Eur Arch Psychiatry Clin Neurosci (2008) 258:406–413 DOI 10.1007/s00406-008-0818-7

ORIGINAL PAPER

Anne Maria Möller-Leimkühler · Michael Obermeier

# Predicting caregiver burden in first admission psychiatric patients

## 2-year follow-up results

Received: 6 February 2008 / Accepted: 3 April 2008 /

**Abstract** *Objective* The aim of the study was to identify the best predictors of the course of burden during a 2-year follow-up period. The study is part of the Munich 5-year follow-up study in relatives of first admitted patients with schizophrenia or depression. *Method* A cohort of 60 key relatives was assessed based on a transactional stress model concerning objective and subjective burden, well-being, self-rated symptoms and global satisfaction with life. The stressors were defined as patients' illness variables, and the potential predictors included different dispositions and resources of the relatives. Effects were analyzed by regression models. In a first step, the main predictors of burden were identified at each assessment. In a second step, the resulting predictors were included in a Generalized Linear Modeling procedure. *Results* Caregivers' burden improved significantly, but well-being and self-rated symptoms remained elevated. In the final regression model, expressed emotion, neuroticism, generalized negative stress response and life stressors resulted as the best predictors of burden. The effects were rather time invariant than time dependent. *Conclusion* In order to effectively work on long-standing unfavourable patterns of stress response, family interventions should be long-term and targeted to vulnerable caregivers who could be identified by virtue of their personality traits.

**Key words** caregiver burden · follow-up · expressed emotion · neuroticism · negative stress response

## Introduction

While caregivers' burden due to a family member's mental illness has been increasingly documented, it has remained rather unclear how burden develops over time and what are the most relevant predictors of the course of burden. To date, only a few longitudinal studies are available, and results are inconsistent. For instance, burden was found to be lower at 6-month-follow-up in relatives of schizophrenic patients with predominantly positive symptoms, and it was found to be stable among those of patients with predominantly negative symptoms [24]. During a 5-year-follow-up period high distress of the relatives of first-admission patients was related to poor outcome of the patients [28]. Relatives' burden was found to be stable at a 15-year-follow-up in a sample of relatives who had not received any specific intervention [5] as well as in a 1-year-follow up [16]. In sum, no consistent pattern in burden experienced across time emerged. Additionally, factors other than the patient's psycho-pathology that might be related to caregiver burden and development of burden have often not been evaluated so that it remains unclear, which factors increase or reduce burden. There are only a few hints from the literature, which suggest, that—beside the symptomatology of the patient—the EE level of the relatives influences the level of perceived burden [3, 26]. Magliano et al. [16] found, that burden decreases at 1-year follow-up only under the condition that relatives adopt less emotion-focused coping strategies and receive social support from their networks. Similar results were reported by Joyce et al. [12].

Roick et al. [25] included the impact of different community based mental health care systems beside caregiver and patient variables on family burden in their 30-months longitudinal study. They concluded, that caregiver characteristics such as coping abilities and social support are most important for their

---

Priv.Doz. Dr.rer.soc. A.M. Möller-Leimkühler (✉)
M. Obermeier
Department of Psychiatry
Ludwig-Maximilians-University
Nußbaumstr. 7
80336 Munich, Germany
Tel.: +49-89/515-05785
Fax: +49-89/516-05522
E-Mail: Anne-Maria.Moeller-Leimkuehler@med.uni-muenchen.de

EAPCN 818

experience of burden. In a recently published 3-year follow-up study [20] caregivers of schizophrenic patients experienced a considerable level of burden throughout the follow-up period, whereas 77% of the relatives reported a stable level of burden despite an overall tendency of improvement. With regard to predictors of burden, this study did not found caregiver characteristics, caregiver-patient interaction characteristics or patient characteristics to be related to follow-up levels of burden, the only significant predictor was the baseline level of caregivers' burden itself.

In general, one main problem in analyzing burden in a stress-coping framework is that the underlying stress-models have been heterogenous and often reduced to one or two potential predictors of burden, whereas other predictors and their interrelations have been neglected. This is especially true for longitudinal studies. Thus, most designs have failed to address caregiver-burden in a broader context of social and individual determinants, mediating influences and outcomes, cross-sectionally as well as longitudinally. However, a multidimensional approach seems to be necessary to identify the most important predictors of burden in order to develop effective strategies to reduce burden.

Empirical evidence for using a comprehensive stress model has been given by the first results of the Munich 5-year-follow-up study on relatives of first hospitalized patients with schizophrenia or depression [17, 18]. Relatives' stress outcome (burden) was measured within a transactional stress model in terms of objective and subjective burden, well-being, self-rated symptoms and global satisfaction with life. Objective stressors were defined as illness characteristics of the patient. Potential predictors included caregiver characteristics such as age and gender, generalized positive and negative stress response, illness-related coping strategies, beliefs of control, perceived social support, personality factors, expressed emotion and life stressors. At baseline, findings showed no association between illness characteristics and caregiver burden, but significant associations with caregiver characteristics; at 1-year follow-up caregiver characteristics significantly moderated the impact of the patients' psychopathology on burden, and had also direct effects.

