

Major depression among medically ill elders contributes to sustained poor mental health in their informal caregivers

JANE MCCUSKER¹, ERIC LATIMER², MARTIN COLE³, ANTONIO CIAMPI⁴, MAIDA SEWITCH⁵

¹ Department of Clinical Epidemiology and Community Studies, St. Mary's Hospital and Department of Epidemiology and Biostatistics, McGill University, Canada

² Douglas Hospital Research Centre, and Department of Psychiatry, McGill University, Canada

³ Department of Psychiatry, St. Mary's Hospital and Department of Psychiatry, McGill University, Canada

⁴ Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Canada

⁵ Department of Medicine, McGill University, Canada

Address correspondence to: Jane McCusker. Tel: (514) 345-3511 ext. 5060; Fax: (514) 734-2652. Email: jane.mccusker@mcgill.ca

Abstract

Background: no longitudinal studies have addressed the effect of late life depression on the physical and mental health status of their informal caregivers.

Objective: to examine whether a diagnosis of depression in older medical inpatients is associated with the physical and mental health status of their informal caregivers after 6 months, independent of the physical health of the care recipient.

Design: longitudinal observational study with 6-month follow-up.

Setting: two Montreal acute-care hospitals.

Subjects: a sample of 97 cognitively intact medical inpatients aged 65 and over and their informal caregivers, with oversampling of patients with a diagnosis of major or minor depression.

Methods: patient data included depression (current diagnosis, duration of current diagnosis, severity of symptoms, and history of depression), physical health (severity of illness, comorbidity, premorbid disability), and cognitive impairment. Caregiver data included relationship to patient, co-residence, and the physical and mental health status subscales of the SF-36. Multivariate linear regression analyses were conducted to determine the relationship between patient depression and caregiver 6 month SF-36 physical and mental scores, adjusting for baseline values, patient comorbidity, disability, and other patient and caregiver variables.

Results: patient characteristics included: mean age 79.3, 62% female, 46% major depression, 18% minor depression, 36% no depression. Caregiver characteristics included: 73% female, 35% co-resident spouse, 15% other co-resident relation, 50% not residing with the patient. Results of the multivariate analyses showed that in comparison with caregivers of patients without a current diagnosis of depression, caregivers of those with major depression had a lower mental health score at follow-up (−9.54, 95% CI −16.66, −2.43), even though their physical health was slightly better (5.42 95% CI 0.04, 10.81).

Conclusions: a diagnosis of major depression in older medical inpatients is independently associated with poor mental health in their informal caregivers 6 months later.

Keywords: aged, depression, informal caregivers, mental health, longitudinal study, elderly

Introduction

Caring for a relative with chronic illness or disability appears to have negative effects on the physical and mental health of the caregiver [1], and may increase their mortality risk [2]. The caregivers of depressed elders are reported to experience significant levels of psychological distress [3, 4], poor mental health and quality of life [5], and spend more time providing instrumental care [6]. However, these studies used self-report depression symptom scales rather than standardised diagnostic criteria, and being cross-sectional, could not examine the temporal relationship between depression in the care recipient and health of the caregiver.

We undertook this observational longitudinal study with 6 month follow-up to investigate the effect of a diagnosis of depression (major or minor) at the time of hospital admission upon the 6-month physical and mental health of informal caregivers, after adjustment for baseline physical health and other characteristics of the patient, and for the baseline level of caregiver physical and mental health. Secondary objectives were to explore characteristics of the depression (severity, duration, prior history) and caregiver characteristics that were associated with caregiver health outcomes.

Methods

The method of recruitment of the study cohort has been described previously [7]. Random samples of patients aged 65 and over admitted from the emergency room to the medical services of two university-affiliated acute care Montreal hospitals were screened for inclusion. Patients admitted to the intensive care or cardiac monitoring units were screened after transfer to a medical ward. Exclusion criteria were: admission to palliative care (because of expected survival of less than 6 weeks); residence off the island of Montreal (for ease of follow-up); inability to communicate in English or French; and moderate-severe cognitive impairment (5 or more errors on the Short Portable Mental Status Questionnaire [8]). Major and minor depression were diagnosed using the Diagnostic Interview Schedule (DIS) using DSM-IV criteria [9].

