# Burdening Care

## A Study on Informal Caregivers of Frontotemporal Dementia Patients

*Samantha Riedijk*

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The studies described in this thesis were performed at the Department of Clinical Genetics, in close collaboration with the Department of Medical Psychology and Psychotherapy and the Department of Neurology of the Erasmus Medical Center, Rotterdam, The Netherlands.

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## A Study on Informal Caregivers of Frontotemporal Dementia Patients

# Belastende Zorg

## Een Studie over Mantelzorgers van Frontotemporale Dementie Patiënten

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*Als je houdt van het bestaan, blijk je ook steeds meer waarde te hechten aan het bestaan van je vriend (Aristoteles).*

# CONTENTS

## PROLOGUE

Imagine…

… being somewhere in your forties. You live in a nice house in the suburbs with your loving wife and adolescent children. You get along pretty well with your wife, even after 20 years of marriage. You enjoy your job and your hobby: soccer. You play in a team yourself and you have coached your son's team for years.

Then one day something strange happens. Your wife, always the decent one between you, steals a lipstick form the local drug store. Even stranger, she does not seem to realize just how strange that is. The change continues. Your wife starts to hang out in local pubs and bars. True enough, she used to like a party when she was younger and she still enjoys inviting friends over, drinking too much wine and dancing a little. But now she wants to go out. She dresses up and her clothing is ever more sparse. She comes home with stories about younger men showing their interest in her. The clothes and jewellery she buys become more and more expensive and she does not seem to have a clue about what she can afford and what not. You start quarrelling. Your wife, who used to be the composed one between you, gets angry with you, aggressive sometimes. She does not agree with you that her behavior is inappropriate and she reproaches you for being jealous, selfish and dominant. She seems indifferent to your hurt and concern.

Even worse, the children are embarrassed by her behavior. She flirts with your eldest son's friends. Your children are confused, what's wrong with mom? She used to want to know how they were doing in school. She used to be there when something was upsetting them. Now she does not seem to care anymore. The worst thing is her complete and utter denial that anything is wrong. She refuses to consult a doctor. The situation gets out of hand. You discover that your wife has been gambling on the internet and has build up a debt of several tens of thousands of euros in a few weeks time, money that you do not have.

You finally manage to make her see a psychiatrist. He diagnoses a manic depression. But the medication fails and the situation gets out of control. At last, three years after the onset of the problems, the psychiatrist proposes a visit to the neurologist and the diagnosis hits you:
Frontotemporal dementia.

Your wife will never again be who she used to be. Her condition will only continue to deteriorate and the one person she can rely on to take care of her, even though she is unable to see this, is you. The caregiving career has usurped you before you even realized. The only choice you have is to either make the best of it, or leave.

# Part I

## *General introduction*

# Chapter 1

## *Introduction*

## FRONTOTEMPORAL DEMENTIA

Frontotemporal dementia (FTD) is a degenerative disease of the brain. The frontal areas of the brain that are affected by degeneration of neurones and accumulation of tau and other inclusion material control personality, social conduct, speech and language, organization and reasoning. In the early stages of the disease FTD patients present with disturbance of interpersonal conduct, loss of empathy and loss of insight. Later on patients progressively develop memory problems, aphasia and behavioral alterations such as pacing and repetitive stereotyped behaviors (1, 2). Due to the behavioral features of FTD, FTD is often misdiagnosed in its early phases (3). The age of onset of FTD ranges from 25 to 64 years partly depending on the specific underlying gene mutation (4) and men and women are equally at-risk (5). The mean course of FTD is 8 years from the time of diagnosis. The prevalence of FTD is estimated at 5 to 15 cases per 100.000 in the age group of 45 to 64 years in the Netherlands, thus FTD is recognized as the second most common type of presenile dementia in the Netherlands (6). Around 70-80% of cases are sporadic (6), whereas genetic mutations are found in 40% of cases with a positive family history (4, 6). The inheritance is mostly autosomal dominant, implying that children of a patient have 50% risk of receiving either the disease or the normal gene from the affected parent. The symptoms of the disease may vary significantly between affected relatives.

Since detection of the Microtubule-Associated Tau gene (*MAPT*) mutations in 1998 as one cause of FTD with tau pathology, at least four other genes potentially involved in familial FTD have been identified. These include the progranulin gene (*GRN*), the Chromatin modifying protein 2B gene (*CHMP2B*), the Valosin-containing protein gene (*IBMPFD*) and Dynactin 1 (*DCTN1*). The phenotypic ranges of these forms are to be defined, but range between AD, FTD (frontotemporal dementia), FTLD (frontotemporal lobar degeneration), amotor neuron disease (*MND*) and Amyotrophic Lateral Sclerosis (ALS) (7-10). Important intrafamilial variability in symptoms is observed, which demonstrates the need for molecular classification in every new family or single case (9, 10). From a Dutch FTD patient cohort, about 14 % had its origin in a *MAPT* mutation, and 7 % in a *GRN* (11). In the other families a genetic mechanism is still unidentified (11). In the present study, the classification of patients was based upon clinical diagnostic criteria for FTD and Alzheimer disease.

To date, there is no effective treatment to stop or slow down the degenerative process (12). Behavioral symptoms are difficult to manage and are commonly treated with selective serotonin reuptake inhibitors (SSRI's) and atypical antipsychotic agents (13-16).

## BACKGROUND

Since 1994, the Depts of Neurology, Clinical Genetics, Epidemiology and Medical Psychology at the Erasmus Medical Center, Rotterdam, and the Neurogenetics Section of the Dept Clinical Genetics, Free University Medical Center, Amsterdam, have a tradition of research into FTD genetics, aetiology and prevalence.

In collecting FTD patients and studying their characteristics, researchers were struck by the severe disturbance of social conduct, the emotional blunting and the lack of insight they observed in FTD patients. It was noticed that FTD informal caregivers (from now on referred to as FTD caregivers) were particularly burdened. The FTD caregivers revealed their difficulties in caring for their patient and finding the much required understanding and support in the Dutch health care system. FTD caregivers made clear that the support already available to informal caregivers of Alzheimer's disease (AD) patients did not meet their specific needs. For instance, one very successful initiative to support informal caregivers of AD patients in the Netherlands is the Alzheimer café. This is a monthly informal meeting held in a local community center for patients with dementia, their caregivers, relatives and other caretakers, with the purpose of sharing information and experiences. However, given the lower prevalence of FTD, the FTD caregivers are unlikely to encounter many other FTD caregivers in these meetings. Moreover, the issues confronting FTD caregivers are often quite different from the issues relevant for the AD caregivers.

Most initiatives to support dementia caregivers are designed for AD patients and caregivers. Even though FTD and AD are both dementias, different areas of the brain are affected and therefore their presentation differs greatly. FTD patients typically present with personality changes and behavioral disturbance (17) whereas AD patients typically show pronounced memory and visuospatial deficits (18). FTD patients clearly display greater lack of insight, more disrupted eating behavior, more frontal behavioral problems and less misidentification symptoms than AD patients, whilst memory and visuospatial skills are relatively unaffected (19-23). Furthermore, FTD caregivers and patients are often much younger than AD caregivers and patients. FTD caregivers are thus faced with the care of their loved one when they still have to work to earn a living and raise their children (24). These fundamental differences between AD and FTD explain why the support for dementia caregivers did not meet the needs of FTD caregivers. The heavy burden FTD caregivers reported and the lack of adequate support have prompted the current study.

## CAREGIVER BURDEN

A dementia caregiver may suffer from physical problems, psychological distress, social isolation, loss of income and religious despondency. The strain caregiving imposes on physical, psychological, social, financial and spiritual well-being is termed ‘caregiver burden’ (25). Experiencing burden is inherent to being the main caregiver and is an appropriate and legitimate response to the caregiving demands. Noticeably, dementia caregivers are more affected in their health than caregivers of patients with other illness conditions (12). However, experiencing more caregiver burden is not only associated with a decrease in the quality of life of the caregiver but also in the quality of life of the patient (26). Worn out caregivers are no longer able to provide care to the patient, work or care for themselves properly and consequently caregiver burden is often accompanied by the nursing home placement of the patient (27-29). More heavily burdened caregivers often experience physical and psychological problems that force them to seek help. Therefore, when the burden becomes too heavy to bear it is important to know how caregivers may best be supported. For the prevention of overburden it is equally important to know which factors will lead to overburden.

Some caregivers experience more burden than others and the literature into caregiver burden reports caregiver as well as patient characteristics to be associated with the experience of caregiver burden. Being of closer kinship to the patient and female gender are associated with higher caregiver burden (30, 31). Caregivers who report lower self efficacy in caregiving experience more burden (32). Also there seems to be a cultural component in the report of caregiver burden in that African-American caregivers report less caregivers burden than Caucasian American caregivers (33). Furthermore, family conflict interferes with the process of receiving support and appreciation from the social environment (34). Receiving little social support in turn is associated with experiencing more burden (35).

Furthermore, the behavior of the patient is a major source of caregiver burden. Apathetic and disruptive behavior is burdening to caregivers (36-38). FTD presents with more frontal behavioral problems such as disinhibition, emotional blunting and lack of disease insight than AD (39-41) and such behaviors are particularly burdening to caregivers (42, 43). Also, the inability to handle and eat food properly and regulate its intake are a prominent and distressing feature of FTD patients (20).

Nearly all studies into caregiver burden concern AD. Their conclusions cannot be generalized to FTD, given its great differences with AD. Even though similar functional disabilities are sometimes observed in FTD and AD, FTD caregivers feel more burdened (44).

Our study operationalised caregiver burden as the burden caregivers experience as a consequence of behavioral problems of the patient and as a consequence of the caregiving situation in general. Furthermore, we operationalised burden as the strain of caregiving on psychological and physical well-being. In this regard caregivers’ health-related quality of life, psychological problems, sense of competence and physical problems were assessed. Caregiver coping, motivation, relationship quality and social support were evaluated as sources for dealing with the caregiving demands.

# Chapter 2

## *Aims and outline of this thesis*

The current study was embedded in the larger research project 'Genotype and phenotype and co-morbidity studies of different forms of hereditary frontotemporal dementia and psychosocial effects in at-risk relatives and caregivers'. Our study was aimed at increasing our understanding of FTD caregiver burden. Our goal was to gain insights into FTD caregiver suffering that might improve support to FTD caregivers.

## PART II FTD VS. AD

Knowledge about caregiver burden has been provided mainly by studies concerning Alzheimer's disease (AD). We suspected FTD caregivers to be more burdened than AD caregivers because of the frontal features of FTD. Therefore, part I of this thesis addressed the differences in caregiver burden between FTD and AD caregivers. In addition, the behavioral problems of FTD patients were compared to the behavioral problems of AD patients and its differential impact on caregivers was assessed. For part II of our study we collaborated with the MAASBED study in the Maastricht area.

## PART III ZOOMING IN ON FTD CAREGIVER BURDEN

In part III of this thesis we focused on the FTD caregiver. Some caregivers were able to care for their loved ones at home until the final stages of FTD, whereas others had institutionalised their loved ones earlier. We did a comparative study on caregivers at home and caregivers of FTD patients in a nursing home, in order to identify the characteristics of these seemingly resilient caregivers. In addition, we assessed caregiver motivation.

Furthermore, we followed the caregivers during two years. During these two years the condition of the patients deteriorated. We evaluated the course of caregiver burden and psychological well-being in the face of FTD progress. As a consequence of FTD, the relationship between patient and his partner gradually transformed from a partner relationship into a caregiver- care recipient relationship. We explored how caregivers experienced the quality of their relationship and how their relationship evolved over time.

Finally, we addressed the apparent discrepancy between the burden caregivers reported in the clinic and the burden they reported in our study. We specifically focused on caregiver sense of competence as a measure for caregiver suffering and inspected its association with caregiver burden.

## PART IV IMPRESSIONS ON CLINICAL GENETIC TESTING FOR FTD

Most instances of FTD are sporadic, however, an inheritable mutation is found in 40% of cases with a positive family history. The Rotterdam group identified the disease causing mutations in three large families in 1997 (45). This discovery implied that the members of these families were offered the option of presymptomatic genetic testing. In assessing the acceptability for presymptomatic genetic testing for FTD, 27 out 40 individuals at-risk indicated they would opt for such testing if it became available (46). However, when the test became available an estimated 7-17% of the potential counselees presented themselves at our department of Clinical Genetics in Rotterdam, which was the only center in the Netherlands offering genetic counseling for FTDbetween 1999 and 2007. In the third part of this thesis we share our clinical impressions on a decade of genetic counseling for FTD and attempt to understand why so few individuals at-risk for FTD presented for genetic counseling.

## PART V GENERAL DISCUSSION

The main findings of this study and the ramifications of these findings are discussed in chapter 10.

# Chapter 3

## *Study design and methods*

## PARTICIPANTS

Between January 1994 and June 2002, neurological and psychiatric outpatient clinics, and psycho-geriatric nursing homes in the Netherlands were enquired annually about the presence of suspected FTD patients. FTD patients were diagnosed according to the Lund-Manchester criteria (47). Neuroimaging and neuropsychological assessments were conducted to provide further support for the diagnosis (48). Patients affected by the sporadic type as well as the familial type were included. Primary FTD caregivers were recruited for participation in our longitudinal psychological study on caregiver burden between December 2001 and June 2002. The study approached FTD patients in their home environment as well as in nursing homes. The Medical Ethics Committee of the Erasmus Medical Center approved of the study. We obtained informed consent from all caregivers. Informed consent by proxy was obtained for the investigation of patient characteristics.

## UPTAKE

At the time of the study, 111 patients were eligible. Twenty-four primary caregivers could not be contacted because they had either moved or were deceased. Of the remaining 87, 17 decided not to participate, four could not participate due to major health problems and three did not respond to our invitation letter. A total of 63 participants were included in our study, representing a response rate of 72.4 %. At 24-month follow-up, 46 caregiver-care recipient dyads remained in the study.

## MAASBED

The Maastricht Study of Behavior in Dementia (MAASBED) is a 2-year follow-up study conducted by the University of Maastricht. MAASBED studied the course and risk factors of behavioral and psychological symptoms of dementia in AD patients and their caregivers. Ninety patients with AD (DSM IV) were included. Trained psychologists conducted patient and caregiver assessments, and data assessment was discussed regularly to minimize differences between the Rotterdam and MAASBED settings. The MAASBED study and the current study had similar study designs, which enabled the comparison of results.

## PROCEDURE

Patient and caregiver assessments were carried out at baseline and 24-months follow-up and consisted of administering a self-report questionnaire (see Table 1). A structured interview assessing in-depth caregiver burden was conducted after baseline. Regarding this interview, only the question about caregiver motivation (see measures) was used for analysis. Between baseline and 24 months, three semi-structured interviews with the caregivers (6, 12 and 18 months after baseline) were conducted by telephone. Trained psychologists carried out the semi-structured interviews.

## MEASURES

### Patient characteristics

#### Socio-demographic characteristics

Gender, age and patient's domicile (home, nursing home or deceased).

#### Illness characteristics

Severity of dementia was measured by the Global Deterioration Scale (GDS) (49). Scores range from 1 (not at all) to 7 (highest level of severity) and correspond to the 7 stages of dementia. Duration of dementia was measured in months.

