

The cultural context of caregiving: a comparison of Alzheimer's caregivers in Shanghai, China and San Diego, California

T. L. PATTERSON,¹ S. J. SEMPLE, W. S. SHAW, E. YU, Y. HE, M. Y. ZHANG, W. WU
AND I. GRANT

From the Department of Psychiatry, University of California at San Diego School of Medicine, La Jolla and San Diego State University, San Diego, California, USA; and Shanghai Mental Health Center, Shanghai, China

ABSTRACT

Background. Systematic comparisons of the psychological and physical responses of caregivers of Alzheimer's disease (AD) patients in the US and China have not been previously reported.

Methods. Informal caregivers of community dwelling AD patients in Shanghai, China and demographically-matched non-caregiving Chinese controls were compared with a sample of American caregivers residing in San Diego, California and demographically-matched American controls.

Results. Despite some demographic discrepancies, caregivers from both China and the US were similar. Caregivers from both cultures reported more depressive symptoms and more physical symptoms when compared with non-caregivers. Both groups of caregivers reported that patients required similar amounts of care and help with activities of daily living (ADLs). However, Shanghai caregivers reported less access to emotional support when compared with the San Diego sample. A conceptual model, guided by the stress process model of Pearlin *et al.* (1990), was used to explore multivariate relationships between caregiver characteristics and the physical and psychological health of our sample of AD caregivers in Shanghai, China. Results from a path analytical procedure revealed that the relationships among these variables and health outcome did not differ significantly from those observed in the US sample.

Conclusions. Although elderly family members are venerated in the stereotypical Chinese family unit, and informal caregiving of disabled family members is socially mandated, the negative health consequences of caregiving appear to be similar to those observed among caregivers in the US.

INTRODUCTION

Caregiving for a relative with Alzheimer's disease (AD) has been shown to result in psychological distress and increased physical symptoms among caregivers (Wright, *et al.* 1993). However, caregiving research has, for the most part, been conducted on white, middle-class American samples (e.g. Kiecolt-Glaser *et al.* 1991;

Vitaliano *et al.* 1991) and cultural differences in response to the stress of caregiving have been largely ignored. China, for example, has the largest population in the world, and appears to have approximately the same age-related prevalence of AD as that reported in the US (Hill *et al.* 1993); however, psychosocial response to the stress of caregiving in the Chinese population have not been studied systematically. Yu *et al.* (1993) produced an early report focusing on patient characteristics and caregiver demographics within a sample of AD caregivers living in Shanghai, China and compared them with

¹ Address for correspondence: Dr Thomas L. Patterson, Department of Psychiatry (0680), University of California, San Diego, Clinical Sciences Building, Room 249, La Jolla, CA 92093-0680, USA.

caregivers of medically disabled patients. They reported that caregivers of the disabled patients were more stressed than caregivers of AD patients. In our review of the caregiving literature, we found no published reports that directly compared the experiences of caregivers from distant cultures. Cross-cultural studies of caregiving may provide insight into the demands and consequences of caregiving that are universal and those that are related to societal norms and expectations.

The purpose of the present study was to describe and compare caregivers of AD patients in Shanghai, China with a sample of American caregivers residing in San Diego, California. San Diego is a large Pacific port city of approximately 2.0 million people. Shanghai is also a Pacific port city but with a considerably larger population (14.7 million). We examined group differences in terms of patient and caregiver characteristics, and physical and psychological health outcomes. We hypothesized that Chinese and US caregivers would be equally distressed, both psychologically and physically. In addition, we sought to examine the interrelationships between patient characteristics (e.g. stage of dementia), caregivers' personal resources (e.g. coping) and health outcome (e.g. physical symptoms) in our sample of Shanghai caregivers. To address this second objective, we tested a conceptual model guided by a previous path analytical study of our US caregiver sample (Shaw *et al.* 1995), which was based on a stress process model (Pearlin *et al.* 1990). This conceptual model was used to explore relationships between patient and caregiver characteristics and the physical and psychological health of AD caregivers in Shanghai, China.

Caregiving in the United States

During the past 15 years, researchers in the United States have amassed a large body of literature on the sources and consequences of stress associated with providing care to AD patients (see Schultz *et al.* 1995 for a review). These efforts have contributed significantly to our understanding of the caregiving process, and this literature provides a framework for examining the experiences of family caregivers in other cultures. The majority of American studies have focused on the relationship between patient characteristics, caregivers' personal

resources, and the health and well-being of the caregiver.

Several studies have demonstrated strong associations between characteristics of the AD patient and caregivers' well-being. Increased cognitive impairment and problems of daily living (Moritz *et al.* 1989; Vitaliano *et al.* 1991), and asocial or disorientated behaviour (Pruchno & Resch, 1989*a*) have been frequently cited as predictors of caregiver burden. However, these findings are somewhat inconsistent (e.g. Haley *et al.* 1987; Pruchno & Resch, 1989*b*), suggesting that other potential explanatory variables may exist.

A number of sociodemographic factors as well as interpersonal and intrapersonal resources of caregivers have also been related to health outcomes. Increased age, being male (Fitting *et al.* 1986; Malonebeach & Zarit, 1991), use of maladaptive coping responses and decreased social support (Haley *et al.* 1987; Vitaliano *et al.* 1991) have all been associated with increased caregiver burden and psychological distress (e.g. depression, anxiety). Decreased physical health as a consequence of caregiving has been less documented (Shaw *et al.* 1997). A number of studies that have utilized cross-sectional or retrospective designs have reported more physical health symptoms among caregivers (e.g. Dura *et al.* 1990; Baumgarten *et al.* 1992), a higher incidence of chronic health conditions (Pruchno & Potashnik, 1989), and more use of prescription medications (Haley *et al.* 1987) compared with age-matched controls. Other studies, however, have reported no health differences between caregivers and controls (George & Gwyther, 1986). At least one prospective research study has demonstrated that providing extensive ADL assistance may have negative health implications for spousal caregivers, while caregiving, *per se*, does not (Shaw *et al.* 1997). However, poor physical health of the caregiver remains an important predictor of institutionalization of AD patients (Chenoweth & Spencer, 1986). Therefore, investigations of the physical health impacts of caregiving have continued.