All depressed patients and a systematic (random) sample of non-depressed patients were invited to participate in the study. At one of the hospitals, patients with major depression were invited to participate in a randomised controlled trial (RCT) [10]. Study subjects were asked whether they had an informal caregiver (defined as the family member or friend who provides the most assistance and support and is not paid). If the patient identified such an individual and agreed for the caregiver to be contacted by research staff, the caregiver was invited to participate in the study. The study protocol was approved by the research ethics committees of both hospitals. Data were collected concurrently at the two hospitals for the two studies using the same research staff and methods.

Patient measures

Current depression

The depressive disorders section of the DIS was administered at the baseline interview [9]. Patients were classified as having current (at least 2 weeks duration of symptoms) major, minor, or no depression with DSM-IV criteria using the 'inclusive' approach (symptoms counted towards the diagnosis regardless of the symptoms' origins, whether physical illness or depression) [11]. Duration of the depression was determined by the maximum duration of the two core symptoms (depressed mood, loss of interest) and classified as 6 months or greater versus less than 6 months. Severity of depressive symptoms was measured with the Hamilton Depression Scale (HAMD, 21-item version), also at the baseline interview [12]. Items on the HAMD are rated from 0 to 4, a higher score indicating greater severity. The inter-rater reliability of the DIS and HAMD were assessed in a convenience sample of 28 patients at intervals throughout the study period, using independent simultaneous ratings by two or more raters, including the study psychiatrist (MC). Values of the kappa coefficient were 0.78 (95% CI 0.52, 1.00) for a diagnosis of major depression versus minor or no depression, and 0.61 (0.35, 0.87) for a diagnosis of either major or minor versus no depression. The intraclass correlation coefficient (ICC) for the HAMD was 0.93 (95% CI 0.86, 0.97).

History of depression

A history of depression at enrollment was defined as either a report by patients that they ever have been told by a doctor that they were depressed, or a diagnosis of depression in the hospital chart during the 2 years before admission.

Cognitive impairment

The Mini-Mental State Examination (MMSE) was administered at the baseline interview; scores range from 30 (no impairment) to 0 (maximum impairment) [13]. The inter-rater reliability (ICC) in this study was 0.99 ($n = 17$).

Physical disability and illness severity

Premorbid activities of daily living (ADL) disability (2 weeks before admission) was assessed with the self-report version of the Older Americans Research and Services scale of dependence in 14 items on a 3-point scale (completely independent, partially dependent, and completely dependent) [14]. Patients with partial or complete dependence were considered disabled. Because almost all patients had some premorbid instrumental ADL disability, patients were classified into those with and without premorbid disability in basic (physical) ADL. The Charlson Comorbidity Index (CCI) was derived from chart review of diagnoses during the 2 years before enrollment [15]. The clinical severity

of illness was assessed at enrollment based on a global clinical impression on a scale ranging from 1 (not ill) to 9 (moribund) [16]. The Acute Physiology Score (APS) derived from the Acute Physiology and Chronic Health Evaluation II (APACHE II) was coded from computerised laboratory test results and hospital chart data [17].

Caregiver measures

Physical and mental health status

The Medical Outcomes Study Short Form-36 (SF-36) is a 36-item generic indicator of health status with demonstrated validity, internal consistency, and retest reliability [18, 19]. The acute form of the SF-36 (using a reference time period of the previous week) was administered to the caregiver at baseline and the 6-month follow-up. Two sub-scales were used in the analyses, the mental health and physical function sub-scales.

Other measures

Caregiver baseline characteristics included age, sex, relationship to patient, co-residence with patient, and current employment status.