This paper presents the results of the 2-year follow-up period of the Munich 5-year follow-up study. The aim is to identify the most relevant predictors of the course of caregiver burden during this period.

## Materials and methods

### Subjects

In-patients first hospitalized for a schizophrenic or depressive episode were recruited within the German Research Networks of Schizophrenia or Depression. Patients who lived with a relative or had a facial contact of at least 15 h per week were informed of the caregiver study and asked to name the person to whom they have the closest contact. After getting the informed consent from the patient the relative was contacted and, if he/she agreed to participate into the study, he/she was interviewed by the author about three weeks after first hospitalisation of the patient. The index-interview was audiotaped, and a protocol was written by the author adapting to the wording of the caregiver. The questionnaires were filled out by the caregivers at home.

At baseline 85 caregivers participated, and full standardized data files of 83 caregivers were available (48 relatives of depressed patients, 35 relatives of schizophrenic patients).

Of the 85 key relatives, 73 (90.41%) could be reassessed at 1-year follow-up (45 relatives of the depressed patients, 25 relatives of the schizophrenic patients). Of these, 3 relatives participated in the interview but did not complete the questionnaires. As a result, complete data files of 70 key relatives were available at 1-year follow-up. At 2-year follow-up, 63 relatives completed the questionnaires.

### Caregivers' variables

#### Expressed emotion

The five minute speech sample (FMSS) [15] was used as well as the *Family Questionnaire* [29]. Although the FMSS shows a high concurrent reliability with the Camberwell Family Interview and a high interrater reliability, a systematic underassessment of high EE relatives has been observed, which goes even beyond 28% in this study. This is the reason why the Family Questionnaire was prefered in data analysis at baseline and follow-ups. Relatives were rated as high EE, if their sum score on the scale 'criticism' and/or their sum score on the scale 'emotional overinvolvement' exceed the cutoff-points.

#### Stress-coping relationship

Contacting the caregivers and creating a motivational basis for further participation in the study was based on a *semi-structural biographical interview* lasting for about 2 h. In this interview life situation, development of the illness, perception of the patients behaviour and own response patterns as well as subjective meaning, evaluations and problems were addressed. This was also the basis for the follow-up interviews in which changes of the situation were picked out as a central theme.

#### Illness-related burden

Burden was measured with the family burden questionnaire (FBQ), which was adapted by the author from the semi-structural interview of Pai and Kapur [21]. This instrument is psychometrically tested and applicable to relatives of schizophrenic as well as depressive patients. With regard to several life domains (daily living, family atmosphere, leisure, financial aspects and well-being), objective and subjective aspects of burden are assessed with 29 items for the last three months. Objective burden is defined as observable changes in routine arrangements and is bipolarly assessed by the relative (e.g. "Does his/her behaviour disturb daily routine?" The answer is yes or no). Subjective burden refers to each item of objective burden with the question, how burdensome this is for the relative. The answer consists of a three-point scale: not at all/moderate/very burdensome.

While Pai and Kapur offer only one global score of subjective burden, the author has constructed several scores for objective and subjective burden, once with regard to each life domain and once with regard to a global measure of the objective and subjective dimension of burden. To make the scores more perceptual, the quotients (sums of item values are divided through number of items) are transferred to percentage by multiplication with 100.

Reliability test ($n = 83$) for the global percentage of objective burden resulted in $\alpha = 0.83$, for the global percentage of subjective burden in $\alpha = 0.88$, and for the entire scale $\alpha$ was 0.92.

### Life stressors

Qualitative interview data were used to assess an additional dimension of burden independent of the psychiatric disorder of the patient: '*life stressors*'. Life stressors were defined to include either chronic everyday burden (e.g. financial problems, own disorders of the caregiver, job strain, marital strain, family conflicts, caring for small children and/or other chronically ill family members) or several life events in the last 6 months (e.g. moving, loss of a job, birth of a child, accident). The occurrence and the degree of subjective burden with regard to these life stressors was assessed by the author on a four-point-scale (0 = no additional life stressors, 4 = several strong life stressors with a degree of burden comparable to the manifestation of the psychiatric disorder).

### Generalized stress-response

The German questionnaire '*Stressverarbeitungsbogen*' (SVF) [11] was chosen to measure general coping strategies of the caregivers. It includes 19 subscales which are summed up in 'positive' and 'negative' stress response.

### Illness-related coping

Strategies aimed to cope with typical symptoms/events of the illness were assessed with the German version '*Skala zur Erfassung des Bewältigungsverhaltens*' (SEBV) [8] of the 'Ways of Coping Checklist' [9], which differentiates two scales: problem focused and emotion focused coping.