Caregiving in China

Similar to American culture, the Chinese societal norm is to assign primary responsibility for care of impaired elders to their families. Although no

studies have directly compared Chinese and US caregivers, the findings from earlier reports of Shanghai caregivers suggest that caregivers in both cultures are most frequently kin of the patient (Yu *et al.* 1993). However, compared with caregivers in the US, caregivers in China are more often children or in-laws, and less often spouses. Yu *et al.* (1993) also note that cognitively impaired individuals living in the US who are single or widowed are more likely to be institutionalized than those in China. This may in part be due to the general lack of institutional care facilities for the aged in China, and the pervasiveness of inter- and intra-generational co-living arrangements in Shanghai. Yu *et al.* (1993) speculate that while caring for a cognitively impaired person implies 'deviance and dependency' on the part of the care recipient, Chinese caregivers may view this increased dependency as part of the expected behaviour of the ageing population, and the cognitive and behavioural problems as less deviant than caregivers in the US. The authors hypothesize that because lay people may view memory and behavioural problems associated with dementia as part of normal ageing processes, and dependency in old age as normative behaviour, family caregivers in China may experience less stress compared with those in the US.

METHOD

Subjects

One hundred caregivers to AD patients residing in Shanghai, China were recruited from a large-scale, longitudinal research programme of AD and dementia described by Yu *et al.* (1989), Zhang *et al.* (1990) and Katzman *et al.* (1994). The original study was a community-wide epidemiological survey of cognitive impairment using a probability sample of 5055 non-institutionalized elderly adults, age 55 and older, who were representative of the ageing population in the Jing-An district of Shanghai, the largest city in China. Subjects for the present study were responsible for the home care of patients who had received a clinical diagnosis of either 'probable' or 'possible' AD. Diagnostic procedures and sampling procedures for determining AD diagnosis for the initial sample are described by Katzman *et al.* (1994). Caregiver data were collected after Phase II re-interviews

of all positive cases of cognitive impairment obtained 1 year earlier in order to arrive at a clinical diagnosis of AD. All families with patients diagnosed with AD were approached and asked to participate in the present study. Eighty-eight per cent of those contacted agreed to participate. No medical exclusionary criteria for caregiver participation in this sample were utilized. One hundred and ten caregivers were interviewed, 10 of whom were not living with the patient. In order to increase comparability with our San Diego sample, these 10 caregivers were excluded from the present analyses.

Shanghai control subjects were 99 participants who were equivalent to AD caregivers in terms of gender, age and relationship to the patient. Control subjects were chosen from a pool of families without dementia patients identified through the same epidemiological survey described above. One hundred and ten potential control subjects were interviewed; however, 11 of these subjects were providing care (> 12 h per day) to a medically ill patient in their home. Therefore, these subjects were excluded from the present analysis, yielding 99 controls. All subjects were interviewed in their homes by trained interviewers from the Shanghai Mental Health Center.

The San Diego sample of caregivers was made up of 74 spouses of AD patients. All patients had a diagnosis of probable or possible AD, and their caregivers were participating in an ongoing longitudinal study of health outcomes. Caregivers were recruited from the San Diego (UCSD) Alzheimer's Disease Research Center (ADRC), or through community support groups and physician referrals. The San Diego caregivers and patients met the following eligibility requirements: (1) caregivers were responsible for home care of the patient at their baseline assessment; (2) both caregiver and patient were willing to participate in a 5-year longitudinal study, which involved multiple 6-month assessments; (3) both caregiver and patient communicated in English; and (4) patient and caregiver resided within the San Diego, California metropolitan area. Exclusionary criteria for caregivers in San Diego included immune disease, autoimmune diseases, or taking medications that were likely to influence immunological or neuroendocrine assays. San Diego caregivers were not excluded from par-

Table 1. Demographic characteristics of US and Shanghai caregivers and non-caregiving controls

Variable	Shanghai		US	
	A (N = 100) Caregiver	B (N = 99) Control	C (N = 74) Caregiver	D (N = 41) Control
Gender N (%)				
Male	43 (43.0)	49 (49.5)	25 (33.8)	22 (53.7)
Female	57 (57.0)	50 (50.5)	49 (66.2)	19 (46.3)
Race/ethnicity N (%)				
Han	100 (100)	99 (100)	—	—
US Black	—	—	1 (1.4)	—
US Hispanic	—	—	1 (1.4)	—
US Caucasian	—	—	70 (94.6)	41 (100)
US Other	—	—	2 (2.7)	—
Working status N (%)				
Never worked	5 (5.0)	3 (3.0)	9 (12.2)	1 (2.4)
Worked and retired	46 (46.0)	45 (45.5)	47 (63.5)	29 (70.7)
Still working	47 (47.0)	48 (48.5)	11 (14.9)	7 (17.1)
Worked in past	2 (2.0)	3 (3.0)	7 (9.5)	4 (9.8)
Living situation N (%)				
Caregiver lives with Pt	100 (100)	99 (100)	74 (100)	41 (100)
Relationship to Pt N (%)				
Spouse	34 (34.0)	33 (33.3)	74 (100)	41 (100)
Child	37 (37.0)	34 (34.3)	—	—
Grandchild	6 (6.0)	12 (12.2)	—	—
Daughter-in-law	16 (16.0)	12 (12.2)	—	—
Other	7 (7.0)	8 (8.1)	—	—
Age M (s.d.) ^a	58.8 (15.7)	56.7 (18.0)	70.4 (5.6)	71.9 (6.9)
Years Pt married M (s.d.) ^b	49.4 (11.3)	52.8 (8.5)	39.7 (13.6)	39.0 (13.9)
No. of children M (s.d.)	2.2 (1.8)	2.2 (2.0)	2.8 (1.4)	2.7 (1.7)
Years of school M (s.d.) ^c	8.5 (5.3)	9.2 (5.3)	14.7 (3.4)	15.7 (2.8)
Current monthly income M (s.d.) ^d	703.9 (413.4)	779.7 (709.1)	2779.0 (1337.0)	3533.3 (22)

