has become common in caregiving research and clinical practice (O'Rourke & Tuokko, 2003) and over the last three decades, various instruments have been proposed for its assessment. The Zarit Burden Interview (ZBI) is the first

measure of caregiver burden and one of the most commonly used (Knight, Fox, & Chou, 2000). Initially developed and validated more than 25 years ago (Zarit, Reever, & Bach-Peterson, 1980), the ZBI measures strain associated with the care of community-dwelling individuals with Alzheimer's disease (AD). The original format of the ZBI included 29 items on a four-point Likert type scale (Zarit et al., 1980). Later, an updated version of the ZBI was introduced. The number of items was reduced to 22 on a five-point Likert type scale, and a two-factor structure was reported (personal strain and role strain) (Zarit, Orr, & Zarit, 1985). The ZBI demonstrated adequate concurrent and construct validity (Pratt, Schmall, & Wright, 1986; Zarit & Zarit, 1990) as well as high internal reliability (Bachner & O'Rourke, 2007). An important advantage of the widespread use of the ZBI is that results obtained across studies can be easily compared and synthesized (Bédard et al., 2001). Furthermore, in a meta-analytic study concerning the reliability of the ZBI, Bachner and O'Rourke (2007) concluded that responses to the ZBI are reliable across populations of caregivers (i.e. spouses/partners, children, and parents) and care-recipients (i.e. AD/dementia, physical illness, and mental illness).

Whereas the ZBI has good internal consistency, Bédard et al. (2001) suggested that the length of this scale might be a deterrent to its use in clinical and research contexts. In accordance with this view, a short

*Corresponding author. Email: bachner@bgu.ac.il

12-item ZBI version was proposed. Items were selected through a combination of high factor loadings and high-item total correlations across different points in time and diagnosis. As in the full 22-item scale, two distinct factors were identified—personal strain and role strain—both demonstrating adequate internal consistency ($\alpha = 0.89$ and 0.77 , respectively). High correlations were found between the short and the full (22 items) ZBI version across all time points and diagnoses (ranging between $\gamma = 0.92$ and 0.97). In addition, similar correlations were found between the short and the full versions and measures of care-recipients' problem behaviors and impairment in activity of daily living (Bédard et al., 2001). These correlations provided support for the concurrent validity of responses to the short version. Based on these findings, the authors concluded that the reduction of the number of items does not affect the psychometric properties of the scale, and the short version can be used with confidence to measure caregiving burden (Bédard et al., 2001).

O'Rourke and Tuokko (2003) further examined the psychometric properties of responses to Bédard et al.'s (2001) short ZBI version within a large representative Canadian caregiver sample. Their findings were similar to those reported by Bédard et al. (2001).

Caregiving research has gained popularity in Israel over the past two decades. A substantial portion of this research assessed the burden imposed on caregivers of individuals with terminal or chronic conditions. The majority of these studies used the existing Hebrew ZBI version that is based on the original 29-item scale, translated to Hebrew more than 25 years ago (Bachner & O'Rourke, 2007). A recent meta-analytic study found that responses to this Hebrew ZBI version have statistically lower internal consistency estimates relative to the original English language format (Bachner & O'Rourke, 2007). Although average mean levels of this Hebrew version are within accepted parameters ($\alpha > 0.70$; Nunnally, 1978), a translation and validation study with a revised, shorter ZBI version is warranted. The current study was undertaken in order to achieve this goal. The overall goal of this study is to examine the psychometric properties and factor structure of the Hebrew version of Bédard et al.'s (2001) short ZBI scale, and to determine its concurrent validity.

Methods

Sample and procedure

Inclusion criteria for this study were: Self-identifying as Jewish, proficiency in the Hebrew language, and self-identifying as the primary family caregiver of a person, 60 years of age or older, with physical impairment or both, physical and cognitive impairments.

Trained research assistants recruited potential participants through snowballing techniques using a standardized protocol. We approached respondents

in adult day centers and meetings of the Alzheimer's Association in various geographical regions across the country. Prospective participants were also asked to suggest other individuals who are caregivers of persons with cognitive or physical impairments. The sample included participants from a variety of geographical regions in Israel. Participation was voluntary. Prior to enrollment, participants signed an informed consent. The vast majority of the interviews took place in participants' homes and lasted for about 30–40 min. During the time of the interview, care-recipients were asked to respond to a cognitive screen test in order to assess their cognitive status. The physical dependency of care-recipients was also assessed during that time. The results of these tests indicated the presence of physical/cognitive impairments. The study was approved by the ethics committee of Bar-Ilan University.