### Subjective beliefs of competence and control

General beliefs about one's competence to solve problems and one's control over the environment represent an important coping resource and were measured with the '*Fragebogen zu Kompetenz- und Kontrollüberzeugungen*' (FKK) [14]. The questionnaire consists of four scales, two of them related to internality and two of them related to externality. These four scales are summed up into two secondary scales 'general selfefficacy' and 'general externality of control beliefs'.

### Personality

In order to assess the influence of further personality dimensions on the caregivers' burden, the German Version of the 'NEO five-factor inventory' (NEO-FFI) [2] was used. The five personality descriptors are: neuroticism, extraversion, openness to experience, sociability and conscientiousness. They are self-rated on a five-point-scale. Under the assumption that these personality dimensions are stable traits they were assessed only at baseline.

### Perceived social support

Perceived social support represents an important dimension of social resources, being measured with the shortform of the German '*Fragebogen zur Sozialen Unterstützung*' (SOZU) [27], including 22 items and a five-point rating scale.

### Subjective well-being

In order to assess the current subjective well-being of the caregivers, the German '*Befindlichkeitsskala*' (Bf-S) [30] was used, which includes a broad scope of bipolar structured cognitive-emotional states. Occurrence and degree of current symptoms were also self-rated by the caregivers by using the '*Symptom-Checklist-90-R*' (SCL-90) [7].

### Subjective quality of life

This was assessed with a German adapation of the 'Lancashire quality of life profile' (LQLP) by [23]. Questions ask for objective conditions in different life domains, for subjective satisfaction with these domains and for global satisfaction with life. Subjective satisfaction is rated on a 7-point-scale (1 = totally dissatisfied to 7 = totally satisfied).

### Interim events

In order to approximately control effects of potential intervening factors influencing the level of burden, positive and negative life events were assessed between baseline and all follow-ups on the basis of the relatives' narratives. These events should have been independent of the patient's illness. They were rated by the author on a three-point scale (0 = no event, 1 = one or more events which the relative experienced as mainly positive, 2 = one or more events which the relative experienced as mainly negative, 3 = some events which the relative experienced differently, neither positive nor negative).

## Patients' variables

Patients' data were assessed by psychiatrists using standardized rating instruments like PANSS or HAMD, who were involved in two naturalistic follow-up studies of schizophrenic or depressive patients respectively. These studies have been part of the German Research Networks of Schizophrenia and Depression/Suicidality. Patients were diagnosed according to ICD-10 (F 20–29 and F 30–39). For the caregiver-study the following variables were selected.

### Severity of disorder

The severity of depression at admission was assessed with the '*Hamilton depression scale*' (HAMD) [10], the severity of schizophrenia with the '*positive and negative syndrome scale*' (PANSS) [13].

### Global functioning

Global functioning of the patients was measured using the '*Global Assessment of Functioning Scale*' (GAF) [1] including a range from 1 to 100. Scores represent the sum of psychopathological symptoms and disturbances of psychosocial adjustment. Lower scores indicate a higher level of disturbance, higher scores a lower level of disturbance.

### Relapse and residual symptoms at follow-up

Clinical data of the patients assessed by the psychiatrists have been incomplete at 1-year-follow up. This was due to clinical overburden preventing the involved psychiatrists from reassessing all patients participating already the index assessment. In order to "compensate" this deficit and to reach information on all patients, two additional variables were constructed by the author on the basis of the relatives 'interviews: patients' relapse (yes/no) and patients' residual symptoms independent of a relapse on a four-point-scale (1 = completely remitted, 2 = slight residual symptoms, 3 = moderate residual symptoms, 4 = severe residual symptoms).

## Statistical analysis

Group differences (diagnosis, sex) were tested by Student's *t* test. Changes in levels of burden in each dimension and changes in caregivers' characteristics were compared by using the Friedman-test for dependent samples, and in case of significance by the Wilcoxon-test for post hoc pairwise comparisons. In order to identify the best predictors of burden over time and their interaction with time, the generalized linear modeling (GLZ) procedure was selected. As the ordinary general linear model (GLM) it allows to model the values of dependent scale variables measured at multiple time periods based on their relationship to categorical and scale predictors and the time periods at which they were measured. Additionally, the GLZ procedure allows models to be fit to data that follow probability distributions other than the Normal distribution. In a first step, the potential predictors which had to be included in the GLZ had to be selected. For this purpose, a series of cross-sectional multiple linear regressions were computed for each dependent variable (objective and subjective burden, well-being, self-rated symptoms and subjective quality of life) at baseline, 1- and 2-year follow-up by a stepwise inclusion of all predictors, which correlated significantly with each dependent variable at each assessment. In a second step, the resulting predictors were used as covariates for the GLZ procedure. Time was defined as a factor, and interactions of the time factor and the covariates were inserted into the model. This procedure was calculated separately for each dependent variable, now each including all three values (baseline, 1-year follow up, 2-year follow up). As three of the dependent variables (objective burden, subjective burden and the global score of the SCL-90 R) showed a Gamma distribution, they had to be transformed. Statistical analyses were supervised by the co-author. Analyses were performed with SPSS 15.0 for Windows.