Statistical analyses

We compared caregiver SF-36 scores by patient depression group at baseline and 6 months using ANOVA. In order to compare our sample to Canadian normative data on the SF-36, we computed normalised z -scores [19]. We used multiple linear regression to model the effects of patient depression diagnosis on the caregiver's physical function and mental health SF-36 sub-scale scores at 6 months, adjusting for baseline levels of these sub-scales. Potential confounders included the patient baseline variables (age, gender, clinical severity of physical illness, comorbidity and premorbid disability) and caregiver characteristics (age, gender, relationship with patient, co-residence with patient). Additionally, we tested the significance of the interactions between depression group and caregiver variables and between gender and relationship. Secondary analyses, limited to caregivers of patients with major depression at baseline, evaluated whether additional variables (patient participation in the RCT, severity of depressive symptoms at baseline, duration of the current episode, history of depression, and recovery from major depression at 6 months) were associated with caregiver physical or mental health at 6 months. The models we present are those that minimised both the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC). All the analyses were performed using SAS software, Cary, NC (version 9.1).

This study was funded by the Canadian Institutes for Health Research who played no role in the design, execution, analysis and interpretation of data or writing of the study.

Results

The derivation of the study sample is shown in Figure 1 in the supplementary data (available online at <http://ageing.oxfordjournals.org>). As reported elsewhere, we found that, after adjustment for the oversampling of patients with depression, the prevalence of major depression was within the range reported elsewhere, whereas the prevalence of minor depression was somewhat lower [7]. Among 249 patients with a caregiver, 163 (65%) participated in the study; of the 129 patients who survived to 6 months, 97 caregivers (75%) completed the SF-36 both at baseline and follow-up. There were no significant differences in patient and caregiver characteristics at baseline between the 97 dyads in the sample compared with the 32 dyads with incomplete caregiver follow-up (Table 1).

Caregivers were predominantly female and family members (spouse or adult child), and about half lived with the patient (Table 1). Caregiver age was strongly associated with relationship, spouses having the highest mean age (74.8), followed by non-family members (62.7) and children (49.7). Similarly, living arrangement was strongly associated with relationship, all spouses living with the care recipient. In subsequent analyses, therefore, we focused primarily on the gender and relationship of the caregiver.

Table 2 shows the caregiver SF-36 scores at baseline and 6 months by depression diagnosis. Caregivers of patients with major depression reported better physical functioning but poorer mental health status than caregivers of non-depressed patients; these differences were statistically significant only at 6 months. Furthermore, the z -scores indicate that, compared to age- and sex-specific norms, caregivers of patients with major or minor depression had significantly better physical but worse mental health at baseline. These differences were maintained at 6 months only for caregivers of patients with major depression.

Table 3 shows the results of the regression analyses of caregiver SF-36 scores at follow-up. (Note that the bivariate results for depression group differ from those presented in Table 2, because they are adjusted for the baseline level of the outcome scale.) Characteristics of patients and caregivers that did not contribute to these models are not shown. Caregivers of patients with major depression had better physical function and worse mental health at follow-up than caregivers of non-depressed patients, even after adjustment for covariates. Caregivers of patients with minor depression did not differ significantly in either physical function or mental health at follow-up from caregivers of non-depressed patients. Female and spousal caregivers had significantly poorer physical function at follow-up; there was not a significant interaction between these variables. Because of an interaction between caregiver gender and relationship to the patient in multivariate analyses of mental health ($P = 0.10$), caregivers were stratified by both variables (Table 3). The results of the multivariate analyses indicate that female spouses had poorer mental health at follow-up than the

Table 1. Characteristics of patients and their caregivers at baseline, in samples with and without follow-up