#### Neuropsychiatric Inventory

Behavioral problems were assessed using the Neuropsychiatric Inventory (NPI) (50), which measures 10 domains of neuropsychiatric disturbance with scores ranging from 1 'slightly' to 12 'extremely': delusions, hallucinations, agitation, depression, anxiety, euphoria, apathy, disinhibition, irritability, and aberrant motor behavior, and adds up to a total score for neuropsychiatric disturbance. To minimize administration time, we applied the screening strategy of exploring in-depth only those behavioral problems with positive responses. The Dutch version of the NPI was proven to be reliable and valid (51).

### Caregiver characteristics

#### Socio-demographic characteristics

Gender, age, educational level and type of relationship to the patient (i.e., spouse, child, other).

### Burden

Caregiver burden due to neuropsychiatric disturbance of the patient was measured using the NPI (50). The caregiver was asked to rate the distress experienced in response to neuropsychiatric disturbance on a 6-point Likert scale ranging from 0 'not at all' to 5 'extremely' for each of the 10 domains. These ratings add up to a total distress score. Burden of caregiving in general was measured by rating the question: 'How is taking care of the patient burdening you?' on a visual analogue scale ranging from 0 'not at all' to 10 'extremely'. In case the patient was deceased, caregivers were asked to rate their current burden.

### Physical and mental health problems

At baseline and 24-month follow-up caregivers were asked to indicate on a dichotomous scale (1 yes/0 no) whether they were currently suffering from problems with their physical and mental health. At 6, 12 and 18 months follow-up caregivers were asked to rate their physical and mental health on a visual analogue scale ranging from 0 'extremely poor' to 10 'extremely well' and on a dichotomous scale whether or not (1 yes/0 no) their physical and mental health were negatively influenced by the caregiving task.

### Psychological problems

The Symptom Checklist-90-Revised (SCL-90-R) (52) was used to measure general psychopathology during the preceding week. The SCL-90-R comprises eight dimensions of psychological symptoms: 'interpersonal sensitivity', 'depression', 'anxiety', 'hostility', 'agoraphobia', 'somatization', 'insufficiency of thoughts and actions' and 'sleeping disturbances', ranging from 0 (not at all) to 4 (extremely) which add up to a general psychopathology score. Internal consistency of the eight dimensions was satisfactory with alphas ranging from 0.73 to 0.97.

### Health related quality of life

The 36 items of the Short Form 36 health survey questionnaire (SF-36) measured health related quality of life (HQoL) (53) and add up to a Physical Component Summary (PCS) and a Mental Component Summary (MCS). Scores on each dimension range from 0 (worst possible health state) to 100 (best possible health state). The SF-36 has been tested and has satisfactory validity (54). PCS and MCS internal consistencies at baseline were 0.82 and 0.85, respectively.

### Coping

The Utrecht Coping List (UCL) measures seven coping strategies: 'Seeking distraction' (8 items), 'Expressing emotions' (3 items), 'Seeking social support' (6 items), 'Avoiding' (8 items), 'Fostering reassuring thoughts' (5 items), 'Depressive reaction pattern' (7 items), and 'Active coping' (7 items) (55). Caregivers rated the 44 items on a four-point scale ranging from 1 'hardly ever use this strategy' to 4 'very often use this strategy'. Its validity has been established (56) and the internal consistencies in this study ranged from 0.61 to 0.88.

### Social support

The social support list (SSL) has proven validity (57) and was used to measure the extent to which caregivers received social support (i.e., everyday emotional interactions, emotional support with respect to problems, instrumental interactions, confirmation, social companionship and informative support; 34 items) and experienced negative social interactions (7 items) on a scale ranging from 1 'seldom or never' tot 4 'very often'. Internal consistencies in the current study were 0.90 and 0.88, respectively.

### Relationship quality

At baseline, the quality of the relationship before the patient became demented (premorbid) and the current relationship with the patient and at 24-months the quality of the current relationship were measured on visual analogue scales ranging from 0 'extremely poor' to 10 'extremely well'. At the same time intervals, four items of the University of Southern California Longitudinal Study of Three-Generation Families measures of positive affect (58) were used to rate on a four-point response scale ranging from 0 'not at all' to 3 'very much' four domains of relationship quality: 'connectedness' (How close do you feel to the patient?), 'communication' (How is the communication between you and the patient; how well are you able to exchange ideas and talk about the things that keep you occupied?), 'viewpoints' (To what extent do you and the patient have the same viewpoint on life?) and 'getting along' (How well do you and the patient get along with each other?).

### Caregiver motivation

The motivation caregivers had to provide care was assessed in an interview using an open-ended question; 'What drives you to take care of the patient? Are there things you do or thoughts you have that keep you going?' The answers to this question were tape-recorded and transcribed verbatim. Three psychologists identified four types of caregiver motivation: Marital duty, Love, Virtue and Distraction.

### Sense of Competence

Sense of competence was measured with the Sense of Competence Questionnaire (SCQ), comprising 28 items rated on a 4-point response format ranging from 1 'very strongly agree' to 4 'very strongly disagree' and higher scores indicate greater sense of competence (59). The SCQ has been validated (60) and its internal consistency in the current study was 0.88 (Cronbach's alpha).

Table 1 presents an overview of the time points at which data were assembled.

**Table 1.** Overview of time intervals of data collection presented for each measure

| | Baseline | 6 | 12 | 18 | 24 months |
|---|---|---|---|---|---|
| **Patients** | | | | | |
| Sociodemographic characteristics | X | | | | |
| Domicile | X | X | X | X | X |
| GDS | X | | | | X |
| NPI | X | | | | X |
| **Caregivers** | | | | | |
| Sociodemographic characteristics | X | | | | |
| NPI | X | | | | X |
| Burden | X | X | X | X | X |
| Problems with physical health | X | | | | X |
| Problems with mental health | X | | | | X |
| Physical health on VAS | | X | X | X | |
| Mental health on VAS | | X | X | X | |
| SCL-90 | X | | | | X |
| SF-36 | X | | | | X |
| UCL | X | | | | X |
| SSL | X | | | | X |
| Quality relationship | X | | | | X |
| Caregiver motivation | | X | | | |
| Sense of Competence | | | | | X |

# Part II

## *Frontotemporal dementia versus Alzheimer's disease*

# Chapter 4

## *Caregiver Burden, Health Related Quality of Life and Coping in Dementia Caregivers: A Comparison of Frontotemporal Dementia and Alzheimer's Disease*

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## ABSTRACT

Background: Frontotemporal dementia (FTD) is the second most prevalent dementia after Alzheimer disease (AD). Most support programmes for informal dementia caregivers are designed for AD caregivers whereas FTD caregivers are faced with a different dementia than AD caregivers. The main focus of this study was to assess the differences in caregiver burden between FTD and AD caregivers. Furthermore, the burden caregivers of FTD patients residing at home was compared to the burden of caregivers of institutionalised FTD patients.
Methods: We compared 29 FTD and 90 AD caregivers with respect to burden, health related quality of life (HQoL) and coping. Furthermore, 29 FTD caregivers of FTD patients residing at home were compared with 34 caregivers of institutionalised FTD patients to understand their specific caregiver issues.
Results: FTD caregivers were more burdened than AD caregivers and caregivers of patients who were demented for shorter duration had lowest HQoL. Caregivers of FTD patients institutionalised after shorter dementia duration were most burdened and affected in their HQoL. Overall, the Depressive reaction pattern coping strategy was associated with increased burden and decreased HQoL.
Conclusions: We recommend that FTD caregivers be offered more support than AD caregivers. Furthermore, we suggest that interventions target inadequate coping strategies.

## INTRODUCTION

Frontotemporal Dementia (FTD) is the second most common type of presenile neurodegenerative dementia after Alzheimer's disease (AD). The estimated prevalence of FTD in the Netherlands is 2.7 per 100.000 inhabitants (61). The pathology of FTD differs from AD in that it is restricted to the frontal and/or temporal lobes, and it more frequently presents with presenile onset than AD. The core clinical features of FTD constitute of early decline in interpersonal conduct (disinhibition), early impairment in regulation of personal conduct, early emotional blunting and early loss of insight, all preceding memory decline (62). This contrasts AD, in which patients typically suffer from memory problems from the early phases of the disease onward, whereas personality changes and behavioral problems usually arise in more advanced stages of the disease (17). As FTD advances, patients develop progressive disturbance of executive functions, loss of initiative, mental flexibility and organization. Language is impaired, eventually resulting in aphasia. Behavioral alterations such as pacing and repetitive stereotyped behaviors also develop progressively (17).

The care for patients with AD before their institutionalization is known to represent a significant burden to the well-being and quality of life of caregivers, which is predominantly determined by behavioral problems (63-67). FTD typically presents with more pronounced behavioral problems than AD (68). To date, little is known about the burden that caring for FTD patients represents to informal caregivers. FTD is largely unknown to the general public and therefore, FTD behavioral symptoms are not met with understanding and support from the community. In addition, the health care system is not well acquainted with FTD, which is therefore often misdiagnosed, and adequate knowledge about specific interventions to relieve FTD caregiver burden is lacking.

In the current study we aimed to differentiate FTD caregiver burden from AD caregiver burden. This approach was chosen because the general and medical publics are well aware of AD and AD caregiver burden has been studied quite extensively. AD therefore, is an ideal starting point for comparison. We aim to elucidate the specific dementia symptoms that might be burdening FTD caregivers and the differential influence of dementia type on caregiver burden, health related quality of life (HQoL) and use of coping strategies. The burden that caregivers experience as a consequence of the caring process is a major determinant of patient institutionalization (27, 28). Maintaining HQoL in the process of care is an essential component of psychological well-being of caregivers, which, in turn, may affect the quality of provided care. Furthermore, it is important to understand which coping strategies are adequate in relieving caregiver burden and maintaining HQoL and whether these are dementia specific.

A recent study compared FTD and AD neuropsychologically and functionally and found that FTD patients were more severely affected (69), suggesting that caregiving in FTD possibly has a greater impact on caregivers than caregiving in AD (70). Given the greater impact on social conduct and the more prevalent behavioral disturbance in FTD, we expected caregiver burden to be greater, HQoL to be more decreased and coping strategies to be used more intensively.

Little is known about how FTD caregivers, in terms of their psychological well-being, are adjusting to the situation that the patient is no longer living at home. From clinical experience it is known that some caregivers feel relieved that their partner is now well taken care of whereas other caregivers feel burdened by guilt feelings about having institutionalised the patient. We aimed to assess the burden and quality of life and coping of these caregivers in order to evaluate whether special attention needs to be paid to this subset of caregivers. In order to include these caregivers we stratified data on the basis of domicile.

## METHODS

### Participants

#### FTD patients and caregivers

Between January 1994 and June 2002, neurological and psychiatric outpatient clinics, and psycho-geriatric nursing homes in the Netherlands were enquired yearly about the presence of suspected FTD patients. FTD patients were diagnosed according to the Lund-Manchester criteria (47). Neuroimaging and neuropsychological assessments supported the diagnosis (48). Patients affected by the sporadic type as well as the familial type were included. Primary FTD caregivers were recruited for participation in our longitudinal psychological study on caregiver burden between December 2001 and June 2002. The study addressed FTD patients in their home environment as well as FTD patients in a nursing home. The Medical Ethics Committee of the Erasmus Medical Center approved of the study. We obtained informed consent from all caregivers. Informed consent by proxy was obtained for the investigation of patient characteristics. At the time of the study 111 patients were eligible. Twenty-four primary caregivers could not be contacted because they had either moved or deceased, of the remaining 87, 17 decided not to participate, four could not participate due to major health problems and three did not respond to our invitation letter. Finally, a total of 63 participants were included in our study, representing a response rate of 72.4 %.

#### AD patients and caregivers

The Maastricht Study of Behavior in Dementia (MAASBED) is a 2-year follow-up study conducted by the University of Maastricht. MAASBED studied the course and risk factors of behavioral and psychological symptoms of dementia in AD patients and their caregivers. A total of 90 primary AD caregivers were compared to 63 primary FTD caregivers at baseline. The 90 consecutively referred patients with AD (DSM IV) generally did not suffer from the relatively more severe familial type of AD. Trained psychologists conducted patient and caregiver assessments, and data assessment was discussed regularly to minimize differences between both settings. In the current study, data of AD patients and caregivers were used as a point of reference in order to address the specific issues surrounding the informal care for frontotemporal dementia (FTD) patients, about which little is known at present.

## Measures

### Patient characteristics

Socio-demographic characteristics included gender, age, patient's domicile (home or nursing home) and duration of the dementia in months (as valued by the caregivers).

Neuropsychiatric disturbance was assessed using the Neuropsychiatric Inventory (NPI) (71). This fully structured informant interview evaluates 10 domains of neuro-psychiatric disturbance: 'Delusions', 'Hallucinations', 'Agitation', 'Depression', 'Anxiety', 'Euphoria', 'Apathy', 'Disinhibition', 'Irritability', and 'Aberrant motor behavior'. Scores range from 1 to 12 for each composite domain, with higher scores indicating stronger symptoms. To minimize administration time the screening strategy of exploring in-depth only those behavioral domains with positive responses was applied. The Dutch version of the NPI was proven to be reliable and valid (51).

### Caregiver characteristics

Socio-demographic characteristics included gender, age, educational level and type of relationship to the patient (i.e., spouse, child, other).

Burden due to neuropsychiatric disturbance of the patient was measured using the NPI. The caregiver is asked to rate the distress experienced in response to neuro-psychiatric disturbance on a 6-point Likert scale ranging from 0 'not at all' to 5 'extremely' for each of the 10 domains. These ratings add up to a total distress score, with a maximum of 50.

Burden of caregiving was measured by rating 'How is taking care of the patient burdening you?' on a visual analogue scale ranging from 0 'not at all' to 10 'extremely'.

Health related Quality of Life (HQoL) was measured using the Short Form 36 health survey questionnaire (SF-36), which is a generic measure (72). It consists of 36 items representing eight functional dimensions: Physical functioning, Physical role limitations, Pain, Energy/vitality, Emotional role limitations, Social functioning, Mental health, and General health perceptions. One additional item measures Health change over the past year. Scores on each dimension range from 0 (worst health state) to 100 (best health state). The first four dimensions add up to the Physical Component Summary (PCS) and the latter to the Mental Component Summary (MCS). The SF-36 has been tested and has satisfactory validity (54). PCS and MCS internal consistencies were 0.82 and 0.85, respectively.

Coping styles were assessed using the Utrecht Coping List (UCL) which measures seven general coping styles: 'Seeking distraction' (8 items), 'Expressing emotions' (3 items), 'Seeking social support' (6 items), 'Avoiding' (8 items), 'Fostering reassuring thoughts' (5 items), 'Depressive reaction pattern' (7 items), and 'Active coping' (7 items) (55). Caregivers rated 44 items on a four-point scale ranging from 1 'hardly ever use that style' to 4 'very often use this style'. Its validity has been established (56) and internal consistency in the current study ranged from 0.52 to 0.86.

### Statistical analyses

The method of exact testing was used to detect differences in categorical data; ANCOVAs were conducted for continuous data. The analyses were conducted whilst adjusted for gender and age of the caregiver. Dementia duration and caregiver age were dichotomized using the mean as the cut off. ANCOVAs were conducted to detect interaction effects of caregiver age and dementia duration on quality of life and caregiver burden. The Bonferroni correction for multiple testing was applied, thus all analyses were tested at the 0.025-significance level. Regression analyses were used to assess significant predictors of caregiver burden and HQoL. The analyses are presented separately for the comparison of caregivers of FTD patients at home to caregivers of AD patients and separately for caregivers of FTD at home to caregivers of FTD patients in a nursing home. The results are presented individually for sociodemograhic data, behavioral disorders of the patients, caregiver distress as a result of behavioral disorders, caregivers' health related quality of life and caregiver coping. All statistical analyses were performed two-sided.