## Results

The present sample includes predominantly spouses of the patients with a balanced rate of male and female participants (Table 1). The mean age is 48.3 years (SD 17.9) and is mostly identical in male and female participants. The percentage of caregivers of depressive patients predominates at each assessment, but without age-related differences compared to the caregivers of the schizophrenic patients. Inspite of an unavoidable attrition in follow-up samples due to nonresponse, the structure of this sample remains rather stable (Table 1).

**Table 1** Characteristics of the follow-up sample

| | Baseline (*n* = 83) (%) | 1-year follow up (*n* = 70) (%) | 2-year follow-up (*n* = 63) (%) |
|---|---|---|---|
| Spouses | 75.5 | 75.4 | 81.0 |
| Parents | 22.9 | 24.6 | 17.5 |
| Males | 48.5 | 51.4 | 52.4 |
| Mean age | 48.3 (SD 17.9) | 49.2 (SD 10.9) | 48.3 (SD 17.9) |
| Caregivers of depressed patients | 64.9 | 66.0 | 65.6 |
| Caregivers of schizophrenic patients | 35.1 | 34.0 | 34.4 |
| Full-time job | 44.6 | 39.2 | 33.2 |

### Who suffers more? Influence of patients' diagnosis and caregivers' sex on burden

The relatives of the schizophrenic patients tend to suffer more at each point of assessment, in particular concerning illness- related objective burden (34% ± 22% vs. 28% ± 16% at baseline, 26% ± 23% vs. 17% ± 18% at 1-year follow-up, and 23% ± 21% vs. 16% ± 19% at 2-year follow up) and subjective burden (29% ± 20% vs. 19% ± 14% at baseline, 18% ± 23% vs. 12% ± 15% at 1-year follow-up, and 16% ± 17% vs. 11% ± 18% at 2-year follow up). However, none of these differences reach the level of significance, probably due to the small size of the subsample of schizophrenic patients. With regard to subjective well-being (Bf-S) there are only minor differences between the groups across time, whereas the levels of self-rated symptoms (SCL-90 R, GSI) tend to differ considerably but not significantly at the two follow-ups, with relatives of the schizophrenic patients having again the higher scores. Respectively, they are significantly less satisfied with their life at each point of assessment (4.61 ± 1.78 vs. 5.42 ± 1.16; $p < 0.05$).

Concerning the influence on caregivers' sex on burden, data indicate that women appear to suffer more from the family member's mental illness than men in each dimension of burden except subjective well-being and satisfaction with life, where the differences are minor. Differences in objective burden are observable (32% ± 20% vs. 29% ± 18% at baseline, 24% ± 23% vs. 16% ± 16% at 1-year follow-up, and 24% ± 23% vs. 13% ± 15%, $p < 0.05$ at 2-year follow up), however, reaching significance only at 2-year-follow-up. Similar differences result for subjective burden with $p < 0.05$ at 1- and 2-year follow-up. The women also tend to have higher scores on the SCL-90R, but the differences are not significant. In sum, differences in burden depending on the patients 'diagnosis and the caregivers' sex mainly affect objective and subjective burden, followed by self-rated symptoms.

### Changes in patients' psychopathology, caregivers' burden and caregivers' characteristics

Patients' psychopathology shows a minor, but non-significant improvement from 1- to 2-year follow-up without any differences between the two diagnostic groups; most of them (41.5%) are reported to have slight residual symptoms. Caregivers' perception of the patients' psychopathology corresponds to the global clinical ratings (Global Assessment of Functioning, GAF) at both assessments ($\rho = -0.69$; $p < 0.01$ and $\rho = -0.50$; $p < 0.01$) with GAF mean scores of 76.12 (16.78) at 1-year and 76.62 (14.78) at 2-year follow-up. According to the relatives' report, 11.3% the patients had a relapse during the first year after admission, and 23.1% during the second year.

As is demonstrated in Table 2, in each dimension of caregivers' burden a significant reduction can be observed, mainly in the first year after the patients' first admission.

**Table 2** Changes in mean scores of caregivers' burden (Friedman- and Wilcoxon-test)

| Dimensions of burden | Baseline | 1-year follow-up | 2-year follow up | *p* baseline vs. 1-year | *p* baseline vs. 2-year | *p* 1-year vs. 2-year |
|---|---|---|---|---|---|---|
| FBQ-OB (0–100) | 32 ± 19 | 20 ± 21 | 19 ± 19 | 0.000 | 0.000 | NS |
| FBO-SB (0–100) | 23 ± 18 | 14 ± 18 | 14 ± 18 | 0.000 | 0.000 | NS |
| BF-S (33.9–100) | 60.21 ± 11.90 | 53.67 ± 11.81 | 54.72 ± 11.97 | 0.000 | 0.002 | NS |
| SCL-90R (0–1) | 0.53 ± 0.53 | 0.43 ± 0.44 | 0.47 ± 0.71 | 0.006 | 0.002 | NS |
| LQ (1–7) | 4.57 ± 1.58 | 5.03 ± 1.37 | 5.02 ± 1.67 | 0.002 | 0.008 | NS |