Characteristics	With follow-up (N = 97)		Without follow-up (N = 32)	
	N		N	
Patients:				
Age: mean (SD)	97	79.3 (7.3)	32	80.5 (5.9)
Female: n (%)	97	60 (61.9%)	32	22 (68.8%)
Depression: current diagnosis (%)	97		32	
Major depression		45 (46.4%)		12 (37.5%)
Minor depression		17 (17.5%)		8 (25.0%)
No depression		35 (36.1%)		12 (37.5%)
History of depression (%)	97	29 (29.9%)	32	11 (34.4%)
Duration of core symptoms: (%)	97		31	
No symptoms or <2 weeks		35 (36.1%)		10 (32.2%)
More than 2 weeks and <6 month		20 (20.6%)		9 (29.1%)
≥6 month		42 (43.4%)		12 (38.8%)
HAMD score: mean (SD)	95	15.7 (7.3)	32	15.2 (7.7)
Premorbid disability: n (%)	97	66 (68.0%)	32	20 (62.5%)
Charlson comorbidity score: mean (SD)	96	1.5 (1.5)	32	1.4 (1.1)
Clinical severity of illness: mean (SD)	94	4.0 (0.9)	32	4.1 (0.7)
Acute physiology score: mean (SD)	96	2.6 (2.4)	31	2.2 (1.9)
Caregivers:				
Female: n (%)	97	71 (73.2%)	32	24 (75.0%)
Age: mean (SD)	96	61.0 (14.8)	32	61.5 (14.4)
Co-resident with patient: n (%)	97	48 (49.5%)	66	15 (46.9%)
Relationship to patient: n (%)	97		32	
Spouse		34 (35.1%)		10 (32.3%)
Daughter/son		43 (44.3%)		16 (51.6%)
Other		20 (20.6%)		5 (16.1%)

three other caregiver groups; the 95% CI excluded zero only for male spouses.

In secondary analyses restricted to caregivers of patients with major depression, there was no significant effect in univariate analyses on either physical or mental health of the following variables: intervention versus control group of the RCT; recovery from major depression at 6 months; severity of depressive symptoms, duration of current episode, or history of depression (data not shown).

Discussion

The results of this study indicate that informal caregivers of older medical inpatients with major depression had significantly poorer mental health at 6-month follow-up than caregivers of patients without depression, even after adjustment for the caregiver’s baseline mental health and for the patient’s physical health. Other characteristics of the depression (severity, duration, prior history, and recovery at 6 months) were not associated with caregiver mental health at follow-up. Finally, female caregivers had poorer physical function at follow-up than males, and female spouses had poorer mental health than male spouses at follow-up.

This study has two notable methodological strengths. First, the longitudinal design allows for clearer causal inference than prior cross-sectional studies. Second, the use of a widely used health status measure, the SF-36, allowed us to compare caregiver scores to population norms.

The study also has at least three limitations. First, there was potential selection bias due to initial non-participation among caregivers (35%) and attrition at 6 months (25%), perhaps due to high levels of stress among informal caregivers of acutely medically ill patients. Evidence that these caused selection bias is limited, however, as non-participant caregivers appeared to differ from participants only in that they were more likely to be employed outside the home; patient characteristics for the two groups were the same. Furthermore, attrition at 6 months was not associated with patient or caregiver characteristics at baseline. The second study limitation is the small sample size in several of the study groups. In particular, we had limited statistical power to examine the effects on the caregiver of either minor depression or characteristics of the major depression (e.g. severity, duration, recovery at 6 months). Third, our measure of history of depression which relied on either self-report or chart documentation, may have underestimated prior depressive episodes, and biased our estimates of the effect of history of depression.

Our main finding is the apparent deleterious mental health effect of caregiving for a person with major depression. It should be noted that the majority of patients with a current diagnosis of major depression had core symptoms lasting 6 months or more. Studies on dementia caregiving show that a longer duration of caregiving contributes to poorer caregiver mental health [20]. The nature of caregiving for depressed people and those aspects that are stressful for caregivers have received surprisingly little research attention.

Table 2. Caregiver SF-36 scores at baseline and follow-up by patient depression group

Caregiver SF-36	Major depression, (<i>N</i> = 45)	Minor depression, (<i>N</i> = 17)	No depression, (<i>N</i> = 35)	Anova <i>P</i> -value
	Mean (SD)	Mean (SD)	Mean (SD)	
Raw scores				
Physical function				
Baseline	83.3 (22.7)	88.5 (21.2)	74.3 (27.7)	0.102
6 month	85.0 (19.6)	86.5(18.8)	71.7 (28.2)	0.021 ^a
Mental health				
Baseline	65.8 (22.6)	59.1 (27.4)	72.6 (20.5)	0.123
6 month	66.3 (19.1)	70.4 (24.4)	77.4 (17.2)	0.045 ^a
Z-scores^c				
Physical function				
Baseline	0.2 ^b (0.8)	0.4 ^b (0.7)	0.0 (1.2)	0.365
6 month	0.3 ^b (0.7)	0.3 (0.8)	-0.1 (1.2)	0.128
Mental health				
Baseline	-0.8 ^b (1.5)	-1.2 ^b (1.8)	-0.3 (1.3)	0.109
6 month	-0.8 ^b (1.2)	-0.4 (1.6)	-0.0 (1.1)	0.034 ^a