A total of 148 caregivers enrolled in the study. Characteristics of the caregivers and their older care-recipients are presented in Table 1. The average age of caregivers was 58.8 and the majority were women (60.1%). Most were married (81.8%) and lived in a separate residence from the care-recipient (70.3%). More than half were adult children of care-recipients (62.8%), about a quarter were spouses (23.7%) and the remainder were other family members (13.5%). About half resided in small towns (47.3%) and more than a quarter (28.3%) ranked the importance of their religious beliefs as quite important.

The average age of care-recipients was 82.8 and the majority was woman (65.5%). All care-recipients were dependent in their ADL/IADL activities ($M = 7.92$, median = 8, mode = 10, $SD = 2.86$, and range 0–11) and the majority (90 persons, 60.8%) also had cognitive impairment (Table 1).

Measures

Scale preparation

According to accepted procedures (Koller et al., 2007), Bédard et al.'s (2001) short ZBI was first translated from English to Hebrew by a bilingual psychologist. The translated version was back translated and modified until the back-translated version was comparable to the original version. Following the translation process, selected respondents were asked to comment on the measure. Based on respondents' comments, the final version was formed (Table 2).

Zarit Burden Interview Hebrew Short version (ZBI-HS)

The short version of the ZBI is comprised of 12 items (Bédard et al., 2001). Similar to the original 22-item scale (Zarit et al., 1985), this short scale is composed of two constructs, personal strain and role strain. All items are rated along five-point Likert scale from 0 ('never') to 4 ('almost always'), with a higher score

Table 1. Characteristics of primary caregivers and their older care-recipients.

	Caregivers (<i>n</i> = 148)	Care-recipients (<i>n</i> = 148)
Variable	M (SD)	M (SD)
Age (years)	58.8 (13.1)	82.8 (8.0)
Gender (%)		
Men	59 (39.9)	51 (34.5)
Women	89 (60.1)	97 (65.5)
Marital status (%)		
Married	121(81.8)	42 (28.4)
Others	27 (18.2)	106 (71.6)
Education (years)	14.3 (3.9)	10.6 (5.0)
Financial status (%)		
Comfortable	108 (73.0)	92 (62.2)
Not comfortable	40 (27.0)	56 (37.8)
Relationship to care-recipient (%)		
Spouse	35 (23.7)	
Adult children	93 (62.8)	
Other relatives	20 (13.5)	
Living arrangements (%)		
Living with care-recipient	44 (29.7)	
Separate residence from care-recipient	104 (70.3)	
Importance of religious beliefs (%)		
Not at all important	31 (20.9)	
Not so important	39 (26.4)	
Quite important	42 (28.3)	
Very important	36 (24.3)	
Place of residence (%)		
Large city	52 (34.8)	
Small town	70 (47.3)	
Small community (e.g. Kibbutz)	26 (17.9)	
Caregiver's well-being (range 0–25)	16.2 (4.9)	
Distress concerning behavioral problems of care-recipients (range 0–96)	14.85 (13.5)	
Physical dependency of care-recipients (range 0–11)		7.92 (2.9)
Existence of cognitive impairment among care-recipients (%)		90 (60.8)

Table 2. Factor loadings of the items of the ZBI-HS (*n* = 148).

Item/factor	Personal strain	Role strain
Do you feel that because of the time you spent with your relative that you do not have enough time for yourself	0.70	0.12
Do you feel stressed between caring for your relative and trying to meet other responsibilities (work/family)?	0.66	0.08
Do you feel angry when you are around your relative?	0.63	0.37
Do you feel that your relative currently affects your relationship with family members or friends in a negative way?	0.50	0.22
Do you feel strained when you are around your relative?	0.63	0.11
Do you feel that your health has suffered because of your involvement with your relative?	0.65	0.01
Do you feel that you do not have as much privacy as you would like because of your relative?	0.74	0.08
Do you feel that your social life has suffered because you are caring for your relative?	0.85	0.10
Do you feel that you have lost control of your life since your relative's illness??	0.74	0.14
Do you feel uncertain about what to do about your relative?	0.27	0.62
Do you feel you should be doing more for your relative?	0.01	0.88
Do you feel you could do a better job in caring for your relative?	0.07	0.89

representing higher sense of burden. Range of the entire scale is 0–48.