FBQ-OB: percent score of the theoretical maximum of the global score of objective burden (Family Burden Questionnaire); FBQ-SB: percent score of the theoretical maximum of the global score of subjective burden (Family Burden Questionnaire); Bf-S: well-being, *t*-values of the sum score; SCL-90-R (GSI): self-rated symptoms, global symptom index; LQ: global satisfaction with life (LQLP)

**Table 3** Changes in mean scores of caregivers' characteristics (Friedman-test)

| Predictors | Baseline | 1-year follow-up | 2-year follow-up | *P* |
|---|---|---|---|---|
| Selfefficacy (20–80) | 49.70 ± 10.38 | 51.17 ± 10.75 | 50.97 ± 10.28 | NS |
| Externality (20–80) | 46.03 ± 10.65 | 46.85 ± 12.24 | 46.97 ± 13.38 | NS |
| Social support (1–5) | 4.11 ± 0.67 | 3.63 ± 1.62 | 3.85 ± 1.20 | NS |
| Emotion-focused coping[a] (0–1) | 0.42 ± 0.21 | 0.31 ± 0.26 | 0.28 ± 0.27 | 0.000 |
| Problem-focused coping[b] (0–1) | 0.49 ± 0.23 | 0.36 ± 0.31 | 0.37 ± 0.32 | 0.001 |
| Generalized positive stress response (20–80) | 49.68 ± 7.91 | 48.58 ± 8.79 | 49.81 ± 8.00 | NS |
| Generalized negative stress response[c] (20–80) | 51.47 ± 11.95 | 49.58 ± 11.85 | 48.12 ± 11.57 | 0.024 |
| Additional life stressors[d] (1–4) | 1.60 ± 1.50 | 1.40 ± 1.42 | 1.44 ± 1.35 | 0.045 |

[a] Wilcoxon-test: baseline vs.1-year follow-up: $p = 0.004$; baseline vs. 2-year follow-up: $p = 0.000$;1-year vs. 2-year follow-up: NS

[b] Wilcoxon-test: baseline vs.1-year follow-up: $p = 0.001$; baseline vs. 2-year follow-up: $p = 0.005$; 1-year vs. 2-year follow-up: NS

[c] Wilcoxon-test: baseline vs.1-year follow-up: NS; baseline vs. 2-year follow-up: $p = 0.000$; 1-year vs. 2-year follow-up: NS

[d] Wilcoxon-test: baseline vs.1-year follow-up: 0.003; baseline vs. 2-year follow-up: NS; 1-year vs. 2-year follow-up: NS

Although caregivers' general subjective well-being and their self-rated symptoms tend to improve, the mean scores continue to differ significantly from the respective norm values (well-being: 50 ± 10; self-rated symptoms: 0.31 ± 0.31), indicating a relatively persistent elevated level of psychological burden (well-being: Baseline $t = 5.46$; $p < 0.001$, 1-year follow-up $t = 2.08$; $p < 0.05$; 2-year follow-up $t = 2.62$; $p < 0.01$; self-rated symptoms: Baseline $t = 5.79$; $p < 0.0001$, 1-year follow-up $t = 2.54$; $p < 0.05$; 2-year follow-up $t = 3.56$; $p < 0.001$).

On a cross-sectional bivariate level, caregivers' stress outcome at 2-year follow-up is significantly associated with patients' residual symptoms, except subjective well-being (objective burden: $\rho = 0.55$; $p < 0.001$; subjective burden: $\rho = 0.49$; $p < 0.001$; self-rated symptoms: $\rho = 0.42$; $p < 0.00$; subjective quality of life: $\rho = -0.28$; $p < 0.05$). Clinical ratings of the patientś functioning (GAF, mean = 76.62, SD = 14.78) show significant correlations with objective burden ($\rho = -0.49$; $p < 0.01$), subjective burden ($\rho = -0.55$; $p < 0.01$) and self-rated symptoms of the caregivers ($\rho = -0.36$; $p < 0.05$).

Changes in caregivers' characteristics being supposed to predict their level of experienced burden are given in Table 3.

If changes occur, they mainly occur in the first year after admission of the patient. This is also true for EE which changes significantly in the first year from high to low in 27% of the relatives and remains stable in the second year. Overall, EE was stable in 68% of the relatives. Personality factors (NEO-FFI) are assumed to be stable, so that they had been assessed only once at baseline.