^a Contrast between major and no depression is statistically significant (Bonferroni corrected *P*-value < 0.016).

^b Statistical difference (*P*-value < 0.05) between the raw score and specific norms adjusted for age and sex.

^c *N* = 16 in minor depression group, because the age of one caregiver is missing.

In a study in younger adults, caregivers reported worries about the patient's general health, treatment, safety, and future. Caregivers had to urge patients to undertake activities, or took over tasks for them [21]. The relapsing natural history of major depression may also be stressful for the caregiver. One small study reported, as did ours, that even when the patient's depression improved, there was no reduction in caregiver burden [22]. Future research should address the nature of informal caregiving for depression, examining those aspects that caregivers find stressful and the types of support that would be helpful [23].

We found no similar deleterious effect of depression on caregiver physical health; in fact, the physical health of caregivers of depressed patients at follow-up was somewhat better compared to that of caregivers of non-depressed patients. The difference, however, was small and the lower limit of the 95% CI was close to the null value. The finding may therefore be spurious.

These findings extend the results of previous research on informal caregivers of older, depressed patients. First, the longitudinal design enabled us to examine the temporal relationship between patient depression and caregiver mental health, suggesting that the association reported from cross-sectional studies [3, 4, 6] may reflect a causal relationship. Second, the use of diagnostic criteria enabled us to examine the effects of major depression on the caregiver. Our study thus extends prior research on the significance of major depression in medically ill older patients, which has reported adverse effects primarily on patient disability and health services utilisation [24, 25]. An independent effect of major depression on caregiver mental health may compound the societal effects of this disorder, increasing the utilisation and costs of health services among caregivers [1], and possibly increasing their mortality [2].

Our study also study extends the literature on the effects on caregiving for people with chronic health problems other depression (such as dementia and stroke). This body of literature is increasingly using longitudinal designs to describe the trajectories of caregivers as they transition into roles of varying intensity, and the effects of these transitions on symptoms of depression and other outcomes [26, 27]. A meta-analysis of 228 studies on the association of caregiver-related stressors and uplifts with burden and depressed mood (including none of the effects of depression on the caregiver) found that patient behaviour problems were more strongly related to caregiver burden than was the level of physical impairment [28]. Similarly, our study found that caregiver mental health was more strongly related to depression in the patient than to several measures of the patient's physical disability and medical illness. Moreover, our study supports other research on caregivers of people with dementia and physical illnesses which has found that female caregivers, particularly female spouses, suffer from poorer mental health than other caregivers [29–31].

From a clinical standpoint, this study suggests that the mental health of informal caregivers (particularly female spouses) should be addressed at the time of a medical hospitalisation of a depressed older patient. Caregiver support and psychological interventions may be particularly useful among these high-risk caregivers [23].

Key points

- The informal caregivers of older adults with diagnosed major depression at a medical hospital admission have poorer mental health status compared to those of non-depressed patients 6 months later, even after adjustment

Table 3. Effect of group and history of depression on the 6 month physical function and mental health score of the caregiver