Well-being of caregivers

The World Health Organization Well-Being Index (WHO-5) is a five-item questionnaire endorsed by the World Health Organization as a screening measure

(World Health Organization, 1998). The questionnaire was found to be valid in an elderly population (Heun, Bonsignore, Barkow, & Jessen, 2001). Items range on a five-point Likert scale from 0 ('at no time') to 5 ('all of the time'), with a higher score representing better well-being. Range of the entire scale is 0–25. Internal consistency as measured by Cronbach's alpha in this study is $\alpha = 0.86$.

Distress concerning behavioral problems of care-recipients

Behavioral problems and distress associated with care-recipients were assessed using the Revised Memory and Behavior Problems Checklist (RMBPC; Teri et al., 1992). This is an informant measure of common problem behaviors in older adults with dementia. Participants are asked to indicate whether or not each of 24 behaviors has happened and then indicate on a five-point Likert scale from 0 ('not at all') to 4 ('extremely') the degree of distress associated with the problem behavior. Range of problem behaviors is between 0 and 24, and range of distress associated with problem behaviors is between 0 and 96. In this study, we focused only on the distress associated with problem behaviors ($\alpha = 0.87$).

Physical dependency of care-recipients

The physical dependency of care-recipients was assessed using the activities of daily living (ADL; Katz, Downs, Cash, & Grotz, 1970)/instrumental activities of daily living (IADL; Lawton & Brody, 1969). Family members were asked to indicate whether the care-recipient needed assistance with six ADLs and five IADLs. The range is 0–11 with higher score indicating more ADL/IADL impairments. Internal consistency as measured by Cronbach's alpha is $\alpha = 0.86$.

Cognitive status of care-recipients

The cognitive status of care-recipients was assessed using a short cognitive screen based on the Mini-Mental Status Exam (MMSE) (Callahan, Unverzagt, Hui, Perkins, & Hendrie, 2002). This six-item screener was found to be a sensitive and reliable instrument for identifying individuals with cognitive impairment. The measure has comparable diagnostic properties to the full 30-item MMSE. Its range is between 0 and 6, with a higher score representing better cognitive functioning. A score lower than 4 is indicative of cognitive impairment. Internal consistency as measured by Cronbach's alpha in this study is $\alpha = 0.71$.

Statistical analysis

The structure of the ZBI-HS was explored using an exploratory factor analysis (EFA) with principal component analysis (PCA) and Varimax rotation. Internal consistency of the scale was assessed using Cronbach's alpha coefficient. Concurrent validity was established using multiple linear regression analysis that examined the relative contribution of caregivers' well-being, distress concerning care-recipients' behavioral problems, and the type of care-recipients' impairment to the explanation of ZBI-HS. Significance level was set at $p < 0.05$. The data were analyzed with SPSS statistical software, PC version 16.0.

Results

Exploratory factor analysis

The sample was first assessed for its suitability for factor analysis. Bartlett's Test of Sphericity was highly significant ($\chi^2 = 733.4$, $p < 0.0001$) and the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy value was 0.80. Both of these statistics supported the factorability of the matrix (Tabachnick & Fidell, 2001).

The ZBI-HS was explored using EFA with a two-factor solution based on Bédard et al.'s (2001) study. The two eigenvalues that emerged from the analyses were 4.54 and 2.02. Inspection of the factors and their respective items revealed a structure identical to the one proposed by Bédard et al. (2001) and confirmed by O'Rourke and Tuokko (2003). The first factor, 'personal strain', consisted of nine items and explained 36.2% of the variance. The second factor, 'role strain', included three items and explained 18.5% of the variance (the total scale explained variance was 54.7%; Table 2). Cronbach's alpha for the total scale was $\alpha = 0.83$, and $\alpha = 0.86$, $\alpha = 0.76$ for the two factors, respectively. Two indices were created on the basis of these factors as the average of responses to their respective items. As expected, the correlation between the two factors was low ($\gamma = 0.22$; $p < 0.05$).

Concurrent validity

Regression analysis was performed in order to examine the concurrent validity of responses to the ZBI-HS. Because the sample of care-recipients was composed of persons with either physical impairment or both physical and cognitive impairments, the type of impairment (with or without cognitive impairment) was included in the analysis as a control variable. Hence, the measures of caregivers' well-being, distress concerning care recipients' behavioral problems, and the existence of cognitive impairment were simultaneously entered into the equation as possible predictors of the ZBI-HS. Only the measures of caregivers' well-being and distress concerning care-recipients' behavioral problems provided unique and statistically significant contribution to the explanation of ZBI-HS responses. As expected, higher scores on the ZBI-HS were associated with lower scores on the measure of caregivers' well-being and with higher scores on the measure of distress concerning care-recipients' behavioral problems (Table 3). These findings support the concurrent validity of responses to the ZBI-HS.