## Best predictors of burden over time: GLZ results

A series of multiple linear regression analyses was computed for each dependent variable (different dimensions of burden) with respect to baseline and follow-up assessments in order to reduce the number of predictors for the GLZ procedure. The following variables appeared to predict the different dimensions of burden in different combinations: EE, patients' residual symptoms, patients' global functioning, neuroticism, emotion-focused coping, problem-focused coping, self efficacy, general negative stress response, perceived social support, additional life stressors, extraversion, sociability, opennes, conscientiousness.

The respective combination of these variables was then used as covariates in the separate GLZ for each dimension of burden. The results are shown in Table 4.

Data indicate that the experience of burden is more predicted by the general effects of the resulting predictors than by time dependent effects. From a longitudinal perspective, the effects of the patients' illness on caregivers' burden are obviously suppressed by characteristics of the caregivers and additional life stressors of the family. With regard to time dependent effects, EE, emotion-focused coping and negative

**Table 4** Best predictors of burden over 2 years: GLZ results

| Dimensions of burden | Predictor | Direction of effect | Wald-$\chi^2$ | *p* |
|---|---|---|---|---|
| FBQ-OB | EE | + | 28.008 | 0.000 |
| | Neuroticism | + | 18.508 | 0.000 |
| | Time (baseline) × EE | + | 15.181 | 0.000 |
| FBO-SB | EE | + | 28.209 | 0.000 |
| | Neuroticism | + | 28.478 | 0.000 |
| | Time (baseline) × EE | + | 9.856 | 0.002 |
| BF-S | General negative stress response | + | 16.517 | 0.000 |
| | Life stressors | + | 8.203 | 0.004 |
| | Sociability | – | 7.684 | 0.006 |
| | Time (baseline) × EE | + | 3.972 | 0.046 |
| | Time (baseline) × emotion-focused coping | + | 6.337 | 0.012 |
| SCL-90R (GSI) | General negative stress response | + | 7.533 | 0.006 |
| | EE | + | 20.038 | 0.000 |
| | Emotion-focused coping | + | 7.394 | 0.007 |
| | Life stressors | + | 8.386 | 0.004 |
| LQ | General negative stress response | – | 18.963 | 0.000 |
| | Life stressors | – | 9.729 | 0.002 |
| | Neuroticism | – | 7.797 | 0.005 |
| | Time (baseline) × general negative stress response | – | 3.795 | 0.051 |

stress response are the only predictors where a time effect occurs. However, these time effects are solely significant at baseline.

## Discussion

In a 2-year follow-up period after first admission of the patients a significant decrease in different dimensions of caregivers' burden could be observed, mainly due to the improvement of the patients' psychosocial functioning. This decrease occured during the first year and remained stable during the second year. Nevertheless, caregivers' scores on actual well-being and self-rated symptoms, especially depressive symptoms, continued to differ significantly from norm values, and indicate ongoing psychological strain.

The main question of this study was to identify the most prominent predictors of burden and to evaluate their effects over time. Based on a transactional stress model, a comparatively large number of putative predictors, illness characteristics and caregivers' dispositions and resources, had been assessed. Illness characterstics did not influence the level of caregiver burden at baseline [17], what might be partly explained by the strong stress responses relatives of first admitted patients reveal. These stress responses appear to be comparable to those that persons reveal when exposed to a life threatening illness [4] and may be much more important than clinically rated severity of illness or kind of symptoms [25]. At 1-year follow-up, a significant correlation between patientś psychopathology and caregiver burden appeared which disappeared again in multivariate regression analyses by being moderated by relatives' EE, general negative stress response, neuroticism and life stressors [18]. Similar findings resulted for the course of burden during two years from GLZ which integrates all observations of a person over time in one single model with respect to one dependent variable and multiple predictors. In sum, caregivers experienced a higher level of burden at 2-year follow-up when they were more strongly emotionally involved, when they had higher scores in generalized negative stress response, when they had higher scores in neuroticism, and when they reported additional life stressors. These predictors had mainly general effects, although they had changed over time (except neuroticism). Time dependent effects of EE, as well as of negative stress response and emotion-focused coping could only be detected at baseline, this means, that the level of these predictors was highest at baseline and consequently influenced the experience of stress most strongly.

A closer look at the different dimensions of burden reveals that the combination of predictors is somewhat different for each dimension with the exception of illness-related objective and subjective burden. This is not astonishing due to the subjective perception of objective burden which is directed rather by EE and neuroticism, which are the same predictors for subjective burden, than by objective changes in the patient's behaviour. Apart from this, the results indicate that the different dimensions of burden, from primarily illness-related to more indirect assessments of well-being, general symptoms of distress and global satisfaction with life, are not redundant. Although they are inter-correlated, they represent different indicators of stress outcome and reveal the wide range of effects a mental disorder of a family member can have on his key relative.

While variables such as social support, beliefs of control, the personality factors openness, extraversion and conscientiousness, generalized positive stress response, problem-focused coping and patients' psychopathology did not contribute to the final predictor model, EE, neuroticism, generalized negative stress response and life stressors were the prominent predictors of burden over time. These results generally fit to those of Roick et al. [25], who stated that caregiver characteristics are of greatest importance for relatives' burden, and to those of Parabiaghi et al. [20] who found that changes in family burden over time depend rather on relatives' perceptions of caregiving consequences than on patients' needs and behaviour.