Predictor	Physical function				Mental health			
	Bivariate ^a		Multivariate ^a (N = 96)		Bivariate ^a		Multivariate ^a (N = 96)	
	Estimate	(95% CI)	Estimate	(95% CI)	Estimate	(95% CI)	Estimate	(95% CI)
Patients:								
Age (increase of 1 year)	0.18	(-0.19; 0.55)			-0.04	(-0.49; 0.42)		
Female	5.34	(-0.07; 10.76)			6.11	(-0.64; 12.86)		
Depression diagnosis								
Major depression	6.25	(0.45; 12.04)	5.42	(0.04; 10.81)	-7.99	(-15.26; -0.71)	-9.54	(-16.66; -2.43)
Minor depression	3.56	(-4.06; 11.18)	4.30	(-2.76; 11.35)	-0.37	(-9.97; 9.22)	-1.29	(-10.58; 8.01)
No depression	0		0		0		0	
Premorbid disability	6.01	(0.53; 11.50)	4.25	(-0.92; 9.42)	0.95	(-6.19; 8.08)	1.60	(-5.34; 8.55)
Charlson comorbidity score (increase of 1 point)	-0.81	(-2.51; 0.89)			-2.02	(-4.15; 0.11)	-1.77	(-3.86; 0.31)
Clinical severity of illness score (increase of 1 point)	0.49	(-2.41; 3.39)			-0.91	(-4.45; 2.63)		
Caregivers:								
Female	-8.11	(-13.86; -2.36)	-8.57	(-14.03; -3.11)	-7.62	(-15.42; 0.18)		
Age	-0.08	(-0.29; 0.14)			-0.02	(-0.25; 0.21)		
Co-resident with patient	-2.40	(-7.96; 3.16)			-1.00	(-7.65; 5.64)		
Non-spouse	7.08	(1.56; 12.59)	6.81	(1.61; 12.02)	2.99	(-3.97; 9.96)		
Gender and relationship								
Spouse-female (reference category)								
Spouse-male					15.48	(3.42; 27.55)	14.99	(3.06; 26.92)
Other-male					9.39	(-1.17; 19.95)	9.45	(-0.85; 19.75)
Other-female					6.68	(-1.31; 14.67)	6.93	(-0.98; 14.83)

^a Adjusted for baseline level of outcome score.

for severity of physical illness, comorbidity, and other patient and caregiver characteristics.

- Female caregivers are at greatest risk for poor mental health.
- Caregiver mental health should be addressed at the time of a medical hospitalisation of a depressed older adult.

Conflicts of interest declaration

There is no conflict of interest.

References

1. Cochrane JJ, Goering PN, Rogers JM. The mental health of informal caregivers in Ontario: an epidemiological survey. *Am J Public Health* 1997; 87: 2002–7.
2. Schulz R, Beach SR. Caregiving as a risk factor for mortality: The caregiver health effects study. *JAMA* 1999; 282: 2215–9.
3. Yeatman R, Bennetts K, Allen N, Ames D, Flicker L, Waltrowicz W. Is caring for elderly relatives with depression as stressful as caring for those with dementia? A pilot study in Melbourne. *Int J Geriatr Psychiatry* 1993; 8: 339–42.
4. Wijeratne C, Lovestone S. A pilot study comparing psychological and physical morbidity in carers of elderly people with dementia and those with depression. *Int J Geriatr Psychiatry* 1996; 11: 741–4.
5. Sewitch MJ, McCusker J, Dendukuri N, Yaffe M. Depression in frail elders: impact on family caregivers. *Int J Geriatr Psychiatry* 2004; 19: 655–65.
6. Langa KM, Valenstein MA, Fendrick MA, Kabeto MU, Vijan S. Extent and cost of informal caregiving for older Americans with symptoms of depression. *Am J Psychiatry* 2004; 161: 857–63.