## RESULTS

### FTD patients at Home (FTDH) and their caregivers compared to AD patients at home and their caregivers

#### Patient characteristics

Socio-demographic characteristics

Table 1 displays the socio-demographic characteristics of the patients and their caregivers. A total of 29 FTD patients living at home (FTDH) and 90 AD patients living at home were included in the study, 11 FTDH and 32 AD patients were male. FTDH patients were on average 60.0 years old (range 43-79), which was significantly younger ($P<0.001$) than AD patients, who were on average 78.2 years old (range 56-99). Duration of dementia was significantly ($P<0.01$) longer in FTDH patients than AD patients (mean 59.2; range 24-111 and mean 42.3; range 6-120, respectively).

**Table 1.** FTD and AD caregiver and patient characteristics stratified by domicile

| | AD | FTDH | FTDN | Difference between groups P[a] | |
|---|---|---|---|---|---|
| | (N=90) | (N=29) | (N=34) | AD vs. FTDH | FTDH vs. FTDN |
| Patients | | | | | |
| Male n (%) | 32 (36) | 11 (38) | 18 (53) | .123 | .010 |
| Mean age (SD) | 78.2 (9.0) | 60.0 (8.6) | 61.2 (10.5) | .001 | .634 |
| Mean duration of dementia (SD) | 42.3 (29.8) | 59.2 (23.9) | 98.4 (42.6) | .006 | .001 |
| Caregivers | | | | | |
| Male n (%) | 25 (46) | 16 (55) | 8 (24) | .827 | .312 |
| Mean age (SD) | 63.5 (12.4) | 57.1 10.7 | 57.1 12.5 | .015 | .997 |
| Educational level: | | | | .386 | .249 |
| Low n (%) | 32 (36) | 8 (29) | 10 (29) | | |
| Medium n (%) | 33 (36) | 11 (40) | 14 (41) | | |
| High n (%) | 25 (28) | 9 (31) | 10 (30) | | |
| Type of relationship to patient: | 47 (52) | 27 (93) | 24 (71) | .001 | .061 |
| Spouse n (%) | 43 (48) | 2 (7) | 10 (29) | | |
| Child n (%) | | | | | |

[a] The Bonferroni correction for multiple testing was applied to test for significance

AD: Alzheimer Disease

FTDH: Frontotemporal dementia patients living at home

FTDN: Frontotemporal dementia patients living in a nursing home

### Neuropsychiatric disturbance

Table 2 displays the neuropsychiatric symptoms reported by the primary caregivers. FTDH patients and AD patients differed significantly in occurrence of neuropsychiatric symptoms. Significantly more FTDH patients suffered from Euphoria (P<0.001), Apathy (P<0.001), Disinhibition (P<0.001) and Aberrant motor behavior (P<0.001), whereas significantly more AD patients suffered from Depression (P<0.025). Overall, AD patients suffered significantly less frequently from neuropsychiatric symptoms than FTDH patients (P<0.001). FTDH patients experienced more intense neuropsychiatric symptoms than AD patients, with P-values approximating significance (P=0.04).

## Caregiver characteristics

### Socio-demographic characteristics

Table 1 displays the socio-demographic characteristics of the patients and their caregivers. A total of 29 caregivers of FTDH patients and 90 caregivers of AD patients were included in the study. Sixteen caregivers of FTDH patients and 35 AD caregivers were male. Caregivers of FTDH patients were significantly younger (P<0.05) than AD caregivers (mean 57.1; range 32-76 and 63.5 years; range 36-90, respectively). Caregivers of FTDH patients and AD caregivers did not differ in educational level. FTDH caregivers significantly more often were spouses of the patients than AD caregivers (P<0.001).

**Table 2.** Neuropsychiatric disturbance in 90 AD patients, 29 FTD patients living at home (FTDH) and 34 institutionalised FTD patients (FTDN)

| | Del | Hal | Agi | Dep | Anx | Eup | Apa | Dis | Irr | Abb |
|---|---|---|---|---|---|---|---|---|---|---|
| Symptoms AD | | | | | | | | | | |
| % present | 34 | 11 | 30 | 57 | 46 | 7 | 62 | 13 | 42 | 36 |
| Mean | 5.3 | 5.9 | 4.6 | 5.7 | 5.2 | 4.5 | 5.0 | 4.3 | 5.1 | 6.3 |
| SD | 3.5 | 3.5 | 2.5 | 3.7 | 4.0 | 3.3 | 2.9 | 3.7 | 3.7 | 3.4 |
| Symptoms FTDH | | | | | | | | | | |
| % present | 24 | 14 | 45 | 24 | 45 | 41 | 90 | 72 | 48 | 83 |
| Mean | 3.7 | 3.3 | 5.1 | 4.4 | 5.2 | 4.5 | 6.4 | 4.9 | 4.9 | 7.0 |
| SD | (2.4) | 1.0 | 2.6 | 3.6 | 3.7 | 4.0 | 2.9 | 3.4 | 2.9 | 3.0 |
| Symptoms FTDN | | | | | | | | | | |
| % present | 3 | 0 | 32 | 9 | 12 | 21 | 100 | 35 | 12 | 74 |
| Mean | 9.0 | 0 | 5.7 | 4.7 | 4.8 | 6.4 | 10.8 | 7.6 | 4.3 | 7.7 |
| SD | (n.a.) | 0 | 4.2 | 6.4 | 2.9 | 3.2 | 2.1 | 3.7 | 2.6 | 2.3 |
| Difference presence AD vs. FTDH | 0.46 | 1.00 | 0.23 | 0.02 | 0.38 | 0.00 | 0.00 | 0.00 | 0.38 | 0.00 |
| Difference mean AD vs. FTDH | 0.48 | 0.22 | 0.31 | 0.33 | 0.90 | 0.33 | 0.17 | 0.90 | 0.92 | 0.45 |
| Difference presence FTDH vs. FTDN | 0.09 | 0.09 | 0.60 | 0.04 | 0.01 | 0.39 | 0.04 | 0.08 | 0.01 | 0.29 |
| Difference mean FTDH vs. FTDN | 0.06 | n.a. | 0.50 | 0.34 | 0.90 | 0.66 | 0.00 | 0.05 | 0.57 | 0.51 |

Subscales of the NeuroPsychiatric Inventory (NPI)

Del: Delusisions; Hal: Halucinations; Agi: Agitation; Dep: Depression; Anx: Anxiety; Eup: Euphoria; Apa: Apathy; Dis: Disinhibition; Irr: Irritability; Abb: Abberrant motor behavior

### Burden due to neuropsychiatric disturbance of the patient

FTDH caregivers and AD caregivers did not differ significantly in the emotional burden they experienced due to neuropsychiatric disturbance in the patients.

### Burden of caregiving

ANCOVAs demonstrated that FTDH caregivers felt significantly more burdened by the process of caring (P<0.01) than AD caregivers (mean 5.6; SD 0.46 and mean 4.2; SD 0.28 respectively). In regression analysis caregiver burden was predicted significantly by the coping strategy of Seeking distraction (β=0.20; P<0.025) and by the neuropsychiatric symptoms Anxiety (β=0.27; P<0.01) and Disinhibition (β=0.24; P<0.01), together explaining 31% of variance. It was exploratively tested whether type of caregiver relationship to the patient (e.g. spouse or child) was of relevance to caregiver burden. It appeared that there was no statistical difference between the different types of relationships.

### Health Related Quality of Life (HQoL)

ANCOVAs demonstrated a two-way interaction effect ($P<0.025$) on the Mental Component Scale (MCS). Older caregivers of FTDH patients who had been demented for longer duration had the highest MCS scores (mean 83.3; SD 6.89). In contrast, younger caregivers of AD patients who had been demented for shorter duration had the lowest MCS scores (mean 63.7; SD 4.16). This implies that HQoL was more affected in caregivers of AD patients having been demented for shorter duration. In regression analysis MCS scores were predicted significantly by Depressive reaction pattern ($\beta=-0.56$; $P<0.001$), explaining 37% of variance.

No significant differences were found between FTDH caregivers and AD caregivers on the Physical Component Scale (PCS).

### Coping

FTDH and AD caregivers did not differ significantly in their use of coping strategies. Both FTDH and AD caregivers made most use of Active coping strategies (mean=2.7; SD 0.61 and mean=2.5; SD 0.48 respectively) and Reassuring thoughts (mean=2.5; SD 0.50 and mean=2.5; SD 0.48 respectively) and both groups made least use of Depressive reaction pattern (mean=1.6; SD 0.38 and mean=1.7; SD 0.48 respectively).

## FTD patients living at Home (FTDH) and their caregivers compared to FTD patients living in a Nursing Home (FTDN) and their caregivers

### Patient characteristics

### Socio-demographic characteristics

Table 1 displays the socio-demographic characteristics of the patients and their caregivers. A total of 34 FTD patients living in a nursing home (FTDN) were included in the study. Eleven FTDH patients and 18 FTDN patients were male ($P<0.01$). FTDN patients were on average 61.2 years old (range 37-77). Duration of dementia was significantly ($P<0.001$) longer in FTDN patients than in FTDH patients (mean 98.4; range 42-220 and mean 59.2; range 24-111 respectively).

### Neuropsychiatric disturbance

Table 2 displays the neuropsychiatric symptoms reported by the primary caregivers.

FTDH patients suffered significantly more from Anxiety ($P<0.01$) and Irritability ($P<0.01$) than FTDN patients, whereas FTDN patients suffered from higher levels of Apathy than FTDH patients. The difference in Disinhibition approximated significance; FTDH patients experienced higher levels of Disinhibition than FTDN patients ($P=0.05$). Overall, FTDH patients experienced more neuropsychiatric symptoms than FTDN patients ($P<0.01$).

## Caregiver characteristics

### Socio-demographic characteristics

Table 1 displays the socio-demographic characteristics of the patients and their caregivers. A total of 34 caregivers of FTDN patients were included in the study. Eight caregivers of FTDN patients were male. FTDN caregivers were on average 57.1 years old (range 34-77). FTDN caregivers did not differ significantly in educational level or in the type of relationship to the patient from FTDH caregivers.

### Burden due to neuropsychiatric disturbance of the patient

FTDH caregivers experienced significantly more emotional burden due to the neuropsychiatric disturbance of the patient than FTDN caregivers (P<0.001).

### Burden of caregiving

ANCOVAs demonstrated that a two-way interaction effect (see Figure 1) approximated significance (P=0.04); FTDN caregivers of patients who had been demented for shorter duration were more heavily burdened (mean=8.8; SD 1.50) than FTDN caregivers of patients who had been demented for longer duration (mean 5.5; SD 0.46) and FTDH caregivers of patients who had been demented for shorter or longer duration (mean 5.2; SD 0.76 and mean 6.0; SD 0.76 respectively).

In regression analysis burden of caregiving was predicted significantly by Depressive reaction pattern (β=0.43; P<0.001), explaining 25% of variance.

### Health Related Quality of Life

ANCOVAs demonstrated two (near) significant one-way interaction effects on the MCS. First, FTDN caregivers had lower (P=0.027) MCS scores than FTDH caregivers (mean 59.4; SD 6.00 and mean 75.0; SD 3.24 respectively). Second, caregivers of FTD patients who had been demented for shorter duration had significantly lower (P<0.025) MCS scores than caregivers of FTD patients having been demented for longer duration (mean 59.0; SD 6.32 and mean 75.4; SD 2.55 respectively). In regression analysis MCS scores were predicted significantly by Depressive reaction pattern (β=-0.55; P<0.001), explaining 31% of variance.

No significant differences were found between caregivers of FTD patients at home and in a nursing home on the PCS.

### Coping

FTDH caregivers did not differ significantly from FTDN caregivers in their use of coping strategies. Both FTDH and FTDN caregivers mostly used Active coping strategies (mean=2.7; SD 0.61 and mean=2.6; SD 0.57 respectively) and Reassuring thoughts (mean=2.5; SD 0.50 and mean=2.33; SD 0.56 respectively) and both groups made least use of Depressive reaction pattern (mean=1.6; SD 0.38 and mean=1.7; SD 0.39 respectively).

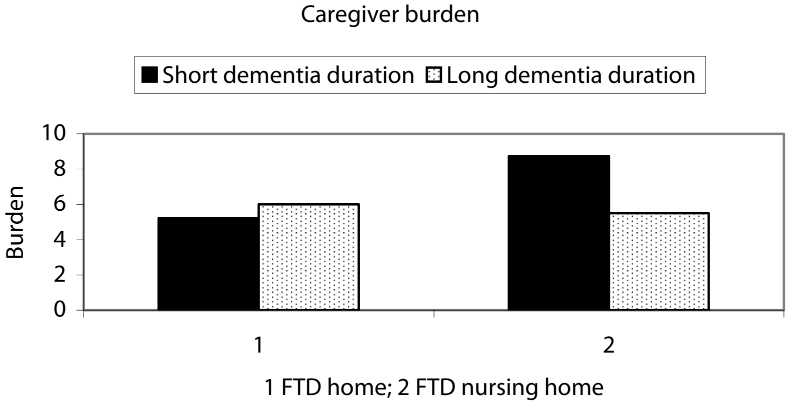

**Figure 1.** Two-way interaction effect for dementia duration and patient domicile on caregiver burden.

## DISCUSSION

### FTDH patients and their caregivers compared to AD patients and their caregivers

In the current study, informal caregivers of FTD patients living at home (FTDH) and AD caregivers were compared with respect to caregiver burden, health related quality of life (HQoL), and coping.

Our study demonstrated that caring for FTDH patients differed significantly from caring for AD patients. FTD patients were more affected in terms of dementia symptoms (68). In congruence with the literature, FTDH patients presented significantly more often with Aberrant motor behavior, Disinhibition, Apathy and Euphoria symptoms whereas AD patients suffered significantly more from Depressive symptoms (39, 40, 73). In line with the findings reported by Cummings and McPherson (74), Apathy was most prevalent in both FTD and AD. The amount of overall neuropsychiatric disturbance was greatest in FTDH patients. The specific neuropsychiatric symptoms causing emotional burden differed for FTDH and AD, but the amount of experienced emotional burden due to these symptoms did not. The neuropsychiatric symptoms of Anxiety and Disinhibition were particularly burdening to both FTDH and AD caregivers.

FTD caregivers did feel more burdened by the caring process in general, suggesting that other factors add up to the experienced burden in addition to neuropsychiatric disturbance. FTD caregivers have more trouble finding support in the health care system since FTD is much less prevalent and known than AD. The higher levels of FTD caregiver burden we found suggest that support offered to FTDH caregivers by the health care system should be improved and intensified. Health care providers should be aware of the important differences between

FTDH and AD caregivers. More research will be necessary to identify which factors contribute to the higher burden FTD caregivers experience to enhance tailor-made support.

In accordance with the AD literature (75, 76) we found that caregivers of AD patients who had been demented for shorter duration were most affected in their HQoL. Caregivers of patients (both FTDH and AD) who had been demented for relatively longer duration had higher HQoL, suggesting there may be adaptation over time. FTDH patients, on average, had been demented for relatively longer duration than AD patients and their caregivers were less affected in their HQoL, supporting the notion of adaptation over time. Follow-up data are needed to further investigate this notion.