Due to the fact, that illness-related behaviour (coping) and attitudes (EE) as well as general dispositions of the relatives had been assessed in this study probably the first time, it is possible to demonstrate the great importance of these general dispositions for dealing with a threatening life event. Neuroticism, generalized negative stress response and life stressors such as financial or working strain, being unemployed or previous marital conflicts are likely to operate as stable vulnerability factors which are reactivated by the critical event of the family member's disease and constrain a flexible cognitive and behavioural regulation of the consequences. According to Pearlin et al. [22], transactional coping models have been focussing predominantly on illness-related coping, and have neglected the potential effects of generalized response styles on the experience of burden. Although (illness-related) emotion-focused coping resulted as a risk factor for increasing levels of self-rated symptoms (SCL-90 R) in this study, the negative effects of generalized stress response extend also to subjective well-being and global satisfaction with life. The importance of general dispositions for event-specific stress responses is considerably supported by the qualitative analyses of the relatives' interviews [19]. Overall, coping strategies related to the mental illness of the spouse or child appeared to be very similar to coping strategies related to other stressors, especially psychosocial stressors. For instance, the following general patterns could be differentiated: reflection of the own strategies and flexible change of the strategies if necessary versus continous repeating of the same strategies regardless of the effects, or: caring for one's own well-being versus generating or remaining in stressful situations. These strategies were not specifically used to deal with the unexpected mental illness, but represent habitual response styles of the relatives.

Response styles may be directly facilitated or constrained by personality factors. In this study neuroticism was positively associated with illness-related burden and negatively with subjective quality of life across time. It can be assumed that neuroticism affects the perception of burden and quality of life through negative stress response and ineffective emotional regulation (e.g. high EE). A recent meta-analysis [6] has demonstrated that neuroticism predicted less problem-solving and cognitive restructuring, and more problematic strategies like wishful thinking, withdrawal and emotion-focused coping, but also seeking social support. These results correspond to the significant intercorrelations between neuroticism, negative stress response and EE in this study. However, the association between neuroticism and social support was not confirmed by the present data, at least in terms of the perception of social support. Furthermore, additional life stressors, which have been largely ignored in caregiver research, appeared as another important predictor of burden and were also consistently intercorrelated with neuroticism, negative stress response and EE. At least in part, the report of additional stressors could be explained by neuroticism and dysfunctional coping patterns generating or prolonging stressful life situations. In any case, the existence of additional stressors complicates effective coping with the unexpected event of a family member's mental illness and increases the level of burden.

Although the resulting predictors were intercorrelated to a certain extent, they appeared as independent predictors of burden in the regression models. Their impact on burden was mainly general and time invariant. Nevertheless, a decline in emotional involvement (from high to low EE), emotion-focused coping and negative stress response caused a reduction of burden at 1-year follow-up.

The scope of the findings is mostly limited by the fact that well-being and symptoms of the relatives are solely based on self-ratings, and that clinical ratings of the patients' psychopathology were not completely available at the follow-ups, so that a complementary approach had to be added using the reports of the relatives as a source of information. Another shortcoming is the small percentage of relatives of schizophrenic patients. In spite of these limitations, the findings of this study give evidence to the predictive importance of caregiver characteristics in experiencing burden and in the course of burden.

Theoretical and clinical conclusions can be drawn. From a theoretical perspective, multivariate approaches are required to assess the impact of longstanding personal attributes of the caregivers together with specific coping strategies. In order to further enhance family interventions, the findings suggest that interventions should already be offered at first admission of the patients, that they should be bifocal, targeted to vulnerable caregivers who could be identified by virtue of their personality traits, and that they should be long-term to be effective on unfavourable coping styles.

**Acknowledgments** Part of the research project was supported by the German Ministry of Education and Research in the context of the German Research Networks on Schizophrenia and Depression/Suicidality. The author thanks the involved psychiatrists for placing the clinical ratings of the patients at the author's disposal.