Discussion

This study examined the psychometric properties and factor structure of a Hebrew version of Bédard et al.'s (2001) short ZBI scale (ZBI-HS). This timely study is highly needed in light of the importance of developing valid and reliable research tools for measuring caregiving burden and the relatively low internal

Table 3. Caregiver's well-being, distress concerning care-recipients' behavioral problems and existence of cognitive impairment as predictors of ZBI-HS: Results of a multiple regression analysis ($n = 148$).

Predictor	<i>B</i>	SE <i>B</i>	β	<i>F</i>
Caregiver's well-being	-1.95	0.70	-0.27	-2.79*
Distress concerning care-recipient's behavioral problems	0.20	0.05	0.37	3.80**
Existence of cognitive impairment [^]	-0.40	2.63	-0.15	-0.15

Note: Total $R^2 = 0.236$, adjusted $R^2 = 0.209$, [^]1 = yes, 2 = no, * $p < 0.01$, ** $p < 0.001$.

consistency of responses to the existing Hebrew ZBI scale (Bachner & O'Rourke, 2007).

The factor analysis supported the two-factor structure previously reported by Bédard et al. (2001) and later confirmed by O'Rourke and Tuokko (2003). As expected, the structure of the two factors (personal strain and role strain) and their respective items was similar to that proposed by Bédard et al. (2001). The scale demonstrated a high percentage of explained variance as well as adequate internal consistency for the entire scale and each of the factors. The low association found between the two factors indicates that they pertain to distinct constructs. The concurrent validity of responses to the scale was supported by its significant negative association with caregivers' well-being and positive association with distress concerning care-recipients' behavioral problems.

These findings suggest that the ZBI-HS is appropriate for evaluating caregiving burden. It appears that the translation of the ZBI-short form into Hebrew as well as the cultural differences between the United States and Israel do not affect the scale's psychometric properties or lessen its internal reliability or validity. This implies that the scale measures common feelings and experiences that transcend language and cultural differences. Given recent tendency to develop short instruments in order to reduce the burden associated with participation in such studies among older adults (Bédard et al., 2001), we encourage researchers in other non-English speaking countries to replicate our study.

Despite the encouraging findings, several limitations of the study should be acknowledged. Although the 148 caregivers were recruited in a variety of geographical regions and residential areas, this is not a representative sample. Furthermore, the snowball recruitment procedure might affect our findings. Individuals usually propose other individuals that resemble them and share their own views. Hence, it is possible that the caregivers who participated in this study differ from other caregivers who did not participate with regard to personality traits or ability to cope with stress. Also of note, the sample is composed solely of Jewish Israelis. Israel is a multicultural society composed of a variety of ethnic, cultural, and religious groups, each characterized by its own norms, values, and customs. However, because of our relatively small sample size, we attempted to reach a homogenous group of caregivers in terms of religious belief and language. Despite ethnic and cultural differences in

Israel, the Israeli-Jewish population is considered to share a common general culture comprised of the Jewish religion, nationalism, common language, cultural norms, and other western characteristics such as democratic ethos, materialism, and competitiveness (Smootha, 1978).

Another limitation might be the relatively high percentage of caregivers not living with the care-recipients. This may have had an effect on their burden experience. Finally, the use of the Revised Memory and Behavior Problems Checklist (RMBPC) with a mixed population of care-recipients that suffers from either physical impairment or both, physical impairment and cognitive impairment, is somewhat problematic as the measure is originally intended for use with individuals with dementia. However, given the fact that the RMBPC evaluates caregivers' subjective distress associated with his or her subjective perception of care recipients' functioning, we believe the use of such a measure is appropriate. Further, this measure evaluates several domains, all are highly relevant for older adults in general (e.g., depression, behavioral disturbance, and memory problems). It also is important to note that such a measure has been used with care-recipients who did not suffer from cognitive impairment in past research (Ayalon, 2009). Given these limitations, this study should be seen as an initial examination and validation of the ZBI-HS. Future studies need to further examine the ZBI-HS with larger samples of caregivers from different ethnic, cultural, and religious backgrounds, derived by random recruitment. Nonetheless, our findings provide important information about the psychometric properties and the usability of a commonly used scale for measuring burden in caregivers of older adults and support the use of the ZBI-HS in this population.

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