In terms of coping strategies there were no differences between FTDH and AD caregivers. It may therefore be concluded that, in our study, coping strategies were used independently of dementia type. We did find that the use of Depressive reaction pattern contributed significantly to decreased HQoL. Interventions aimed at improving HQoL in dementia caregivers may thus benefit from targeting the use of inadequate coping strategies like the Depressive reaction pattern.

In summary, FTDH caregivers have to treat with more diverse and intense neuropsychiatric symptoms than AD caregivers. FTDH caregivers feel more burdened by the process of caring than AD caregivers. Irrespective of dementia type, Depressive reaction pattern and caring for patients who had been demented for shorter duration was associated with decreased HQoL.

### FTDH patients and their caregivers compared to FTDN patients and their caregivers

In the current study we were able to include FTD patients at home (FTDH) and their caregivers as well as FTD patients in a nursing home (FTDN) and their caregivers. We inspected caregiver burden, health related quality of life (HQoL) and coping in order to enhance our understanding of the specific caregiver issues once the FTD patient is institutionalised compared to when the FTD patient is living at home.

FTDN patients experienced the most Apathy and the least other neuropsychiatric symptoms, which is congruent with findings from other studies that diversity in neuropsychiatric disturbance decreases with advancing stages of FTD (77). In FTDH patients Anxiety and Irritability was observed more frequently than in FTDN patients. Overall, in FTDH patients more intense neuropsychiatric symptoms were observed than in FTDN patients. In accordance with the lower presence and intensity of neuropsychiatric symptoms, caregivers of FTDN patients felt significantly less burdened emotionally by neuropsychiatric symptoms than FTDH caregivers of patients. A previous study on FTD also found more behavioral problems to be associated with more caregiver distress (78). More specifically, caregivers of FTDN patients who had suffered from FTD for a shorter period of time felt most heavily burdened by the caring process in general. An explanation could be that over time caregivers adapt to their circumstances and as a consequence feel less burdened. Caregivers who had experienced a longer disease period may be recognized by their social environment and subsequently may have been more encouraged to give in with regard to institutionalization. Moreover, in the early phases, FTD patients may seem unaffected to the social environment, especially since these patients typically lack disease insight. Institutionalization of the patients then, is difficult to explain to the environment, which may respond with rejection.

We found that the caregivers who felt most heavily burdened also had the lowest HQoL compared to the other FTD caregivers. Our findings thus demonstrate that caregivers of patients who were institutionalised after relatively short dementia duration were seriously affected in their psychological well-being. To these caregivers, support aimed at relieving burden and improving their HQoL should be offered without delay. From clinical experience it is known that FTD caregivers often have great difficulties finding the professional support they need. Recognition by health care professionals of the greater support needs would aid these caregivers in finding support more quickly. Swift caregiver support may even benefit the postponement of institutionalization (79). This would be beneficial to the caregiver who would be partly relieved, to the patient who would be cared for by a loved one at home for longer and to the health care system, which would spend less money on home care than on institutionalised care.

Caregivers of FTDH and FTDN patients did not differ in their use of coping strategies. Irrespective of the patient's domicile the use of Depressive reaction pattern contributed to increased caregiver burden and decreased HQoL. Interventions aimed at decreasing burden and improving HQoL may thus benefit from targeting the use of inadequate coping strategies like the Depressive reaction pattern.

In summary, we found that caregivers of FTDN patients institutionalised after relatively shorter dementia duration were particularly burdened and affected in their HQoL. To these caregivers in particular, recognition of the greater needs for support may be an important aid in finding support faster.

A limitation of the current study is that the data were cross-sectional. Longitudinal follow-up data will be needed to further investigate the role of dementia duration, burden and institutionalization and these data will be published in due time. Our sample was quite small, which is a limitation to generalizability. However, we did include 72.4% of all FTD patients who were known to us nation-wide.

## Conclusion

FTD caregivers in our study were more heavily burdened by the caring process than AD caregivers. Caregivers of FTD patients institutionalised after relatively shorter dementia duration were most burdened and affected in their health related quality of life. We therefore recommend that caregivers of FTD patients should be offered improved and intensified support and that special attention should be paid to caregivers of already institutionalised patients.

Furthermore, we suggest that interventions aimed at relieving burden and improving health related quality of life of target the inadequate coping strategy of Depressive reaction pattern. Further research will be necessary to identify the factors that make FTD caregiving more burdensome than AD caregiving.

# Chapter 5

## *Impact of Behavioral Problems on Spousal Caregivers: A Comparison Between Alzheimer's Disease and Frontotemporal Dementia*

De Vugt ME, Riedijk SR, Aalten P, Tibben A, Van Swieten JC, Verhey FRJ. Dementia. Dement Geriatr Cogn Disord 2006; 22: 35-41.

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## ABSTRACT

Background: Behavioral changes are a key factor in distinguishing Frontotemporal Dementia (FTD) from Alzheimer's Disease (AD); however, little is known about the impact of these changes on caregivers. The aim of this study was to compare caregivers' distress related to behavioral symptoms of AD and FTD.

Methods: Forty-seven spouse caregivers of consecutively referred patients with AD and 27 spouse caregivers of patients with FTD participated in this study. Behavioral disturbances in the patient and caregivers' emotional reactions were measured with the NeuroPsychiatric Inventory (NPI).

Results: Patients with FTD had significantly higher levels of agitation, apathy, disinhibition and aberrant motor behavior than did patients with AD. High distress scores were found for disinhibition, depression and apathy in caregivers of FTD patients whereas caregivers of AD patients reported patient apathy, depression and anxiety as being severely distressing. Higher mean distress scores were found for disinhibition in the FTD group. Furthermore, caregivers of FTD patients reported higher levels of general burden, and felt less competent than AD caregivers.

Conclusions: Caregivers of FTD patients were overall more distressed by the behavior of their partners than were the caregivers of AD patients. Findings from this study underscore the importance of differentiating between diagnostic groups and specific behavioral domains when focusing on caregiver reactions to problem behavior.

## INTRODUCTION

Behavioral and psychological symptoms are common in patients with dementia. These symptoms have important consequences for primary caregivers because they are associated with caregiver distress and negative health effects (80). Moreover, these symptoms are important determinants of nursing home placement (47). A greater understanding of the impact of these symptoms on caregivers may facilitate the development of more specific caregiver interventions.

Research has identified a broad spectrum of behavioral disturbances related to dementia, including depression, apathy, agitation, aggressiveness and disinhibition. In addition to the well-known associations between caregiver distress and general measures of behavioral problems, some specific behavioral symptoms have been linked to caregiver burden. For example, it has been shown that apathetic and withdrawn behavior are stressful to caregivers (81), as is disruptive behavior (47). However, most of these studies looked at heterogeneous samples of dementia patients or included primarily patients with Alzheimer's disease (AD). Although a number of studies compared behavior in different types of dementia, little is known about differences in caregivers' emotional reactions to patient behavioral problems between specific diagnostic groups.

Behavioral changes are a key factor in distinguishing frontotemporal dementia (FTD) from AD. At the onset of FTD, non-cognitive behavioral changes predominate and cognitive functions are relatively preserved, whereas the diagnosis of AD is based principally on the presence of cognitive disturbances. Furthermore, unlike AD, FTD has a relatively early onset and is characterized by early loss of insight (47). A number of studies have investigated behavioral changes in FTD [10-15], and these have shown that overall FTD patients present with more behavioral problems than AD patients (82). Symptoms that have been reported to be more pronounced in FTD are apathy, disinhibition, euphoria, and aberrant motor behavior.

In view of these differences in behavior between the two disorders, we expected that caregiver distress related to specific behavioral problems of the patient would differ between FTD and AD and that total distress would be higher in FTD caregivers. Therefore, we compared the behavioral symptom profiles of AD and FTD patients, and the emotional distress of caregivers in relation to the behavioral symptoms of patients with AD and FTD.

## METHODS

### Participants

Forty-seven spouse caregivers of consecutively referred patients with AD (DSM IV) (47) and 27 spouse caregivers of patients with FTD (diagnosis according to the criteria of The Lund and Manchester Groups) (47) participated in this study. Patients with AD and their caregivers were drawn from the Maastricht Memory Clinic of the Academic Hospital Maastricht or the Department of Mental Health Care for the Elderly of the Community Mental Health Center of Maastricht, the Netherlands. They were included in the Maastricht Study of Behavior in Dementia (MAASBED) (83). MAASBED was a 2-year follow-up study that focused on the course and risk factors of behavioral and psychological symptoms of dementia (BPSD). FTD patients and their caregivers were examined at the Department of Neurology of the Academic Hospital of Rotterdam, the Netherlands (47). They were included in a follow-up study of caregiver burden in FTD (84). Baseline data were used for the current study. Patient and caregiver assessment were conducted by independent, clinically experienced, trained psychologists. Data assessment was discussed in regular meetings to minimize differences in assessment between both settings.

All patients were living at home at baseline. Informed consent was obtained from all subjects.

## Measures

### Patient characteristics

Patient behavioral problems were measured with the 10-item version of the Neuropsychiatric Inventory (NPI). The NPI (85) is a structured interview held with the caregiver and evaluates 10 neuropsychiatric symptoms which are commonly observed in dementia: delusions, hallucinations, agitation, depression, anxiety, apathy, irritability, euphoria, disinhibition, and aberrant motor behavior. The score for each item is obtained by multiplying severity (1-3) by frequency (1-4) (range 0-12). The validity and internal consistency of the NPI have been established earlier (80), as well as its Dutch version (86).

The Mini Mental Status Examination (MMSE) (83) was used to measure patient cognitive functioning. The dependency of the patient on assistance to perform daily activities was measured with the Interview for Deterioration in Daily living activities in Dementia (IDDD) (87). This questionnaire consists of 20 items reflecting initiative to and actual performance of daily activities. A summed score was used for items concerning actual performance of activities (range 0 to 44) and for items concerning initiative to activities (range 0 to 36).

### Caregiver characteristics

For each of the 10 neuropsychiatric symptoms on the NPI, caregivers rated the level of distress they experienced on a scale from 0 (none) to 5 (extreme). NPI-D total score is the sum of these 10 ratings. In addition, a visual analogue scale was used to assess overall caregiver distress, ranging from 1 (“not at all”) to 10 (“extremely”).

Caregiver competence was measured with the Short Sense of Competence Questionnaire (SSCQ) (85). This questionnaire consists of 7 items rated on a 5-point scale (1 “agree very strongly” to 5 “disagree very strongly”). These items reflect three domains of caregivers’ feelings of being able to care for a demented person: (1) satisfaction with the demented person as a recipient of care; (2) satisfaction with one's own performance as a caregiver; (3) consequences of involvement in care for the personal life of the caregiver.

### Statistical analyses

Demographic variables of the AD and the FTD group were compared using t-tests and Chi-square tests. Mean NPI symptom scores and NPI-distress scores for the FTD and AD groups were compared using t-tests or Mann-Whitney U tests. Since NPI item scores were not normally distributed, a logistic regression analysis was used to adjust for dementia severity and patient or caregiver age, when significant. For this analysis, NPI symptom and distress scores were dichotomized (score 0 versus ≥ 1). Patient functional impairment (IDDD performance score) was used as a measure of dementia severity.

## RESULTS

### Group characteristics

The caregiver and patient characteristics of both groups are shown in Table 1. There were no significant differences between the two groups in caregiver or patient education and sex. However, caregivers and patients in the FTD group were significantly younger than caregivers and patients in the AD group. Furthermore, disease duration was longer, and cognitive functioning and initiative to perform activities were worse in the FTD patients than in the AD patients. There was no difference in actual performance in activities between the groups.

**Table 1.** Differences between Alzheimer's disease (AD) and Frontotemporal Dementia (FTD) groups

| | AD group (n=47) | FTD group (n=27) | Test value | P value |
|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | | |
| Caregiver | | | | |
| Age (years) | 71.3 (8.6) | 58.5 (9.6) | t =5.9 | <0.001 |
| Education[1] (range 1-8) | 3.4 (1.9) | 3.6 (1.6) | t =-0.6 | 0.575 |
| Sex[2] (m/f) | 20/27 | 11/16 | $\chi2$=0.02 | 0.879 |
| Patient | | | | |
| Age (years) | 71.5 (8.2) | 59.5 (8.4) | t =6.0 | <0.001 |
| Education[1] (range 1-8) | 2.9 (2.1) | 3.5 (1.8) | t =-1.2 | 0.231 |
| Sex[2] (m/f) | 28/19 | 15/12 | $\chi2$=0.1 | 0.736 |
| IDDD | | | | |
| Performance | 17.6 (10.9) | 15.7 (13.4) | t = 0.7 | 0.513 |
| Initiative | 24.6 (9.3) | 16.2 (9.9) | t = 3.6 | 0.001 |
| Duration of illness (months) | 39.7 (28.5) | 60.5 (24.3) | t = -3.15 | 0.002 |
| MMSE-score | 19.3 (4.9) | 13.2 (9.3) | t = 3.6 | 0.001 |

IDDD = Interview of Daily living activities in Dementia; MMSE = Mini-Mental State examination

1. ranging from primary school (1) to university degree (8)

2. values represent number of males and females

## Patient behavioral problems

Table 2 shows the frequency of behavioral symptoms for the two diagnostic groups. Frequencies refer to the number and proportion of patients in a subgroup showing a specific behavioral symptom. Behavioral symptoms were present in all FTD patients and in 91% of the AD patients. Apathy was the most common behavioral symptom in both groups, but it occurred more often in the FTD group (89%) than in the AD group (57%). In the AD group, anxiety and depression were the next most common symptoms, each being present in more than 50% of the patients. In the FTD group the other next common symptom was aberrant motor behavior (82%), followed by disinhibition (67%) and irritability (52%).

Comparison of the mean NPI subscale scores showed that the patients with FTD had significantly higher NPI total scores and higher scores for agitation, euphoria, apathy, disinhibition and aberrant motor behavior than patients with AD (Table 2). Additional logistic regression analyses revealed that after controlling for disease severity (IDDD performance) and patient age, group differences remained significant, except for euphoria (OR=3.4, 95% CI=0.7-15.4; p=0.113). But in an additional analysis after controlling for cognitive functioning (MMSE), only disinhibition (OR=14.5, 95% CI =3.0–69.7; p<0.001) and aberrant motor behavior (OR=7.6, 95% CI=1.6-35.7; p=0.010) remained significant.