^a $F = 22.15$, $df\ 3/313$, $P = 0.0000$; $AB < CD^*$.

^b $F = 16.04$, $df\ 3/205$, $P = 0.0000$; $AB > CD^*$.

^c $F = 44.89$, $df\ 3/313$, $P = 0.0000$; $AB < CD^*$.

^d $F = 99.32$, $df\ 3/294$, $P = 0.0000$; $AB < CD^*$.

* *Post-hoc* comparisons using Student–Newman–Keuls' statistic.

participation for most major medical conditions (e.g. heart problems). Data reported herein are from baseline interviews.

Control subjects for the San Diego sample were 41 age-matched, married couples selected from neighbourhoods sociodemographically matched to the caregivers. Controls were recruited from a pool of 150 volunteer control subjects available through the ADRC and other geriatric research centres affiliated with UCSD. From each control couple, one spouse was randomly assigned as 'non-patient' and the other as 'non-caregiver'.

Demographic characteristics of both caregivers and controls are listed in Table 1. Equivalent proportions of male caregivers (approximately one-third) were recruited in San

Diego and Shanghai. Shanghai included children, siblings, and other relatives of the patient compared with the San Diego caregivers who were all spouses to the AD patient. San Diego caregivers tended to be somewhat older than Shanghai caregivers (70.4 versus 58.8 years, respectively). When comparing only spousal caregivers in the two cultures, caregivers of the Shanghai group were slightly older (75.1 years) as compared to the San Diego spouses (70.4 years). Shanghai caregivers tended to be married for a longer period of time, have more children, and have less education. Although direct comparisons of purchasing power report were not made, Shanghai caregivers reported less income (in US dollars equivalent) as compared to the San Diego caregivers.

Measures

All measures were translated, and independently back-translated (to insure accuracy) by Shanghai Mental Health Center staff. Where inaccuracies were identified, new translations and re-checks of translations were conducted. Where appropriate, internal consistencies (alphas) are presented below for the Shanghai sample, and previously reported internal consistencies from other US samples are cited. The measures were as follows.

Clinical Dementia Rating

The global deterioration scale for assessment of primary degenerative dementia (Hughes *et al.* 1982) was used to rate overall patient dementia. This scale captures seven stages in the progression of dementia. Each stage is defined by specific (distinct) clinical characteristics. Possible scores on the Clinical Dementia Rating (CDR) scale are: 0 (normal), 0.5 (questionable dementia), 1 (mild dementia), 2 (moderate dementia), or 3 (severe dementia). This scale has been used with samples of primary degenerative dementia patients and its psychometric properties are well established (Reisberg *et al.* 1982).

Memory and problem behaviours

Pearlin's 14-item scale problematrical behaviours (Pearlin *et al.* 1990). Scale items were derived from open-ended exploratory interviews with caregivers and reflect commonly reported behavioural problems of AD patients. The scale distinguishes caregivers according to number and frequency of problem behaviours dealt with on a weekly basis. The frequency of the behaviour is measured on a 4-point scale ranging from 'no days' to '5 or more days per week'. A single score based on the mean value of responses to all items was computed. The internal consistency (alpha) for the 14-item scale has been reported to be 0.79 for a US sample (Pearlin *et al.* 1990), and internal consistency was 0.85 for the Shanghai sample.

Activities of daily living

The number of activities for which the AD patient is dependent upon the caregiver, and the extent of the dependency for each activity, was

assessed by Pearlin's (1990) 15-item measure of activities of daily living (ADL) and instrumental activities of daily living (IADL). These activities include satisfying daily needs such as bathing (ADL) and more managerial tasks such as shopping (IADL). The extent to which the patient depended upon the caregiver for help with each activity was scored on a 4-point scale ranging from 'not at all' to 'completely'. A mean value for total ADL and IADL dependencies was computed for each participant. The internal consistency (alpha) for the 15-item scale was 0.92. Factor analysis has established a 7-item ADL factor (alpha = 0.92), and an 8-item IADL factor (alpha = 0.86) (Pearlin *et al.* 1990). The internal consistencies for our Shanghai sample were 0.70 and 0.64 for the ADL and IADL scales, respectively.

Amount of care required

Caregivers were asked a single question that quantified the number of hours per day devoted to caregiving activities: 'During the past 6 months, how much direct care did your (relative) require from you?' Response categories included: none (0 h per day); little (1 to 6 h per day); some (7 to 12 h per day); a lot (13 to 18 h per day); and constant (19 to 24 h per day).