## References

1. American Psychiatric Association (1987) Diagnostic and statistical manual of mental disorders (DSM-III-R). Washington DC
2. Borkenau P, Ostendorf F (1993) NEO-Fünf-Faktoren Inventar (NEO-FFI) nach Costa und McCrae. Göttingen-Bern-Toronto-Seattle, Hogrefe
3. Boye B, Bentsen H, Ulstein I, Notland TH, Lersbryggen A, Lingjaerde O, Malt UF (2001) Relatives' distress and patients' symptoms and behaviours: a prospective study of patients with schizophrenia and their relatives. Acta Psychiatr Scand 104:42–50
4. Boye B, Malt UF (2002) Stress response symptoms in relatives of acutely admitted psychotic patients: a pilot study. Nord J Psychiatry 56:253–260
5. Brown S, Birtwistle J (1990) People with schizophrenia and their families. Fifteen-year outcome. Br J Psychiatry 173:139–144
6. Connor-Smith JK, Flachsbart C (2007) Relations between personality and coping: a meta-analysis. J Pers Soc Psychol 93:1080–1107
7. Derogatis LR (1977) SCL-90-R, administration, scoring and procedures. Manual for the (revised) version. John Hopkins University School of Medicine, Baltimore
8. Ferring D, Filipp S-H (1989) Bewältigung kritischer Lebensereignisse: Erste Erfahrungen mit einer deutschsprachigen version der "ways of coping checklist". Zeitschrift für Differentielle und Diagnostische Psychologie 10:189–199
9. Folkman S, Lazarus RS (1989) An analysis of coping in a middle-aged community sample. J Health Soc Behav 21:219–239
10. Hamilton M (1960) A rating scale for depression. J Neurol Neurosurg Psychiatry 23:56–62
11. Janke W, Erdmann G (1997) Streßverarbeitungsfragebogen. Göttingen-Bern-Toronto-Seattle: Hogrefe
12. Joyce J, Leese M, Kuipers E, Szmukler G, Harris T, Staples E (2003) Evaluating a model of caregiving for people with psychosis. Soc Psychiatry Psychiatr Epidemiol 38:189–195
13. Kay SR, Fiszbein A, Opler LA (1987) The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophr Bull 13:261–276
14. Krampen G (1991) Fragebogen zu Kompetenz-und Kontrollüberzeugungen (FKK). Göttingen-Toronto-Zürich: Hogrefe
15. Magana AB, Goldstein MJ, Karno M, et al (1986) A brief method for assessing expressed emotion in relatives of psychiatric patients. Psychiatr Res 17:203–212
16. Magliano L, Fadden G, Economou M, Held T, Xavier M, Guarneri M, Malangone C, Marasco C, Maj M (2000) Family burden and coping strategies in schizophrenia: 1-year follow-up data from the BIOMED I study. Soc Psychiatry Psychiatr Epidemiol 35:109–115
17. Möller-Leimkühler AM (2005) Burden of relatives and predictors of burden. Baseline results from the Munich 5-yeat-follow up study on relatives of first hospitalized patients with schizophrenia or depression. Eur Arch Psychiatry Clin Neurosci 255:223–231
18. Möller-Leimkühler AM (2006) Multivariate prediction of realtives' stress outcome 1 year after first hospitalization of schizophrenic and depressed patients. Eur Arch Psychiatry Clin Neurosci 256:122–130
19. Möller-Leimkühler AM, Wohlgemuth N (in preparation) The coping-stress response in caregivers of first admitted psychiatric patients: a qualitative analysis
20. Parabiaghi A, Lasalvia A, Bonetto C et al (2007) Predictors of changes in caregiving burden in people with schizophrenia: a 3-year follow-up study in a community mental health service. Acta Psychiatr Scand 116(suppl. 437):66–76
21. Pai S, Kapur RL (1981) The burden on the family of a psychiatric patient: development of an interview schedule. Br J Psychiatr 138:332–335
22. Pearlin LI, Mullan JT, Semple SJ, Skaff MM (1990) Caregiving and the stress process: an overview of concepts and their measures. Gerontologist 30:583–594
23. Priebe S, Gruyters T, Heinze M, Hoffmann C, Jäkel A (1995) Subjektive Evaluationskriterien in der psychiatrischen Versorgung—Erhebungsmethoden für Forschung und Praxis. Psychiatr Prax 22:140–144
24. Ray J, Kulhara P, Avasthi A (1991) Social burden of positive and negative schizophrenia. Int J Soc Psychiatr 37:242–250
25. Roick C, Heider D, Toumi M, Angermeyer MC (2006) The impact of caregivers' characteristics, patients' conditions and regional differences on family burden in schizophrenia: a longitudinal analysis. Acta Psychiatr Scand 114:363–374
26. Scazufca M, Kuipers E (1998) Stability of expressed emotion in relatives of those with schizophrenia and its relationship with burden of care and perception of patient's social functioning. Psychol Med 28:453–461
27. Sommer G, Frydrich T (1989) Soziale Unterstützung: Diagnostik, Konzepte, F-SOZU. Dt. Ges. für Verhaltenstherapie, Tübingen
28. The Scottish Schizophrenia Research Group (1992) The Scottish first episode schizophrenia study VIII. Five-year follow-up: clinical and psychosocial findings. Br J Psychiatry 161:496–500
29. Wiedemann G, Rayki O, Feinstein E, Hahlweg K (2002) The family questionnaire: development and validation of a new self-report scale for assessing expressed emotion. Psychiatr Res 109:265–279
30. Zerssen D von (1976) Die Befindlichkeitsskala: Parallelformen Bf-S und Bf-S'. Beltz-Test, Göttingen