**Table 2.** Number (%) of patients with symptoms and mean NPI subscale scores (severity * frequency; range 0-12)

| NPI subscales | Alzheimer Disease (n= 47) | | Frontotemporal Dementia (n= 27) | | Test[1] Value | P [2] value |
|---|---|---|---|---|---|---|
| | N (%) | Mean (SD) | N (%) | Mean (SD) | | |
| Delusions | 10 (21.3) | 1.1 (2.6) | 6 (22.2) | 1.0 (2.0) | -0.3 | 0.726 |
| Hallucinations | 4 (8.5) | 0.6 (2.1) | 4 (14.8) | 0.5 (1.2) | -0.7 | 0.492 |
| Agitation | 7 (14.9) | 0.6 (1.5) | 13 (49.1) | 2.4 (3.1) | -3.2 | 0.001 |
| Depression | 24 (51.1) | 2.4 (3.4) | 7 (25.9) | 1.1 (2.6) | -2.1 | 0.040 |
| Anxiety | 25 (53.2) | 2.2 (3.2) | 11 (40.7) | 2.3 (3.7) | -0.5 | 0.620 |
| Euphoria | 4 (8.5) | 0.2 (1.0) | 12 (44.4) | 2.0 (3.4) | -3.7 | <0.001 |
| Apathy | 27 (57.4) | 2.7 (3.1) | 24 (88.9) | 5.5 (3.5) | -3.5 | <0.001 |
| Disinhibition | 4 (8.5) | 0.1 (0.4) | 18 (66.7) | 3.1 (3.4) | -5.7 | <0.001 |
| Irritability | 19 (40.4) | 2.5 (3.2) | 14 (51.9) | 5.5 (3.8) | -1.1 | 0.280 |
| Aberrant motor | 16 (34.0) | 2.4 (3.8) | 22 (81.5) | 5.5 (3.8) | -3.6 | <0.001 |
| Total NPI score | 43 (91.4) | 16.1 (17.2) | 27 (100%) | 26.0 (16.4) | -2.9 | 0.003 |

NPI = Neuropsychiatric Inventory; [1] Mann-Whitney U test; [2] following Bonferonni correction the significance level was set at .0045

## Caregiver distress in AD and FTD

Caregiver distress in relation to individual NPI symptoms was examined in both diagnostic groups. The most distressing symptoms in the AD group were anxiety (mean=1.7; SD=2.0), apathy (mean=1.6; SD=1.8) and depression (mean=1.6; SD=1.9) (see Table 3). The most distressing symptom in the FTD group was also apathy (mean=2.4; SD=1.6) followed by disinhibition (mean=2.0; SD=1.7).

A comparison of distress related to the specific symptoms between the two groups showed that disinhibition and euphoria were significantly more distressing to the caregivers of FTD patients than to the caregivers of AD patients (Table 3). Additional logistic regression analyses were carried out to test whether these differences in NPI distress subscale scores were associated with disease severity or caregiver age. After controlling for functional impairment (IDDD performance) and caregiver age, group differences remained significant for disinhibition but not for euphoria (OR=3.9, 95% CI=0.893-17.7; p=0.070). Group differences also remained significant for disinhibition after controlling for cognitive functioning (OR=15.5, 95% CI =3.0-79.6; p=0.001).

**Table 3.** Differences in mean NPI distress scores (range 0-5) between caregivers of Frontotemporal Dementia patients (FTD; n= 27) and Alzheimer's Disease patients (AD; n= 47)

| NPI distress subscales | AD (n= 47) | FTD (n= 27) | Test value [1] | P value [2] |
|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | | |
| Delusions | 0.7 (1.5) | 0.7 (1.5) | -0.2 | 0.829 |
| Hallucinations | 0.3 (1.0) | 0.3 (0.8) | -0.7 | 0.472 |
| Agitation | 0.6 (1.4) | 1.4 (1.7) | -2.7 | 0.006 |
| Depression | 1.6 (1.9) | 1.1 (1.9) | -1.3 | 0.175 |
| Anxiety | 1.7 (2.0) | 0.9 (1.6) | -1.7 | 0.096 |
| Euphoria | 0.1 (0.5) | 0.8 (1.2) | -3.3 | 0.001 |
| Apathy | 1.6 (1.8) | 2.4 (1.6) | -2.2 | 0.028 |
| Disinhibition | 0.1 (0.4) | 2.0 (1.7) | -5.5 | <0.001 |
| Irritability | 1.1 (1.8) | 1.4 (1.6) | -1.1 | 0.278 |
| Aberrant motor | 0.8 (1.5) | 1.3 (1.4) | -2.1 | 0.034 |
| Total NPI score | 9.2 (8.1) | 12.7 (7.6) | -2.1 | 0.038 |

NPI = Neuropsychiatric Inventory; [1] Mann-Whitney U test; [2] following Bonferonni correction the significance level was set at .0045

In addition, overall caregiver distress and caregiver feelings of competence were compared between the caregivers of AD and FTD patients using regression analysis controlled for disease severity and caregiver age. The caregivers of FTD patients experienced caregiving as more distressing (t=3.4, p=0.001). There were no differences in total caregiver competence scores (t=-1.5, p=0.124), but when examining the three subscales of the Sense of Competence Scale, caregivers of FTD patients felt less satisfied with the patient (t=-2.9, p=0.005) and with themselves as caregivers (t=-2.1, p=0.037). However, caregivers of AD patients experienced more consequences for their personal life (t=3.1, p=0.003).

### Frequency distributions for distress ratings

NPI-Distress ratings were divided into three categories (Low = score 0 to 1, Medium = score 2 to 3, and High = score 4 to 5) (75). Table 4 shows the distribution of distress ratings in caregivers when a particular symptom was present in the patient. The most frequent symptoms in the AD patient were apathy, anxiety and depression. When apathy was present in the AD patient it was most often rated as highly distressing (44.4%). When anxiety or depression was present in the AD patient it was most often rated as medium (respectively 44% and 41.7%) to highly distressing (respectively 40% and 45.8%). Agitation occurred less frequent in the AD group, but when it was present it was most often highly distressing (71.4%).

In the FTD group apathy, aberrant motor behavior and disinhibition occurred most frequent in the patient. When apathy was present in the FTD patient is was most often rated as medium distressing (54.2%). Disinhibition was most often rated as highly distressing (50%) and aberrant motor behavior as lowly distressing (59.1%). Depression occurred less frequently in the FTD group, but when it was present it was experienced as highly distressing (100%).

**Table 4.** NPI distress ratings in caregivers of patients with Alzheimer's disease (AD; n=47) or Frontotemporal Dementia (FTD; n=27)

| | n[1] | | No / Low distress[2] | | Medium distress | | High distress | |
|---|---|---|---|---|---|---|---|---|
| | AD | FTD | AD | FTD | AD | FTD | AD | FTD |
| Delusions | | | | | | | | |
| N (%) | 10 | 7 | 2 (20.0) | 3 (2.9) | 3 (30.0) | 1 (14.3) | 5 (50.0) | 3 (42.9) |
| Hallucinations | | | | | | | | |
| N (%) | 4 | 4 | 0 (0) | 3 (75.0) | 2 (50.0) | 0 (0) | 2 (50.0) | 1 (25.0) |
| Agitation | | | | | | | | |
| N (%) | 7 | 13 | 0 (0) | 2 (15.4) | 2 (28.6) | 6 (46.2) | 5 (71.4) | 5 (38.5) |
| Depression | | | | | | | | |
| N (%) | 24 | 7 | 4 (16.7) | 0 (0) | 10 (41.7) | 0 (0) | 11 (45.8) | 7 (100) |
| Anxiety | | | | | | | | |
| N (%) | 25 | 11 | 4 (16.0) | 4 (36.4) | 11 (44.0) | 4 (36.4) | 10 (40.0) | 3 (27.3) |
| Euphoria | | | | | | | | |
| N (%) | 4 | 12 | 2 (50.0) | 5 (41.7) | 2 (50.0) | 6 (22.2) | 0 (0) | 1 (8.3) |
| Apathy | | | | | | | | |
| N (%) | 27 | 24 | 7 (25.9) | 5 (20.8) | 8 (29.6) | 13 (54.2) | 12 (44.4) | 6 (25.0) |
| Disinhibition | | | | | | | | |
| N (%) | 4 | 18 | 3 (75.0) | 4 (22.2) | 1 (25.0) | 6 (33.3) | 0 (0) | 9 (50.0) |
| Irritability | | | | | | | | |
| N (%) | 19 | 14 | 6 (31.6) | 1 (7.1) | 6 (31.6) | 11 (8.6) | 7 (36.8) | 2 (14.3) |
| Aberrant Mot. | | | | | | | | |
| N (%) | 16 | 22 | 6 (37.5) | 13 (59.1) | 6 (37.5) | 6 (27.3) | 4 (25.0) | 3 (13.6) |
| Mean | | | | | | | | |
| N (%) | 14 | 13 | 3 (21.4) | 4 (30.8) | 5 (35.7) | 5 (38.5) | 6 (42.9) | 4 (30.8) |

[1] n=number of caregivers whose spouse (patient) exhibited the symptom; [2] distress rates (%) per diagnostic group when the patient exhibits the symptom

## DISCUSSION

Although many studies have investigated the behavioral changes in FTD, few have investigated these behavioral problems in relation to caregiver distress [10-15]. We found that the behavioral symptom profile was different in patients with FTD and AD, and that differences existed between both diagnostic groups in the level of caregiver distress related to these symptoms.

Patients with FTD had significantly higher levels of agitation, apathy, disinhibition and aberrant motor behavior than patients with AD when the level of functional impairment was taken into account. The observed differences are largely consistent with the results of Levy and colleagues (82) who also used the NPI to assess behavioral symptoms. However, Levy and colleagues found that FTD patients exhibited more euphoria, but they found no differences in agitation. The difference in findings between the two studies may be due to differences in dementia severity between groups and different operationalizations of dementia severity. We did find higher levels of euphoria in FTD patients when functional impairment was not taken into account.

To our knowledge, this study is one of the first to compare distress related to patient behavioral problems experienced by caregivers of patients with FTD or AD. In one earlier study of Mourik and colleagues (84) caregiver distress related to problem behavior was examined but not compared to another diagnostic group. The most distressing symptoms in the total FTD group in this study were apathy and disinhibition. Moreover, although not many patients were depressed (25%), their caregivers experienced patient depression as being highly distressing. Aberrant motor behavior, which affected 81% of the FTD patients, was most often rated as not or slightly distressing. These findings support previous findings that some problem behaviors have a greater impact on caregivers than others [27-29], which underscores the importance of focusing on specific behavioral changes when studying and trying to ameliorate caregiver distress.

Comparison of the caregivers of FTD patients and the caregivers of AD patients revealed that caregivers of FTD patients had higher mean distress scores than caregivers of AD patients. Disinhibition and apathy in particular had higher mean distress scores in the FTD group compared to the AD group. But again in the AD group caregivers most frequently reported apathy as highly distressing when the symptom was present, while in the FTD group caregivers most frequently reported apathy as medium distressing when present. Therefore, higher mean distress levels in FTD caregivers are probably caused by a higher frequency or severity of behavioral problems in FTD patients. The caregivers of FTD patients also reported higher levels of general caregiver distress than did the caregivers of AD patients, even after controlling for dementia severity and caregiver age. In addition, caregivers of FTD patients felt less satisfied with the patient and themselves as caregiver. However, AD caregivers experienced more consequences for their personal life (a lack of privacy and a heavy responsibility). An explanation for this finding may be that AD patients need more continuous supervision than FTD patients because of their cognitive impairment (e.g. memory problems and disorientation), which requires greater interference of the caregiver and consequently less time for themselves compared to FTD caregivers.

In this study we did not examine other determinants of caregiver distress than behavior in the patient. Therefore we can only speculate about possible reasons explaining higher general levels of distress in FTD caregivers. An explanation may be that early-onset dementia is often not correctly diagnosed at an early stage, which may result in frustration for patient and caregiver, and may delay adequate care. In addition, early-onset dementia gives additional problems because it appears when most people are enjoying an active and independent lifestyle. Behavioral changes are a more salient characteristic of FTD than of AD (87) and are a well-known risk factor for caregiver stress [28-30]. Problems related to disinhibition are probably socially embarrassing to caregivers and hamper pleasant social interactions, causing the caregiver greater distress (88). Apathy occurred frequently in FTD and was also stressful to many FTD caregivers, as it was in other studies of patients with dementia (51). Apathy diminished the interaction between patient and caregiver, harming their relationship (47). Finally, differences in the level of stress may have been influenced by differences in availability of support between the groups. Support services are mostly established for the geriatric population and therefore the older AD patients and caregivers may have better access to these services than the younger FTD group. In addition, there may have been differences in family support, because FTD patients had probably younger children than AD patients.

The study has some potential limitations. First, the risk of circularity exists when selecting FTD patients on the basis of behavioral changes in order to compare the problem behaviors of patients with AD and FTD. We minimized this by diagnosing patients on the basis of neurological, neuropsychological and neuroimaging data and by selecting patients on the basis of well defined diagnostic criteria (47). Secondly, the issue of matching AD and FTD patients should be discussed. To compare specific aspects of behavior in FTD patients with AD patients, one must ensure the overall comparability of the two groups. However, differences in disease course and symptomatology between AD and FTD might render traditional measures of dementia severity invalid (84). Using the MMSE as a measure of dementia severity in this study is problematic because of the influence of lack of motivation or cooperation, perseveration and language problems on the test score of FTD patients (84). Likewise, disease duration was considered unsuitable because of differences in disease course between AD and FTD. Therefore, we used an alternative strategy by adjusting for functional impairment in the analysis. In an additional analysis we checked our results by controlling for cognitive functioning (MMSE). Thus, it is not likely that group differences in this study are due to differences in dementia severity. Thirdly, group comparisons were adjusted for caregiver age in addition to dementia severity as potential confounders of group differences in caregiver distress. However, the way in which a caregiver reacts to a patient's behavior is probably determined by several factors, for example caregiver coping styles, social support and quality of the relationship. Future studies into caregiver distress should explore the impact of these factors.

Our findings underscore the importance of distinguishing between diagnostic groups and specific domains of behavior when investigating caregiver reactions to problem behavior. Some behaviors occur more frequently in a specific diagnostic group, such as disinhibition or apathy in FTD patients, causing distress in the caregiver. Other behaviors are less frequent, but cause high levels of distress when they are present in the patient, such as depression in FTD patients. However, most caregiver training programs mainly target patient behavioral excesses and do not focus on apathy or depression. Our results suggest that specific intervention programmes should be developed and target problems related to disinhibition as well as apathy or depression in patients with FTD or AD in order to reduce caregiver distress.

# Part III

## *Zooming in on FTD caregiver burden*

# Chapter 6

## *Frontotemporal dementia (FTD) patients living at home and their spousal caregivers compared with institutionalised FTD patients and their spousal caregivers: Which characteristics are associated with in-home care?*

Riedijk SR, Duivenvoorden HJ, Van Oostrom IIH, Rosso S, Van Swieten JC, Niermeijer MF, Tibben A. Dementia 2009; 8: 61-77.

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# ABSTRACT

Background: Patients with frontotemporal dementia (FTD) need complete care in the final stages of the disease. Some informal caregivers continue the in-home care whereas others institutionalise. This study identifies differences between in-home FTD patients and their caregivers (FTDH) and institutionalised FTD patients (FTDN) and their caregivers.
Methods: Twelve in-home and 24 institutionalised FTD patients in the final stages of the disease, and their spousal caregivers were observed. Neuropsychiatric function disorders, dementia duration and severity, burden, mental and physical health, quality of the current and premorbid relationship and caregiver motivation were analysed.
Results: The majority of FTDH patients had dementia of shorter duration and showed residual independence. In FTDH patients, neuropsychiatric symptoms were more often present whereas apathy and disinhibition were more intense in FTDN patients. FTDH caregivers felt more emotionally burdened but had better mental health.
Caregiver motivations were similarly present in FTDH and FTDN caregivers, while the love-motivated caregivers had worse physical and mental health.
Conclusions: Our data suggest that all FTD caregivers could benefit from psychological support. Motivation for caregiving has intervention potential.