Emotional support

In order to quantify caregivers' access to emotional support, they were asked to indicate the extent to which they agreed or disagreed with statements that assessed the perceived availability of a person who is caring, trustworthy, uplifting, and a confidant. Each statement is rated on a 4-point scale ranging from 'strongly disagree' (1) to 'strongly agree' (4). This 8-items scale of perceived emotional support was developed by Pearlin *et al.* (1990) who reported an internal consistency (alpha) of 0.87 for a large sample of AD caregivers in the US. The internal consistency for the Shanghai sample was 0.78. A single value for emotional support was obtained by averaging the 8-items.

Coping

In San Diego, we utilized the original version of the Ways of Coping Scale developed by Folkman & Lazarus (1988). Participants indicated the degree to which they utilized behavioural and

cognitive strategies to deal with stressful life circumstances. The measure is comprised of 66 items measured on a 5-point Likert-type scale. The original scale yielded 8 factors (Folkman & Lazarus, 1988). In order to reduce the length of this scale and to ensure that items were culturally relevant, the scale was modified for use in Shanghai. Original items with factor loadings greater than 0.5 were retained, and this yielded three items per scale (see Folkman & Lazarus (1988) for a description of the original scales and factor loading). A review of these items was conducted by our Shanghai collaborators; items that were deemed 'culturally irrelevant' were dropped and replaced with the next item with the highest loading that was culturally relevant. A total of 38 items were included in the final version of the scale. Factor analysis of the Shanghai data revealed four factors (i.e. problem confronting, emotional confronting, problem distancing and emotional distancing). An examination of the same items in the San Diego sample yielded a similar factor structure (see Shaw *et al.* 1997, for a detailed report on the development of this scale). The present report utilized the four summary factors.

Role overload

This measure of subjectively experienced hardships was developed by Pearlin *et al.* (1990) specifically for use with AD caregivers. This 4-item scale assesses the degree of overload or burn out resulting from the daily demands of caregiving. Caregivers are presented with four statements that assess the level of fatigue, as well as the perceived nature of the stress (e.g. 'You are exhausted when you go to bed at night'; 'You don't have time just for yourself'). Caregivers respond to each statement using a 4-point scale ranging from 'not at all' (1) to 'completely' (4). The internal consistency (α) for this scale among a sample of 555 caregivers to AD patients was 0.80 (Pearlin *et al.* 1990). The α for this scale in the present study was 0.92.

Psychological health

Self-report of mood was assessed using the global severity index of the Brief Symptom Inventory (BSI), as well as the depression and anxiety subscales. The BSI is a shortened 53-item version of the Hopkin's Symptom Checklist-90 (Derogatis *et al.* 1974). The global

severity index provides a summary score, which reflects overall degree of psychological disorder. Both criterion-related validity and construct validity have been evaluated in psychiatric and non-psychiatric out-patients, and normal controls (Derogatis & Melisaratos, 1983). The Hopkin's Symptom Checklist-90 has been translated and normed in Chinese (Jin *et al.* 1986).

In order to obtain a more objective rating of depression, trained raters used the Hamilton Rating Scale for Depression (HRSD) (Hamilton *et al.* 1960) to assess the severity of depressive symptoms experienced over a 2-week period preceding the participant's interview. The 21 items of the scale are rated on a 0 to 4 or a 0 to 2-point scale. The HRSD yields a summary score, which was utilized in these analyses. The HRSD has been shown to have acceptable validity and interrater reliability (Hamilton, 1969; Cleary & Guy, 1977; Endicott *et al.* 1981). The HRSD has been previously translated and used extensively by the Shanghai Neuropsychiatric Institute.

Physical symptoms

The number of physical symptoms reported by caregivers was assessed using the Interim Medical Survey (IMED) (Grant *et al.* 1988). This comprehensive survey of organ systems probes for any illness experience, physician visits and medications used during the preceding 6-month period. The number of symptoms reported during the 6-month period preceding the measurement was calculated and utilized in these analyses. In addition, a list of symptoms complexes (e.g. colds, flu, etc.), which have been associated with stress reactions were included in the physical health survey. The total number of symptoms complexes was calculated for utilization in these analyses.

Analyses

Statistical analyses were performed using the SPSS-PC computer program (SPSS Inc. 1988). Comparisons between caregivers and controls from Shanghai and San Diego were conducted using one-way between-subjects analyses of variance (ANOVAs). Path analysis, which applies multiple regression techniques to examine both direct and indirect effects of multiple variables, was used cross-sectionally to test causal link-node models. A detailed description

Table 2. Patient characteristics

Variable	Shanghai		US	
	A Caregiver	B Control	C Caregiver	D Control
Patient				
Age M (s.d.) ^a	80.8 (7.3)	80.6 (7.0)	72.5 (6.1)	71.6 (7.8)
Gender (N% male) ^b	33 (33)	30 (30.3)	49 (66.2)	19 (46.3)
Clinical Dementia Rating (CDR) N (%)				
Normal (0)	0	73 (73.7)	0	35 (85.4)
Questionable (0.5)	20 (20)	24 (24.2)	28 (37.8)	4 (9.8)
Mild (1.0)	33 (33)	2 (2.0)	23 (31.1)	2 (4.9)
Moderate (2.0)	21 (21)	0	9 (12.2)	0
Severe (3.0)	26 (26)	0	14 (18.9)	0
Years wrong M (s.d.) ^c	4.4 (3.5)	N/A	6.6 (5.1)	N/A
Care required N (%)				
0 h/day	5 (5)	28 (28.3)	6 (8.1)	35 (35.4)
1–6 h/day	53 (53)	59 (59.6)	35 (47.3)	6 (14.6)
7–12 h/day	18 (18)	3 (3.0)	9 (12.2)	—
13–18 h/day	8 (8)	2 (2.0)	10 (13.5)	—
19–24 h/day	16 (16)	7 (7.1)	14 (18.9)	—
Problem behaviour M (s.d.) ^d	1.58 (0.48)	1.12 (0.23)	1.75 (0.45)	1.12 (0.2)
ADL ^e	2.20 (1.14)	1.14 (0.38)	1.81 (0.91)	1.02 (0.1)
IADL ^f	3.04 (0.87)	1.60 (0.75)	3.21 (0.79)	1.19 (0.3)
Total ADL and IADL M (s.d.) ^g	2.62 (0.95)	1.37 (0.53)	2.51 (0.75)	1.10 (0.2)

^a $F = 36.03$, $df\ 3/309$, $P < 0.001$; $AB > CD^*$.