7. McCusker J, Cole M, Dufouil C *et al.* The prevalence and correlates of major and minor depression in older medical inpatients. *J Am Geriatr Soc* 2005; 53: 1344–53.
8. Pfeiffer E. A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *J Am Geriatr Soc* 1975; 23: 433–41.
9. Robins LN, Helzer JE, Croughan J, Ratcliff KS. National institute of mental health diagnostic interview schedule: its history, characteristics, and validity. *Arch Gen Psychiatry* 1981; 38: 381–9.
10. Cole MG, McCusker J, Elie M, Dendukuri N, Latimer E, Belzile E. Systematic detection and multidisciplinary care of depression in older medical inpatients: A randomized trial. *Can Med Assoc J* 2006; 174: 38–44.
11. Koenig HG, George LK, Petersen BL, Pieper CF. Depression in medically ill hospitalized older adults: Prevalence, characteristics, and course of symptoms according to six diagnostic schemes. *Am J Psychiatry* 1997; 154: 1376–83.
12. Hamilton M. Development of a rating scale for primary depressive illness. *Br J Soc Clin Psychol* 1967; 6: 278–96.
13. Tombaugh TN, McIntyre NJ. The mini-mental state examination: A comprehensive review. *J Am Geriatr Soc* 1992; 40: 922–35.
14. Fillenbaum GG. *Multidimensional Functional Assessment of Older Adults: The Duke Older Americans Resources and Services Procedures*. Hillsdale New Jersey: Lawrence Erlbaum Associates Inc, 1988.
15. Charlson ME, Pompei P, Ales KL, MacKenzie RC. A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *J Chronic Dis* 1987; 40: 373–83.
16. Charlson ME, Sax FL, MacKenzie R, Fields SD, Braham RL, Douglas RG. Assessing illness severity: Does clinical judgment work? *J Chronic Dis* 1986; 39: 439–52.
17. Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II: A severity of disease classification system. *Crit Care Med* 1985; 13: 818–29.
18. McHorney CA, Ware JE, Raczek AE. The MOS 36-Item Short-Form Health Survey (SF-36): II. psychometric and clinical tests of validity in measuring physical and mental health constructs. *Med Care* 1993; 31: 247–63.
19. Hopman WM, Towheed T, Anastassiades T *et al.* Canadian normative data for the SF-36 health survey. *Can Med Assoc J* 2000; 163: 265–71.
20. Baillie V, Norbeck JS, Barnes LEA. Stress, social support, and psychological distress of family caregivers of the elderly. *Nurs Res* 1988; 37: 217–22.
21. van Wijngaarden B, Schene AH, Koeter MWJ. Family caregiving in depression: impact on caregivers' daily life, distress, and help seeking. *J Affect Disord* 2004; 81: 211–22.
22. Liptzin B, Grob MC, Eisen SV. Family burden of demented and depressed elderly psychiatric inpatients. *Gerontologist* 1988; 28: 397–401.
23. Pearlin LI, Mullan JT, Semple SJ, Skaff MM. Caregiving and the stress process: An overview of concepts and their measures. *Gerontologist* 1990; 30: 583–94.
24. Stuck AE, Walthert JM, Nikolaus T, Bula CJ, Hohmann C, Beck JC. Risk factors for functional status decline in community-living elderly people: A systematic literature review. *Soc Sci Med* 1999; 48: 445–69.
25. Beekman ATF, Geerlings SW, Deeg DJH *et al.* The natural history of late-life depression. *Arch Gen Psychiatry* 2002; 59: 605–11.
26. Gaugler JE, Zarit SH, Pearlin LI. The onset of dementia caregiving and its longitudinal implications. *Psychol Aging* 2003; 18: 171–80.
27. Burton LC, Zdaniuk B, Schulz R, Jackson S, Hirsch C. Transitions in spousal caregiving. *Gerontologist* 2003; 43: 230–41.
28. Pinquart M, Sörensen S. Associations of stressors and uplifts caregiving with caregiver burden and depressive mood: A meta-analysis. *J Gerontol Psychol Sci* 2003; 58B: 112–28.
29. Collins E, Katona C, Orrell MW. Management of depression in the elderly by general practitioners: Referral for psychological treatments. *Br J Clin Psychol* 1997; 36: 445–8.
30. Hughes SL, Giobbie-Hurder A, Weaver FM, Kubal JD, Henderson W. Relationship between caregiver burden and health-related quality of life. *Gerontologist* 1999; 39: 534–45.
31. Thomas P, Lalloué F, Preux P-M *et al.* Dementia patients caregivers quality of life: the PIXEL study. *Int J Geriatr Psychiatry* 2006; 21: 50–6.

Received 8 August 2006; accepted in revised form 27 March 2007