## INTRODUCTION

Frontotemporal Dementia (FTD) is the second most common type of presenile neurodegenerative dementia after Alzheimer's disease (AD) and has an estimated prevalence of 2.7 per 100.000 inhabitants in the Netherlands (6). The early clinical features of FTD include decline in interpersonal functioning, i.e., increasing disinhibition, impairment in regulation of personal conduct, emotional blunting and loss of insight. FTD patients progressively develop memory decline, disturbance of executive functions, loss of initiative, deficit of mental flexibility and organization, and aphasia (1).

In a previous study we identified a subgroup of FTD caregivers who felt most burdened and affected in their quality of life. These were caregivers of FTD patients who were institutionalised after relatively short dementia duration (89). The focus of the current paper is on the informal FTD caregiver, who, in the face of the most severe dementia levels, is still taking care of the patient at home. By comparing caregivers at home (FTDH) with caregivers of FTD patients in a nursing home (FTDN) we aimed to identify characteristics associated with sustained in-home care.

Pearlin's comprehensive model of caregiver stress (90) takes into account the level of cognitive impairment and behavioral dysfunction of the patient and the caregiver's personal and environmental resources and weaknesses in dealing with the caregiving task. Pearlin defines the level of dementia severity and behavioral problems of the patient as primary stressors. Primary stressors pose a challenge to the caregiver's intrapsychic well-being (e.g., feelings of incompetence, role captivity) and the caregiver needs to manage strains posed on roles he or she fulfils outside of the caregiving situation (e.g., occupation, relationships). The strains caused by primary stressors are defined in the model as secondary stressors. The stress outcome is a function of the interaction between primary and secondary stressors and may be mediated by the quality of a caregiver's social support network and coping repertoire. In the current study, Pearlin's model of caregiver stress was used as a theoretical framework to understand the interrelations between factors associated with in-home care.

Studies focusing on institutionalization in Alzheimer's disease have reported factors that are congruent with Pearlin's model of caregiver stress. Factors associated with institutionalization are inversely associated with sustained in-home care. Factors associated with institutionalization may be categorized into patient factors and caregiver factors. Dementia patients are institutionalised when they are more severely affected in their cognitive and daily functioning and when they are more behaviorally disturbed (primary stressors)(29, 91). Being less affected and more apt in daily functioning is therefore associated with living at home instead of in a nursing home. Caregivers are more likely to request institutionalization when they feel more heavily burdened (27-29) and when they are in poorer mental and physical health (secondary stressors)(91, 92). Caregivers who feel less burdened and who are in better mental and physical health therefore are more likely to provide in-home care. Caregiver satisfaction is associated with having (had) a better affectionate relationship with the care recipient

(93). Greater caregiver satisfaction and a good (previous) affectionate relationship between caregivers and care recipients are factors known to buffer against caregiver burden (94, 95) and are therefore expected to be associated with in-home care. Furthermore, the motives caregivers have to persist in caregiving (endurance) may have an important association with sustained in-home care.

The factors associated with sustained in-home care in Alzheimer's disease might not be fully comparable to factors associated with in-home care in FTD, because of the different disease characteristics of FTD (39-41). Therefore, the primary objective of this exploratory-psychological study was to identify patient and caregiver characteristics associated with sustained in-home caregiving for FTD patients. Based on the literature findings and Pearlin's stress model, we expected to find that FTDH patients displayed less behavioral symptoms and that FTDH caregivers felt less burdened and were in better mental and physical health. We furthermore expected FTDH caregivers to have (had) a better affectionate relationship with the patient.

The secondary objective of this study was to explore the motives behind caregiver endurance and its association with other caregiver characteristics.

In pursuing more specific knowledge on factors associated with sustained in-home care in FTD, health care professionals may be able to offer more adequate guidance and counseling to FTD caregivers in the ongoing process of caregiving.

## METHODS

### Participants

Neurological and psychiatric outpatient clinics, and psycho-geriatric nursing homes in the Netherlands were inquired annually about the presence of suspected FTD patients between January 1994 and June 2002. The clinical diagnosis was established according to the Lund-Manchester criteria (80) and supported by neuroimaging and neuropsychological assessments (96). Between December 2001 and June 2002 FTD patients and their primary informal caregivers in their home environment as well as in nursing homes were recruited for participation in our study on caregiver burden.

The Medical Ethics Committee of the Erasmus Medical Center approved of the study. At the time of the study 111 patients were eligible; 24 of their primary caregivers could not be contacted because of death or departure from the country. Of the remaining 87 caregivers, 17 refused participation, four were ill, and three were non-responders to our letter. A total of 63 FTD patients and their primary informal caregivers were included in the study, representing a response rate of 72.4%. All caregivers consented and their consent was also obtained for the investigation of their patients' characteristics.

Below severity score 6 on the General Deterioration Scale (GDS) (49) all caregivers were providing in-home care. We excluded these caregivers and their patients from the analyses because apparently beneath score 6 there is no question of not being able to provide in-home care. Finally, of the remaining 46 patients we excluded 12 caregivers who did not (used to) live in the patient's home. The current sample thus comprised 36 patients and their primary spousal caregivers of whom 12 were providing in-home care. The 24 caregivers whose patients were institutionalised still had some caregiving role in the nursing home for example some helped to feed the patient and others still cared for the patient at home for a few hours per week.

## Measures

### Patient characteristics

Socio-demographic characteristics included gender, age, patient's domicile (home or nursing home) and duration of dementia in months. Severity of dementia was measured by the Global Deterioration Scale (GDS) (49). Scores range from 1 'not at all' to 7 'highest level of severity' and correspond to the 7 stages of dementia. Score 6 indicates that patients are mostly unaware of their daily life, surroundings and time of year. Patients have some superficial knowledge of personal history, and are able to distinguish familiar from unfamiliar persons. Patients need help with ADL and may be incontinent. Furthermore, patients may be compulsive, anxious and delusional and day and night rhythm is often disrupted. Score 7 indicates that patients have lost all verbal abilities, continence and psychomotor abilities. Patients are unable to eat independently. Neuropsychiatric disturbance was assessed using the Neuropsychiatric Inventory (NPI) (50), which measures 10 domains of neuropsychiatric disturbance: delusions, hallucinations, agitation, depression, anxiety, euphoria, apathy, disinhibition, irritability, and aberrant motor behavior, and adds up to a total score for neuropsychiatric disturbance. To minimize administration time the screening strategy of exploring in-depth only behavioral domains with positive responses was applied. The Dutch version of the NPI was proven to be reliable and valid (51).

### Caregiver characteristics

Socio-demographic characteristics included gender, age, educational level and occupation. Caregiver burden was measured by the NPI (50) subscale of emotional burden due to neuropsychiatric disturbance of the patient and burden of caregiving in general was measured by rating 'How is taking care of the patient burdening you?' on a visual analogue scale ranging from 0 'not at all' to 10 'extremely'. Caregivers were asked to indicate on a dichotomous scale (yes/no) whether they were currently suffering from problems with their physical and mental health. The quality of the relationship before the patient became demented (premorbid) and of the current relationship with the patient were measured by two visual analogue scales ranging from 0 'extremely poor' to 10 'extremely well'.

Furthermore, the motivation caregivers had to provide care was assessed in an interview using an open-ended question; 'What drives you to take care of the patient? Are there things you do or thoughts you have that keep you going?' The answers to this question were tape-recorded and transcribed verbatim. Two psychologists (SR and AT) derived a posteriori from the interview four categories of caregiver motivation. The four derived categories were: 1. 'Marital loyalty': caregivers provided care because they vowed to stay with their spouse in sickness and in health; 2. 'Virtue': caregivers cared for their patient because it was in their nature to do so; 3. 'Love': caregivers provided care out of the love they felt for their spouse; and 4. 'Distraction': by seeking distraction caregivers kept motivated to provide care. Herewith three psychologists (SR, AT and IO) independently judged each interview. Discordant judgements were assigned to the most frequently scored category. Of the answers, all three psychologists judged 72.1% identically and 27.9% was judged identically by two out of three. The observed inter-judge agreement varied between 91% and 93%. It was concluded that the inter-judge internal consistency was satisfactory.

### Statistical analyses

SPSS 11.0 statistical package was used for data analyses. Chi square and Fisher's exact testing were performed to detect differences in categorical data; independent t-testing and ANOVAs were conducted for continuous data. Due to our selection the GDS had a skewed distribution. Therefore, ANOVA and logistic regression were used for analysis, which are robust against violation of the assumption of normality. The magnitude of differences between variables was estimated with Cohen's d (97). Cohen's d is the expression of the effect size in terms of standard deviations. Variables being significant in univariate testing were entered in logistic regression (method= enter) analyses with patient domicile as the criterion variable (at home coded 0 and in a nursing home coded 1). The hosmer-lemeshow test was used as fit-statistic to select the final model. Given the alpha value for significance of 0.05 (2-sided), the given number of patients in this study (12 H and 24 NH), and the clinically important expected difference of 0.95 in terms of Cohen's d, the yielded statistical power in our study is 0.80. In case of multiple testing, the Bonferroni correction was applied.

## RESULTS

### Patient characteristics

Table 1 displays socio-demographic characteristics of the patients and their caregivers. A total of 12 FTD patients living at home (FTDH) and 24 FTD patients living in a nursing home (FTDN) were included. Four FTDH and 8 FTDN patients were male. FTDH and FTDN patients did not differ significantly in age (range 44-79).

Table 2 displays characteristics of the patients and their caregivers. Average duration of dementia was significantly (P=0.007) longer in FTDN patients than in FTDH patients (mean

**Table 1.** Patient and caregiver socio-demographic characteristics stratified by domicile

| | FTDH (N=12) | FTDN (N=24) | Difference between groups P | Cohen's d |
|---|---|---|---|---|
| Patients | | | | |
| Male n (%) | 4 (33.3) | 8 (33.3) | 0.65 | Na |
| Mean age (SD) | 63.8 (8.1) | 62.1 (8.8) | 0.58 | 0.20 |
| Caregivers | | | | |
| Male n (%) | 8 (66.7) | 16 (66.7) | 0.64 | Na |
| Mean age (SD) | 64.5 (5.9) | 61.6 (10.7) | 0.33 | 0.32 |
| Educational level | | | 0.23 | Na |
| Low n (%) | 3 (25) | 9 (37.5) | | |
| Medium n (%) | 3 (25) | 10 (41.7) | | |
| High n (%) | 5 (41.6) | 5 (20.8) | | |
| Occupation: | | | 0.26 | Na |
| At home (%) | 2 (16.7) | 5 (20.8) | | |
| Paid job (%) | 3 (25.0) | 12 (50.0) | | |
| Volunteer (%) | 0 | 1 (4.2) | | |
| Unemployed (%) | 1 (8.3) | 0 (0.0) | | |
| Retired (%) | 6 (50.0) | 6 (25.0) | | |

**Table 2.** Patient and caregiver characteristics stratified by domicile

| | FTDH (N=12) | FTDN (N=24) | Difference between groups P | Cohen's d |
|---|---|---|---|---|
| Patients | | | | |
| Mean duration of dementia yrs (SD) | 5.1 (1.8) | 7.7 (2.9) | **0.007** | **-1.05** |
| Mean dementia severity (SD) | 6.3 (0.5) | 6.6 (0.5) | 0.06 | -0.41 |
| Total NPI symptoms (SD) | 26.3 (11.1) | 23.3 (12.6) | 0.49 | 0.25 |
| Caregivers | | | | |
| Total NPI emotional burden (SD) | 12.3 (6.9) | 6.7 (5.6) | **0.01** | **0.95** |
| Mean general burden (SD) | 5.6 (2.1) | 6.4 (2.7) | 0.43 | -0.33 |
| n physical health problems (%) | 3 (27) | 13 (54) | 0.15 | -0.55 |
| n mental health problems (%) | 0 (0) | 7 (30) | 0.04 | 1.09 |
| Mean quality of current relationship (SD) | 5.5 (2.7) | 5.4 (3.4) | 0.97 | 0.03 |
| Quality of previous relationship (SD) | 8.2 (2.2) | 8.5 (1.1) | 0.58 | -0.17 |
| Caregiver motivation: | | | 0.66 | Na |
| n Marital loyalty (%) | 6 (50) | 8 (33) | | |
| n Virtue (%) | 1 (8) | 1 (4) | | |
| n Love (%) | 3 (25) | 9 (37) | | |
| n Distraction (%) | 1 (8) | 4 (17) | | |

Legends to table 1 and 2

Figures in bold indicate statistically significant differences.

FTDH: Frontotemporal dementia patients living at home

FTDN: Frontotemporal dementia patients living in a nursing home

Na= not applicable

SD = standard deviation

92.8; SD 34.2 range 50-170 months, and mean 61.6; SD 21.6 range 27-94 months respectively; Cohen's d=-1.05). The difference in dementia scores was marginally significant (see Table 2); dementia severity score 7 was present in 30% of FTDH and 58% of FTDN patients.

Delusions, depression, anxiety, disinhibition and irritability were significantly more often present in FTDH patients than FTDN patients and marginal significance levels were reached for agitation and aberrant motor behavior (see Table 3). The presence of hallucinations, euphoria and apathy did not differ significantly. Regarding the intensity of neuropsychiatric symptoms, FTDN patients displayed significantly higher levels of apathy (P=0.003; mean 10.7; SD 2.3 and mean 6.6; SD 3.8; Cohen's d=-1.41) and disinhibition (P=0.02; mean 9.0; SD 3.5 and mean 4.6; SD 3.6; Cohen's d=-1.23) than FTDH patients. On average FTDH and FTDN patients did not differ in the total load of displayed neuropsychiatric disturbance; FTDH patients had more symptoms of lesser intensity and FTDN patients had fewer symptoms of greater intensity.

**Table 3.** Neuropsychiatric disturbance 12 FTD patients living at home (FTDH) and 24 institutionalised FTD patients (FTDN)

| | Del | Hal | Agi | Dep | Anx | Eup | Apa | Dis | Irr | Abb |
|---|---|---|---|---|---|---|---|---|---|---|
| Symptoms FTDH | | | | | | | | | | |
| N present % | 4 (33.3) | 2 (16.7) | 7 (58.3) | 3 (25.0) | 6 (50) | 5 (41.7) | 11 (91.7) | 9 (75.0) | 6 (50) | 12 (100) |
| Mean | 3.0 | 2.5 | 4.4 | 3.7 | 3.7 | 4.4 | 6.6 | 4.6 | 5.0 | 5.8 |
| SD | 2.4 | 0.7 | 3.0 | 2.1 | 2.3 | 4.4 | 3.4 | 3.6 | 2.8 | 2.8 |
| Symptoms FTDN | | | | | | | | | | |
| N present % | 1 (0.0) | 0 (0) | 5 (20.8) | 0 (0) | 2 (8.3) | 6 (25.0) | 24 (100) | 8 (33.3) | 3 (12.5) | 17 (70.8) |
| Mean | 9.0 | n.a. | 7.0 | n.a. | 3.5 | 6.2 | 10.7 | 9.0 | 5.0 | 7.6 |
| SD | n.a. | n.a. | 4.6 | n.a. | 0.7 | 3.4 | 2.3 | 3.5 | 2.6 | 2.4 |
| Difference presence FTDH vs. FTDN | **0.03** | 0.11 | 0.06 | **0.03** | **0.01** | 0.45 | 0.33 | **0.03** | **0.04** | 0.07 |
| Difference mean FTDH vs. FTDN | 0.12 | n.a. | 0.31 | n.a. | 0.92 | 0.47 | **0.003** | **0.02** | 1.00 | 0.07 |
| Cohen's d | n.a. | n.a. | -0.67 | n.a. | 0.12 | -0.46 | **-1.41** | **-1.23** | 0.00 | -0.69 |

Legends to table 3

Figures in bold indicate statistically significant differences.