^b $\chi^2 = 27.06$, $df\ 3$, $P < 0.001$.

^c $t = 3.11$, $df\ 154$, $P < 0.002$.

^d $F = 53.89$, $df\ 3/313$, $P < 0.001$; $AC > BD$, $A < C^*$.

^e $F = 37.57$, $df\ 3/219$, $P = 0.0000$; $AC > BD$, $A > C^*$.

^f $F = 123.54$, $df\ 3/299$, $P = 0.0000$; $AC > BD$, $B > D^*$.

^g $F = 84.13$, $df\ 3/313$, $P = 0.001$; $AC > BD^*$.

* *Post-hoc* comparisons using Student–Newman–Keuls' statistic.

of path analysis can be found in Cohen & Cohen (1983). The model can include both serial and parallel effects between variables. The methodology is limited by the requirements that all causal relationships be unidirectional and that the assumption of multiple regression be upheld at all stages of the model. For each endogenous variable (a variable which is 'caused' by at least one other variable), a multiple regression analysis is performed using the predictor variables hypothesized to have an effect on the dependent variable. This procedure is repeated for all endogenous variables and overall R^2 values for multiple regression analyses are calculated at each step. Standardized beta weights (partial regression coefficients) between predictor variables and dependent variables are used to represent 'path coefficients'. The relative strength of direct relationships between variables can be determined by comparing path coefficients. Indirect effects can be determined by multiplying all in-line path coefficients between two variables in the model. This procedure

is particularly effective when examining several intercorrelated variables for which multiple causal relationships can be hypothesized. A proposed path model was developed and causal links were tested using separate multiple regression analyses to predict each endogenous variable. The overall path model was tested by comparing it with a 'just identified model' including all possible causal links.

RESULTS

Comparisons with the San Diego sample of caregivers were conducted twice: once with the entire Shanghai sample; and, once with only spousal caregivers. Few differences emerged. Thus, unless otherwise indicated, all comparisons reported below include the entire Shanghai sample.

Patient characteristics are presented in Table 2. Shanghai patients and controls tended to be younger and more often female compared with the San Diego sample. In addition, Shanghai

Table 3. *Interpersonal and intrapersonal resources of caregivers*

Variable	Shanghai		US	
	A Caregiver Mean (s.d.) (N = 100)	B Control Mean (s.d.) (N = 99)	C Caregiver Mean (s.d.) (N = 74)	D Control Mean (s.d.) (N = 41)
Social support				
Emotional ^a	3.04 (0.52)	2.98 (0.44)	3.19 (0.46)	3.28 (0.39)
Coping				
Problem confronting ^b	33.26 (23.62)	35.53 (23.31)	20.53 (16.23)	28.81 (17.98)
Emotional confronting ^c	37.73 (18.81)	38.08 (18.29)	30.54 (17.84)	25.65 (16.78)
Problem distancing	41.22 (24.51)	39.96 (21.82)	39.22 (19.07)	32.96 (20.33)
Emotional distancing	39.59 (22.55)	41.19 (23.61)	45.36 (20.00)	41.88 (22.07)

^a $F = 5.41$, $df\ 3/310$, $P = 0.001$; $AC < CD^*$.

^b $F = 6.79$, $df\ 3/299$, $P = 0.0002$; $AB > DC^*$.

^c $F = 6.43$, $df\ 3/299$, $P = 0.0003$; $AB > CD^*$.

* *Post-hoc* comparisons using Student–Newman–Keuls' statistic.

Table 4. *Mental and physical health of Shanghai and US caregivers*

Variable	Shanghai		US	
	A Caregiver Mean (s.d.)	B Control Mean (s.d.)	C Caregiver Mean (s.d.)	D Control Mean (s.d.)
Overload ^a	2.16 (0.96)	1.24 (0.58)	2.29 (0.79)	1.41 (0.51)
Psychological symptoms				
Hamilton Depression ^b	2.74 (3.13)	1.73 (3.16)	3.03 (3.49)	0.88 (1.44)
BSI Depression ^c	0.28 (0.54)	0.21 (0.38)	0.62 (0.66)	0.14 (0.24)
BSI Anxiety ^d	0.24 (0.27)	0.21 (0.29)	0.39 (0.46)	0.22 (0.36)
BSI Global Severity ^e	0.24 (0.23)	0.22 (0.25)	0.38 (0.31)	0.21 (0.23)
Physical				
IMED total symptom ^f	6.02 (4.38)	4.03 (4.27)	6.93 (6.01)	5.88 (7.03)
Symptom complex ^g	28.58 (68.37)	21.11 (56.31)	54.28 (122.26)	36.15 (78.10)

^a $F = 39.13$, $df\ 3/310$, $P = 0.0000$; $AC > BD^*$.

^b $F = 6.04$, $df\ 3/304$, $P = 0.0005$; $AC > BD^*$.

^c $F = 12.33$, $df\ 3/306$, $P = 0.0000$; $C > ABD^*$.