Subscales of the NeuroPsychiatric Inventory (NPI)

Del: Delusisions; Hal: Halucinations; Agi: Agitation; Dep: Depression; Anx: Anxiety; Eup: Euphoria; Apa: Apathy; Dis: Disinhibition; Irr: Irritability; Abb: Abberrant motor behavior

Na= not applicable

SD = standard deviation

## Caregiver characteristics

Table 1 shows that eight FTDH and sixteen FTDN caregivers were male. FTDH and FTDN caregivers did not differ significantly in age, educational level or occupation. FTDH caregivers felt significantly more burdened emotionally by patients' neuropsychiatric symptoms than FTDN caregivers (P=0.01; mean 12.3; SD 6.9, and mean 6.7; SD 5.6 respectively; Cohen's d=0.95). FTDH and FTDN caregivers did not differ in the general burden they experienced from caregiving. Table 2 shows that there were no significant differences in physical health problems. FTDH caregivers reported marginally significant fewer mental health problems than FTDN caregivers (P=0.04; mean 0.0; SD 0.0; and mean 0.3; SD 0.5 respectively; Cohen's d=1.09). FTDH and FTDN caregivers had similar perceptions of the quality of the current relationship with the patient and when the patient was unaffected.

Interview data on motivations for caregiving were available of 33 caregivers. Motives were marital loyalty (42.4%), love (36.4%), distraction (15.2%) or virtue (6.0%). There were no significant differences in motives between FTDH and FTDN caregivers.

As visualized in Figure 1, out of fourteen caregivers motivated by marital loyalty, two experienced problems with their physical health whereas nine out of twelve caregivers motivated by love experienced problems in their physical health. Of one caregiver data on problems with physical health were missing.

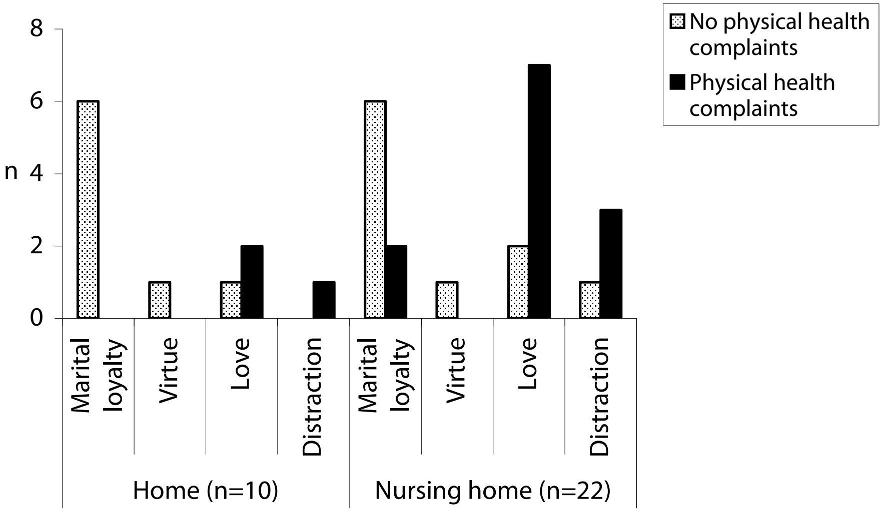

**Figure 1.** Physical health problems stratified by domicile and care motivation
N= number of persons with specified care motivation

Figure 2 demonstrates that of the thirteen caregivers motivated by marital loyalty, none experienced problems with their mental health whereas five out of twelve caregivers motivated by love did experience problems with their mental health.

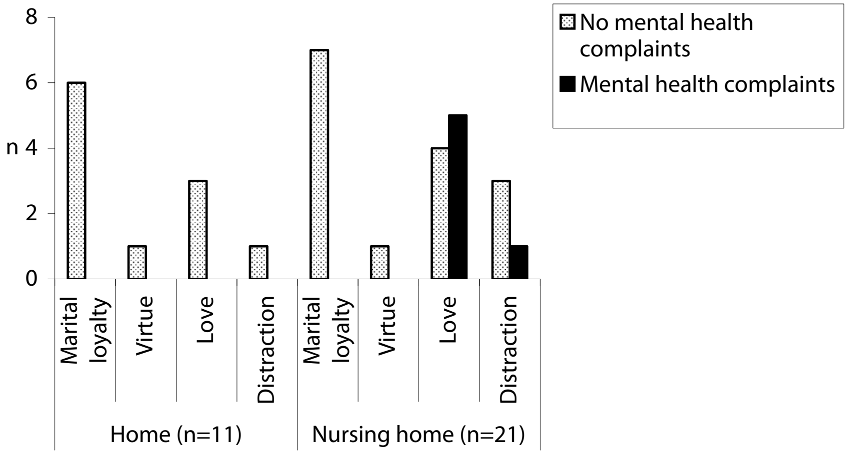

**Figure 2.** Mental health problems stratified by domicile and care motivation
N= number of persons with specified care motivation

In univariate logistic regression analyses apathy (P=0.003; OR 1.58; 95%CI 1.17-2.13), dementia duration (P=0.020; OR 1.05; 95%CI 1.00-1.09) and emotional burden of neuropsychiatric symptoms (P=0.026; OR 0.86; 95%CI 0.76-0.98) were significantly associated with patient domicile. This implies that lower levels of apathy, shorter dementia duration (primary stressors) and higher levels of emotional burden (secondary stressor) were associated with a greater likelihood of the patient residing at home.

## DISCUSSION

In this exploratory-psychological study we investigated a homogeneous subset of spousal caregivers of FTD patients who, in the face of the highest levels of dementia severity, were able to care for their patients at home (FTDH). We compared them to caregivers whose patients were also severely affected but living in a nursing home (FTDN). Guided by Pearlin's model of caregiver stress (90), our primary objective was to identify which patient and caregiver characteristics were associated with in-home care. Our secondary objective was to explore the motivation behind caregiving and its associations with other caregiver characteristics.

Pearlin's model of caregiver stress and the literature report patient factors (primary stressors) to be associated with in-home care (27-29, 91-95, 98-106). In the current study the duration of dementia in FTDH patients was significantly shorter (mean 5 yrs) than in FTDN patients (mean 8 yrs). Furthermore, although both groups of patients had severity scores at the highest levels, the FTDH patients as compared to FTDN patients had some remaining awareness of themselves and their caregiver(s) and were still able to do some tasks independently. FTDH patients furthermore displayed more neuropsychiatric symptoms than FTDN patients. In contrast, the majority of FTDN patients were completely dependent and more apathetic. In disagreement with our hypothesis, FTDH patients did not display less neuropsychiatric symptoms than FTDN patients. This is perhaps due to the fact that the FTDN patients were too severely demented to display neuropsychiatric disturbance. The differences in duration, dementia severity and neuropsychiatric disturbance between FTDH and FTDN patients were congruent with the natural development of FTD (1).

Caregivers rather care for a dementia patient with more neuropsychiatric symptoms than for a dementia patient who is mainly apathetic (38). Managing behavior problems may somehow be more feasible than dealing with the absence of behavior. Since the FTDH group contained more patients with severity score 6 as opposed to 7, this difference in progress of dementia might in part explain why caregivers were still able to care for their patients at home. However, due to the limitations of the cross-sectional design of our study, it cannot be excluded that patients became more apathetic after they were institutionalised.

Based on Pearlin's model of caregiver stress (90) and the literature (27-29, 91-95, 98-106) we formulated the following hypotheses concerning caregivers: FTDH caregivers feel less burdened and are in better mental and physical health, and FTDH caregivers have (had) a better affectionate relationship with the patient than FTDN caregivers. In contrast with our first hypothesis, FTDH caregivers did not feel less burdened than FTDN caregivers. As opposed to our second hypothesis, FTDH caregivers had comparable levels of problems with their physical health as FTDN caregivers. Furthermore, in contrast with our third hypothesis we found no differences in the quality of either the previous or the current relationship with the patients between FTDH and FTDN caregivers.

However, we did some noticeable observations. FTDH caregivers experienced more emotional burden caused by neuropsychiatric disturbance of the patient. FTDH caregivers had to manage more neuropsychiatric symptoms whereas FTDN patients were extremely apathetic, which may explain this difference. With respect to the second hypothesis we found that FTDN caregivers had significantly more problems with their mental health than FTDH caregivers. It may be that FTDN caregivers were more worn out psychologically as a result of having taken care of the patient for significantly longer than FTDH caregivers.

The higher emotional burden in FTDH caregivers and the decreased mental health in FTDN caregivers might underscore our clinical experience that caring for an FTDH patient is gradually wearing out the caregiver. The emotional burden of caring for an FTD patient eventually may result in mental health problems, which are not timely diagnosed. Another speculation is that the lower mental health indicates that FTDN caregivers experience a lack of relief after institutionalization of the patient (107, 108). After institutionalization FTDN caregivers have time to realize what happened to them and how this has affected them emotionally. Also, a feeling of failure might add to FTDN caregivers' feelings of continuous burden and associated mental health problems. In a previous study we found that caregivers of FTD patients institutionalised after relatively short dementia duration felt most burdened and were consequently most affected in their quality of life. It would now seem that not merely caregivers of relatively quickly institutionalised patients are in need of support, but all FTD caregivers might benefit from psychological support, irrespective of patient domicile.

Given the body of literature investigating dementia caregivers, surprisingly little attention has been paid to the motivation caregivers have to provide such intensive and consuming care. We sought to find out how FTD caregivers motivated themselves to give care. We found that the majority of caregivers were motivated to give care because they had vowed to stay with their partner in sickness and in health (Marital duty). A sense of obligation seemed to underlie this type of motivation. Love-motivated caregivers stated that the love they felt for their partner motivated them to give care. Other caregivers felt motivated to give care because it was in their nature to do so (Virtue) and a minority only mustered motivation by seeking distraction. According to attachment theory, caregiving behavior is driven by a behavioral control system that is activated by attachment behavior of the care recipient (109). As an extension to attachment theory it has been proposed that the motivational force behind caregiving is caring (110). Caring in this regard is described as 'an enduring dyadic emotion that serves as an autonomous motivation to see that the needs of a specific partner are met'. Only the motivational type Love was in line with this view on caregiving. It may be that other processes than caring motivate people to give care to FTD patients. On the other hand it may be that the emotion of caring is implicit to the extent that caregivers are unaware of this being what motivated them and that an interview was not the most adequate research tool to assess caregiver motivation. More in-depth exploration and research are needed to understand the motivational forces underlying caregiving and to contribute to theory building.

Caregiver motivation had no relation to providing in-home care or not. We did observe however, that the more rational, emotionally distant caregiver motivations (marital loyalty, virtue) were associated with low occurrences of physical and no mental health problems in the second phase of the care process (nursing home). These motivations may have the potential to protect caregivers from mental and physical health problems. In contrast, caregivers motivated out of love or who needed distraction may have felt emotionally closer to the patient and as a result experienced more mental and physical health problems. It would be interesting to study the intervention potential of caregiver motivation to help those caregivers who experience mental and physical health problems.

Our study has a few important limitations. The sample size of our study was small due to the low prevalence of FTD in our population. However, the statistical power of the analyses was satisfactory. Furthermore, the study was cross-sectional and therefore no inferences on causality could be made.

In conclusion, mainly patient characteristics are associated with in-home care in FTD. A greater presence of neuropsychiatric symptoms, lower levels of apathy, shorter dementia duration and some degree of independence were associated with in-home care. Furthermore, the lack of differences in caregiver characteristics suggest that all FTD caregivers, irrespective of patient domicile might benefit from psychological support. Finally, we found that certain types of caregiver motivation were associated with less mental and physical health problems. More research into caregiver motivation would therefore be justified.

# Chapter 7

## *Frontotemporal dementia: change of familial caregiver burden and partner relation in a Dutch cohort of 63 patients*

Riedijk SR, Duivenvoorden HJ, Rosso S, Van Swieten JC, Niermeijer MF, Tibben A. Dement Geriatr Cogn Disord 2008; 26:398-406

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## ABSTRACT

Background: The current study examined the change of caregiver burden, and the development of the quality of the partner relation in frontotemporal dementia (FTD).
Methods: During a two-year period deterioration, behavioral problems, caregiver burden, general psychopathology, quality of life, social support, coping strategies and relationship quality were inspected in 63 FTD caregiver-care recipient dyads.
Results: After two years patients reached maximum dementia severity with stable NPI levels. Contrary to intuition, caregiver burden decreased and psychological well-being remained stable. Coping style and social support changed unfavorably. Relationship closeness and getting along were preserved, whereas communication and sharing viewpoint on life were dramatically reduced.
Conclusions: FTD caregivers need support in coping with the increasingly hopeless situation of their patients. Future research methods into caregiver burden should address response shift as a means for psychological adjustment.

## INTRODUCTION

Frontotemporal Dementia (FTD) is the second most common type of presenile neurodegenerative dementia after Alzheimer's disease (AD) and its prevalence is estimated to be 2.7 per 100.000 inhabitants in the Netherlands (6). The early clinical features of FTD consist of frontal system -related behavioral problems such as disinhibition and executive dysfunction, impairment in regulation of personal conduct, loss of insight and emotional blunting. FTD patients progressively develop memory decline, loss of initiative and aphasia (1).

The care for patients with dementia before their institutionalization is known to represent a significant burden to the well-being and quality of life of family caregivers. According to Sorensen et al (25) burden encompasses the strain of caregiving on psychological, physical, spiritual, social and financial well-being. Across the literature on caregiver burden, varying factors have been found to be associated with caregiver burden and patient behavioral problems are consistently reported (63-67). Behavioral problems related to the frontal system seem to be particularly burdening (42, 43). The few studies focusing on the course of neuropsychiatric disturbance in FTD found an increase of these behavioral problems during the progression of FTD (111, 112), implying that as FTD severity progresses, caregiver burden in FTD might also increase as a function of behavioral disturbance. This study evaluates for the first time how caregiver burden in FTD unfolds over a period of two years.

In longitudinal and prospective studies on caregiver burden in other types of dementia (mostly Alzheimer's disease) it has been reported that caregivers generally show stable levels of depression and burden over time (113-116). Also, despite increasing severity of dementia and other functional impairment of the patient a reduction of depression is sometimes seen (114). Quality of life was also found to be stable. However, longitudinal analysis of caregiver burden in FTD with its frontal symptoms, might have a different impact on caregiver burden, but has not been studied to date. Our impression of caregiver burden from the clinic and from caregiver meetings is that this group of dementia caregivers feels particularly burdened, due to the frontal systems manifestation of FTD and also due to the age of onset, which is when most caregivers are supposed to be actively partaking in society, and still have to work to earn a living (as opposed to being retired). Therefore, the primary goal of the current study was to assess the change of caregiver burden in family caregivers of FTD patients over two years. In the current study Sorensen's definition of caregiver burden (25) was employed, more specifically we assessed the psychological and social domains of caregiver burden.

The onset of dementia ensues a significant role change within the relationship. The partner relationship gradually transforms from an equal relationship into a caregiver-care recipient relationship. A good relationship is known to buffer against caregiver burden (94, 95, 117). Given the potentially more burdening features of FTD (i.e., behavioral problems, lack of insight, emotional blunting), caregivers will need to preserve some quality aspects of the relationship. Some studies have demonstrated that certain facets of the relationship, such as closeness, may be preserved or even improved in couples who are faced with dementia (38, 103). Therefore, the secondary goal of our study was to assess the evolution of the quality of the caregiver-care recipient relationship during the progression of FTD. By focusing on these aspects of caregiver burden and relationship quality we aimed to attain a detailed impression on the needs of FTD caregivers during the progress of their task.