^d $F = 4.69$, $df\ 3/306$, $P = 0.003$; $C > ABD^*$.

^e $F = 6.58$, $df\ 3/302$, $P = 0.0003$; $C > ABD^*$.

^f $F = 4.93$, $df\ 3/310$, $P = 0.002$; $AC > BD^*$.

^g $F = 2.44$, $df\ 3/310$, $P = 0.064$; $C > B^*$.

* *Post-hoc* comparisons using Student–Newman–Keuls' statistic.

caregivers had noted memory/behavioural problems for a shorter period of time (4.4 *versus* 6.6 years for the Shanghai and San Diego samples, respectively), even though the two patient samples were rated as similar in dementia status as determined by clinical ratings. Shanghai patients were similar to San Diego patients in the amount of care required and the extent of dependencies for IADL. Shanghai caregivers, however, reported giving more help with ADLs, while San Diego caregivers reported dealing with significantly more problematic patient

behaviours compared with their Shanghai caregiver counterparts. Both Shanghai and San Diego caregivers reported providing more help with ADLs and IADLs, more problematic patient behaviours, and more hours of direct care compared with their non-caregiving control groups.

Table 3 presents interpersonal and intrapersonal resources of the Shanghai and San Diego caregivers. We examined both access to emotional support and coping strategies. The San Diego sample (both caregivers and controls)

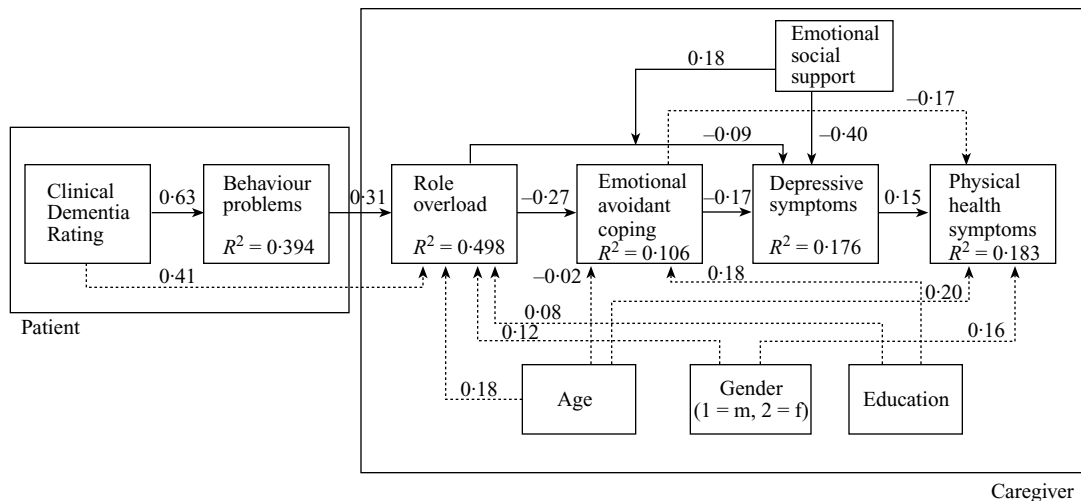


FIG. 1. Structural model for Alzheimer's disease caregiving in the Shanghai sample ($N = 220$). (→, Theoretically-based causal paths; - - ->, additional empirically-supported causal paths. The path coefficients are shown adjacent to each causal path arrow.)

reported significantly greater access to emotional support compared with the Shanghai sample. However, there was no difference between caregivers and non-caregiving controls within the Shanghai or US samples. In relationship to coping, caregivers and controls in Shanghai reported using significantly more Problem-Fronting and Emotional-Fronting coping strategies compared with San Diego caregivers, but neither caregiver group differed from their respective controls. There were no group differences for either Problem- or Emotional-Distancing coping.

Finally, we examined the mental and physical health of the Shanghai and San Diego samples (see Table 4). Caregivers in Shanghai and San Diego both reported significantly more depressive symptomatology (Hamilton Depression Scores) and more role overload compared with non-caregiving controls. In contrast to the Hamilton depression scores, San Diego caregivers reported more depression, anxiety, and global psychological distress in the Brief Symptom Inventory (BSI) compared with Shanghai caregivers and both groups of controls. Shanghai caregivers did not differ from controls on self-reported psychological disturbance as measured by the BSI global severity score. In terms of physical symptoms, both caregiver groups reported significantly more symptoms as compared to Shanghai controls, but not to San Diego controls.

Path analysis

A conceptual model (Fig. 1) was hypothesized to explain causal relationships between variables related to caregiving in our Shanghai sample. This model was based on a stress process model (Pearlin *et al.* 1990), and the authors' earlier findings from a sample of US spousal caregivers to AD patients (Shaw *et al.* 1995). Moving from left to right across the primary causal path, the model suggests that the clinical dementia status of the AD patient is related to the frequency of problematical patient behaviours, which, in turn, is the primary source of role overload for the caregiver. More role overload then leads to emotional avoidant coping, which then results in greater depressive symptoms. Depression, in turn, (perhaps through a suppression of the immune function leading to decreased physical conditioning) results in a greater number of physical symptoms and somatic complaints.

In addition to this primary causal path, several other causal mechanisms were added to the model. Background characteristics of the caregiver (age, gender and years of education) were tested hierarchically and incorporated in the structural equations to show the direct influence of these variables on role overload, emotional avoidant coping, depression and physical health. Lastly, a stress-buffering role of social support as suggested by Lin *et al.* (1979) was added to the model to test the moderating effect of social support on the relationship between role over-

load and depression. In order to increase the stability of the model, both caregivers and controls were utilized in the following sets of analyses.

Data from the Shanghai caregivers were used to examine zero-order correlations for the 10 variables included in the model. Only significant correlations are reported here ($P < 0.05$). Physical symptoms were correlated positively with depression, but negatively with emotional avoidant coping ($r = 0.23$ and $r = -0.37$, respectively). Both depression and physical symptoms were positively correlated with the frequency of problem behaviours exhibited by the AD patient ($r = 0.18$ and $r = 0.25$, respectively). Age was correlated only with role overload ($r = 0.21$), emotional avoidant coping ($r = -0.14$), physical symptoms ($r = 0.27$), and education ($r = -0.35$). Being a female caregiver was associated with more role overload and physical symptoms ($r = -0.17$ and $r = -0.24$, respectively), but not more depressive symptoms. (The complete correlation matrix is available from the authors upon request.)

Path coefficients (standardized regression coefficients) and R^2 values for each of the multiple regression steps are shown in Fig. 1. Along the primary causal path (from clinical dementia rating through physical health outcome), all direct effects were statistically significant ($P < 0.05$) based on the magnitude of path coefficients. Demographic characteristics (age, gender and years of education) were important in predicting role overload and physical health, but they were less important in predicting emotional avoidant coping or depression when controlling for other predictors. The hypothesized 'stress-buffering' role of social support was supported by the model. An examination of the path coefficient revealed that the interaction term made a significant contribution to the overall model. Social support also had a main effect; this variable was negatively associated with depressive symptoms (i.e. more support, less depression).

The overall model was tested by comparing the model with a 'just identified' model as suggested by Cohen & Cohen (1983). The just identified model was similar to the hypothesized model except that additional causal paths were added to show an effect of every earlier cause on every later endogenous variable. A test statistic,

W , which can be approximated by a chi-squared distribution, was computed according to the following equations:

$$R^2(\text{model}) + 1 - (1 - R_1^2) \times (1 - R_2^2) \times \dots \times (1 - R_k^2) \quad (1)$$

$$Q = (1 - R_{(\text{just identified})}^2) / (1 - R_{(\text{hypothesized})}^2) \quad (2)$$

$$W = -(N - \text{df}) \log_e Q \quad (3)$$

(where df = the difference in degrees of freedom between models and k = the total number of structural equations required by the model).

The results of the test of significance showed that the addition of all possible nonrecursive paths significantly improved the amount of variance explained, $W = 70.59$, $P > 0.05$, for $N = 199$ and $\text{df} = 17$. Therefore, path coefficients in the just-identified model were reviewed for empirical support of additional causal paths. Two additional causal paths were added to the model as shown in Fig. 1 (*a*) a direct effect of patient dementia rating on caregiver role overload, and (*b*) a direct effect of emotional avoidant coping on physical health.

A subsequent test of significance supported the revised model by showing that the addition of all possible nonrecursive paths to the revised model did not significantly improve the total variance explained, $W = 24.71$, $P < 0.05$ for $N = 199$ and $\text{df} = 15$. Based on this comparison, no additional causal paths were considered.

For comparative purposes, the results of the same path analytic procedure using data from our US sample of spousal caregivers are summarized below (see Shaw *et al.* 1995 for details). Similar to the Shanghai sample, all direct effects of variables along the primary causal pathway from Clinical Dementia Rating to physical health were significant for the US sample. The effects of age, gender, and SES on primary variables were also similar for the two samples. However, the path coefficients for the effects of emotional support and the interaction of role overload and emotional support (i.e. the stress-buffering effects) on depression were not statistically significant for US caregivers. Another interesting difference between the two samples emerged from the path analysis. Avoidant coping and depression were inversely related among Shanghai caregivers; in contrast, these two variables were positively associated in the US sample of caregivers.

DISCUSSION

Data on the psychosocial, psychological, and physical health functioning were gathered from a sample of caregivers to AD patients and non-caregiving controls in Shanghai, China and were contrasted with findings from a group of caregivers and non-caregiver controls in San Diego, California. Despite some sampling discrepancies, results for both the US and China caregivers were quite similar. Caregivers from both cultures reported more depressive symptoms (as measured by the Hamilton Rating Scale) and more physical symptoms as compared to non-caregivers. Both groups of caregivers reported that patients required similar amounts of care and help with IADLs. Differences in some areas were noted for the two caregiver samples. For example, San Diego caregivers reported significantly more problematical patient behaviours and less help given with activities of daily living (ADLs). Moreover, Shanghai caregivers reported less access to emotional support. Although Shanghai caregivers used more Problem-Confrontive and Emotional-Confronting coping compared to their American counterparts, neither caregiver group's coping efforts differed from their respective controls. Additionally, a path analytical procedure revealed that the relationships among these variables and health outcomes were generally very similar to those observed in the US sample.

The linkages between characteristics of the AD patient, psychosocial resources of the caregiver, and the caregiver's physical and psychological health was tested in a path analytical model. Findings from this model were similar to those generated using our San Diego sample, but differed in some potentially important ways. A striking difference in the Shanghai *versus* San Diego sample was noted in coping behaviour and its association with outcome. In the Shanghai sample, the use of less emotional avoidant coping was related to increased depressive symptomatology. In contrast, the path analysis conducted with the San Diego sample resulted in a positive relationship between these constructs (i.e. more emotional avoidant coping was related to increased depressive symptoms). We speculate that in China, it is culturally less acceptable to express negative emotions than in the US, and this emotional

inhibition may lead to increased depressive symptoms. In contrast, caregivers in the US who exhibit more emotional avoidant coping are more depressed because it is more acceptable to express these negative emotions. It is also possible, however, that while the literal translation of this scale appeared to be good, as indicated by good agreement in our back translation, meanings assigned to items in this scale may have been quite different than those ascribed by our US sample. Access to emotional social support did not differ between controls and caregivers in either culture. However, Shanghai caregivers and controls reported significantly less access to emotional support as compared to the San Diego caregivers and controls. This finding may be attributable, in part, to different recruitment procedures used in the two countries. The majority of US caregivers and controls were recruited through support groups or had other institutional affiliations; in contrast, the Chinese sample derived from an epidemiological survey. Previous research conducted in the US has demonstrated the support enhancement functions of caregiver groups and other types of institutional affiliations (Gallagher *et al.* 1989). In contrast, caregiver support groups and many forms of institutional support available in the US do not exist in Shanghai.

Our path analysis of Chinese caregivers' data also indicated that emotional support played a role in buffering the relationship between role overload and depression (as indicated by an interaction term), as well as a main effect (i.e. more emotional support was related to decreased depression in the Shanghai sample). The significant interaction term indicates that the relationship between role overload and depression is attenuated for those caregivers who reported higher levels of social support. The positive role of social support in relation to caregiving was not observed for our sample of caregivers in San Diego. Neither the interaction term or the main effect was significant in the path analysis of our San Diego sample. This difference should be interpreted with caution since the analysis conducted on the San Diego sample utilized a different measure of emotional support developed by Schaefer *et al.* (1981). This latter measure assesses caregivers' general satisfaction with the emotional support they received while the measure utilized in the Chinese

sample assessed emotional support in relationship to caregiving. Future research is needed to elucidate further potential cross-cultural differences in the role that social support may play in the caregiving process.

This study addressed two dimensions of health outcome – physical and psychological. Caregivers in both cultures reported similar numbers of physical symptoms, and they reported more symptoms than their respective non-caregiving comparison subjects. Similarly, both Shanghai and San Diego caregivers were rated as being significantly more depressed, using the Hamilton Rating Scale for Depression, compared with their non-caregiving counterparts. The latter finding was not as striking when a self-report of depression (the BSI) was considered. Cultural differences in the self-report of psychological symptoms or some inherent problem with the Chinese translation of the BSI may have been responsible for these differences. However, this study showed striking similarities between caregivers in Shanghai and San Diego with respect to the physical and psychological consequences of caregiving.

Caregiving may have different meanings in different cultures. Morycz (1993) has reviewed cross-cultural literature with respect to caregiving, and concluded that coping with the stress of caregiving can vary from culture to culture and within various cultural backgrounds. Cultural beliefs regarding ageing may vary and affect caregivers' willingness or ability to accommodate and accept the process of ageing (Nydegger, 1986). Yu (1993) discussed legal and moral expectations regarding filial material and financial support in the Chinese culture. She pointed out that individuals residing in the People's Republic of China often cohabit with ageing parents and provide financial support. However, while those same values may be important for Chinese immigrants to the US (Sung, 1990), Yu points out that Chinese Americans are more similar to other US caregivers. Thus, more acculturation of Chinese-American immigrants may be an important consideration for studying relationships between psychosocial predictors and health outcomes.

The findings reported in this paper should be viewed with a number of limitations in mind. First, while we attempted to translate questionnaires with all possible rigor (via back

translations), it is difficult, if not impossible, to construct a measure that is identical in meaning across two disparate cultures. Although our measures have good internal consistency reliabilities (i.e. alphas) and face validity (as established by our Chinese collaborators), we caution our readers that some items may have different meaning in Chinese culture. Future research to establish construct validity for measures used in cross-cultural research should be considered a priority. Secondly, our study relied upon caregivers' self-report of patients' behaviours and need for care. It is possible that culturally-determined perceptions of patient need influence the caregiving experience. Thus, in future studies, it would be helpful to include performance measures of patient status, particularly in relation to activities of daily living. Thirdly, demographic differences, such as relationships to the patient, between our samples could confound some of the group comparisons. However, when we separated our Shanghai sample into spousal and non-spousal caregivers and re-analysed our data, the same pattern of results emerged. Nevertheless, it is important to be cautious when comparing the two samples. Our findings regarding the San Diego sample of spousal caregivers may not be generalizable to the more global population of caregivers, which includes a diverse range of relationship categories (e.g. nieces, nephews, grandchildren). Finally, this study included a comparison of only two of many possible cultural groups. Each group may have its own meaning and normative expectations for caregiving and family. For example, Americans of Hispanic heritage have been shown to have stronger family ties than other Americans (Gelfand, 1982), and this effect may differ by specific country of origin and level of assimilation (Mindel, 1983). Thus, future cross-cultural studies of caregiving might identify unique caregiving circumstances or effects of other nationalities or ethnic groups.

Despite some differences in the role of coping and social support, the findings from this study support the notion that the stressfulness of providing care to an AD patient results in similar patterns of caregiver distress across two widely divergent cultures. The identification of universalities in caregiving may help to highlight the plight of caregivers across cultures and to focus further research on interventions to reduce

the negative consequences of caregiving to demented family members. The development of interventions for caregivers should recognize and acknowledge cross-cultural similarities and differences. For example, this research identified similarities in the frequency and form of help given with instrumental activities of daily living. This finding may suggest the viability of sharing information between the two cultures in terms of methods for managing such tasks. On the other hand, the cross-cultural differences in the relationship between avoidant coping and depression noted in this research, suggests that an effective intervention programme in China (but not the US) may involve encouraging caregivers to suppress their negative emotions. In the final analysis, cross-cultural research has a great deal to offer to the field of caregiving, particularly in terms of the development and delivery of services in both US and other countries.

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