## METHODS

### Participants

Neurological and psychiatric outpatient clinics, and psycho-geriatric nursing homes in the Netherlands were inquired annually about the presence of suspected FTD patients between January 1994 and June 2002. The clinical diagnosis was established according to the Lund-Manchester criteria (80) and supported by neuroimaging and neuropsychological assessments (96). At the time of the study 111 patients fulfilled the criteria of FTD. Between December 2001 and June 2002 FTD patients and their primary family caregivers at home and in nursing homes were recruited for participation in our prospective study on caregiver burden.

The Medical Ethics Committee of the Erasmus Medical Center approved of the study. Of the 111 eligible patients; 24 of their primary caregivers could not be contacted because of death or departure from the country. Of the remaining 87 caregivers, 17 refused participation, four were ill, and three did not respond to our letter. All in all, a total of 63 FTD patients and their primary family caregivers could be included in the study, representing a response rate of 72.4%. All caregivers consented to participate and their consent was also obtained for the investigation of their patients' characteristics.

Patient and caregiver assessments were carried out at baseline and 24-months follow-up and consisted of administering a questionnaire and a structured interview. Between baseline and 24-months three semi-structured telephone interviews (6, 12 and 18 months after baseline) were conducted to assess caregiver characteristics. Trained psychologists carried out the semi-structured interviews. Table 1 presents an overview of which data were assembled at which time points.

At baseline, the NPI was filled out for all 63 patients. At 24-months, the NPI was filled out for 31 patients. Fourteen patients were deceased, eight could not be contacted to administrate the NPI at follow-up and ten were lost to follow-up for unknown reasons. Noticeably, patients dropping out of the study had significantly higher levels of behavioral problems at baseline than patients remaining in the study and, as a consequence, their caregivers felt emotionally more burdened. Furthermore, caregivers who dropped out rated the aspects of their premorbid relationship significantly more positively than caregivers remaining in the study.

**Table 1.** Overview of time intervals of data collection presented for each measure

| | Baseline | 6 | 12 | 18 | 24 months |
|---|---|---|---|---|---|
| **Patients** | | | | | |
| Domicile | X | X | X | X | X |
| GDS | X | | | | X |
| NPI | X | | | | X |
| **Caregivers** | | | | | |
| NPI | X | | | | X |
| Burden | X | X | X | X | X |
| Problems with physical health | X | | | | X |
| Problems with mental health | X | | | | X |
| Physical health on VAS | | X | X | X | |
| Mental health on VAS | | X | X | X | |
| SCL-90 | X | | | | X |
| SF-36 | X | | | | X |
| UCL | X | | | | X |
| SSL | X | | | | X |
| Quality relationship | X | | | | X |

## Measures

### Patient characteristics

Socio-demographic characteristics included gender, age, duration of dementia in months and patient's domicile (home or nursing home). Severity of dementia was measured by the Global Deterioration Scale (GDS) (49). Scores range from 1 'not at all' to 7 'highest level of severity' and correspond to the 7 stages of dementia. Behavioral problems were assessed using the Neuropsychiatric Inventory (NPI) (50), which measures 10 domains of neuropsychiatric disturbance with scores ranging from 1 'slightly' to 12 'extremely': delusions, hallucinations, agitation, depression, anxiety, euphoria, apathy, disinhibition, irritability, and aberrant motor behavior, and adds up to a total score for neuropsychiatric disturbance. To minimize administration time the screening strategy of exploring in-depth only behavioral problems with positive responses was applied. The Dutch version of the NPI was proven to be reliable and valid (51). All measures were administered at baseline and 24 months except for the NPI and GDS. If the patient was deceased during follow-up these were not administered at 24 months.

### Caregiver characteristics

Socio-demographic characteristics included gender, age, educational level and occupation. Caregiver burden due to neuropsychiatric disturbance of the patient was measured using the NPI (50). The caregiver was asked to rate the distress experienced in response to neuropsychiatric disturbance on a 6-point Likert scale ranging from 0 'not at all' to 5 'extremely' for each of the 10 domains. These ratings add up to a total distress score, with a maximum of 50. Burden of caregiving in general was measured by rating the question: 'How is taking care of the patient burdening you?' on a visual analogue scale ranging from 0 'not at all' to 10 'extremely'. Caregivers were also asked to rate this burden when the patient was already deceased. At times 1 and 2 caregivers were asked to indicate on a dichotomous scale (1 yes/0 no) whether they were currently suffering from problems with their physical and mental health. At 6, 12 and 18 months follow-up caregivers were asked to rate their physical and mental health on a visual analogue scale ranging from 0 'extremely poor' to 10 'extremely well' and on a dichotomous scale whether or not (1 yes/0 no) their physical and mental health were negatively influenced by the caregiving task.

The Symptom Checklist-90-Revised (SCL-90-R) (52) was used to measure general psychopathology during the preceding week. The SCL-90-R comprises eight dimensions of psychological symptoms: 'interpersonal sensitivity', 'depression', 'anxiety', 'hostility', 'agoraphobia', 'somatization', 'insufficiency of thoughts and actions' and 'sleeping disturbances', ranging from 0 (not at all) to 4 (extremely) which add up to a general psychopathology score. Internal consistencies were satisfactory with alphas ranging from 0.73 to 0.97.

The 36 items of the Short Form 36 health survey questionnaire (SF-36) measured health related quality of life (HQoL) (53) and add up to a Physical Component Summary (PCS) and a Mental Component Summary (MCS). Scores on each dimension range from 0 (worst possible health state) to 100 (best possible health state). The SF-36 has been tested and has satisfactory validity (54). PCS and MCS internal consistencies at baseline were 0.82 and 0.85, respectively.

The Utrecht Coping List (UCL) measures seven coping strategies: 'Seeking distraction' (8 items), 'Expressing emotions' (3 items), 'Seeking social support' (6 items), 'Avoiding' (8 items), 'Fostering reassuring thoughts' (5 items), 'Depressive reaction pattern' (7 items), and 'Active coping' (7 items) (55). Caregivers rated the 44 items on a four-point scale ranging from 1 'hardly ever use this strategy' to 4 'very often use this strategy'. Its validity has been established (56) and the internal consistencies in this study ranged from 0.61 to 0.88.

The social support list (SSL) has proven validity (57) and was used to measure the extent to which caregivers received social support (i.e., everyday emotional interactions, emotional support with respect to problems, instrumental interactions, confirmation, social companionship and informative support; 34 items) and experienced negative social interactions (7 items) on a scale ranging from 1 'seldom or never' tot 4 'very often'. Internal consistencies in the current study were 0.90 and 0.88, respectively.

At baseline the quality of the relationship before the patient became demented (premorbid) and of the current relationship with the patient and at 24-months the quality of the current relationship were measured on visual analogue scales ranging from 0 'extremely poor' to 10 'extremely well'. Four items of the University of Southern California Longitudinal Study of Three-Generation Families measures of positive affect (58) were used to rate on a four-point response option ranging from 0 'not at all' to 3 'very much' four domains of relationship quality: 'connectedness' (How close do you feel to the patient?), 'communication' (How is the communication between you and the patient; how well are you able to exchange ideas and talk about the things that keep you occupied?), 'viewpoints' (To what extent do you and the patient have the same viewpoint on life?) and 'getting along' (How well do you and the patient get along with each other?).

### Statistical analyses

In another study (118) we found important differences in patient variables associated with residence: the majority of FTD patients living at home (FTDH) had dementia of shorter duration and still showed some independence compared to FTD patients residing in a nursing home (FTDN). In FTDH patients, neuropsychiatric symptoms were more often present whereas apathy and disinhibition were more intense in FTDN patients. Therefore these variables are presented separately for FTDH and FTDN patients. Caregivers of FTDH and FTDN patients at baseline showed only marginal differences in the same study and therefore these results are not presented separately but the analyses of caregiver variables were adjusted for patient domicile. When an effect of domicile was found the differences were inspected.

The SPSS 11.0 statistical package was used to analyse data. Independent samples t-tests were performed to detect differences in NPI scores at baseline between patients residing at home, in a nursing home and who were deceased at 24-months. Repeated measures ANOVA were performed to inspect the course of patient variables. Paired samples t-tests exclude drop outs from the analyses and were inspected to assess differences between dementia severity, physical and mental health at times 1 and 2 and the impact of caregiving on their own mental and physical health at times 1 and 2. Due to the small sample size the differences between neuropsychiatric symptoms at times 1 and 2 were only tested for the total amount of symptoms. The correlation between dementia severity and neuropsychiatric symptoms at times 1 and 24-months was inspected. In multiple linear regression analyses the quality of the relationship at baseline was estimated cross-sectionally from the quality of the premorbid relationship, type of relationship to the patient, dementia duration, caregiver and patient gender and caregiver and patient age. SAS Proc Mixed (version 8.2) was used to explore the course of the caregiver variables (caregiver burden, psychological problems, coping strategies, social support, health related quality of life and quality of the relationship) over the two years follow-up. The method of estimation was random regression modeling for repeated measurements, with the time trend as fixed covariable and the error structure defined as unstructured. The analyses were adjusted for domicile, type of relationship to the patient, dementia duration, caregiver and patient gender and caregiver and patient age. All analyses were tested at the 0.05 significance level (two-sided) .

## RESULTS

### Patient characteristics

Ten out of the 29 FTD patients living at home at baseline were still living at home after two-year follow-up, 7 were institutionalized, 5 were deceased, and 7 were lost to follow-up. Twenty-two out of the 34 FTD patients living in a nursing home were still living there, 9 were deceased and 3 were lost to follow-up.

As displayed in Table 2, the majority of patients were male. At baseline, patients were on average 60.7 years old and had been demented for on average 6.7 years. The duration of dementia at baseline was significantly shorter ($P<0.05$) for patients who were still living at home at 24-months (mean 4.9; SD 1.8) than for patients who were admitted in a nursing home (mean 7.7; SD 2.9) or deceased (mean 8.7; SD 4.4) at 24-months.

**Table 2.** Patient and caregiver characteristics at baseline stratified by domicile

| | FTDH (N=29) | | FTDN (N=34) | | FTD Total (N=63) | |
|---|---|---|---|---|---|---|
| **Patients** | | | | | | |
| Male n (%) | 11 | (38) | 18 | (53) | 29 | (46) |
| Mean age (SD) | 60.0 | (8.6) | 61.2 | (10.5) | 60.7 | (9.6) |
| Mean duration of dementia (SD) | 59.2 | (23.9) | 98.4 | (42.6) | 80.8 | (40.1) |
| **Caregivers** | | | | | | |
| Male n (%) | 16 | (55) | 8 | (24) | 24 | (38) |
| Mean age (SD) | 57.1 | 10.7 | 57.1 | 12.5 | 57.1 | (11.6) |
| Educational level: | | | | | | |
| Low n (%) | 8 | (29) | 10 | (29) | 18 | (18) |
| Medium n (%) | 11 | (40) | 14 | (41) | 25 | (40) |
| High n (%) | 9 | (31) | 10 | (30) | 19 | (30) |
| Type of relationship to patient: | | | | | | |
| Spouse n (%) | 27 | (93) | 24 | (71) | 51 | (81) |
| Child n (%) | 2 | (7) | 10 | (29) | 9 | (14) |

Legends to table 2
Figures in bold indicate statistically significant differences.
FTDH: Frontotemporal dementia patients living at home
FTDN: Frontotemporal dementia patients living in a nursing home
SD = standard deviation

At baseline, two patients had dementia severity score three on the GDS rating scale, six severity score four, nine severity score five, 26 had severity score six and 20 had severity score seven. Mean dementia severity significantly ($P<0.001$) increased over the 2-year follow-up period from 5.7 (SD 1.2) to 6.5 (SD 0.7), more rapidly so in FTDH patients; 4.9 (SD 1.2) to 5.9 (SD 0.8; $P<0.001$). The progress of dementia in FTDN patients approached the maximal level on the severity scale of 6.6 (SD 0.5) to 6.9 (SD 0.2; $P<0.01$). At baseline the dementia severity was significantly lower (P<0.01) for patients who lived at home during the follow-up (mean 4.6; SD 1.5) than for patients who lived in a nursing home (mean 6.0; SD 0.9) or were deceased (mean 6.2; SD 1.0) during the follow-up.

The total score of neuropsychiatric symptoms showed a non-significant decrease from 25.1 (SD 13.5) to 20.4 (SD 7.7). Dementia severity and neuropsychiatric disturbance (the latter measured as the number of symptoms) at baseline showed no association (r=-0.07). At 24-months the association between dementia severity and neuropsychiatric disturbance was r=–0.65 (P<0.001). Figure 1 demonstrates a declining tendency in the frequency of neuropsychiatric symptoms as measured by the NPI at times 1 and 2.

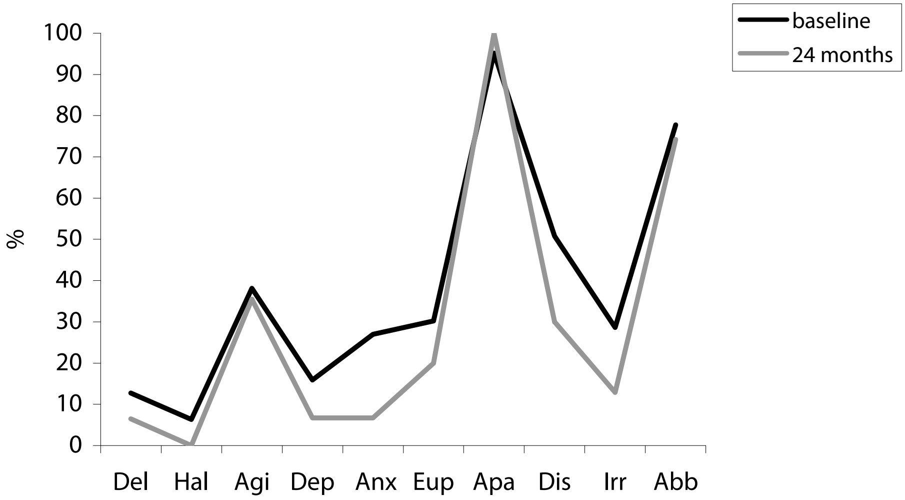

**Figure 1.** Presence of neuropsychiatric symptoms from time 1 to time 2 in percentage of patients with these neuropsychiatric symptoms compared to the total group.

Legends to figure 1

Subscales of the NeuroPsychiatric Inventory (NPI)

Del: Delusisions; Hal: Halucinations; Agi: Agitation; Dep: Depression; Anx: Anxiety; Eup: Euphoria; Apa: Apathy; Dis: Disinhibition; Irr: Irritability; Abb: Abberrant motor behavior

T-tests for independent observations demonstrated that at baseline the NPI total score was significantly lower (P<0.05) for patients who were still living at home at 24-months (mean 12.7; SD 4.6) than for patients who were in a nursing home (mean 24.5; SD 13.0) or deceased (mean 27.5; SD 14.5) at 24-months.

## Caregiver characteristics

As displayed in Table 2, 38% of caregivers were female. At baseline caregivers were on average 57.1 years old (range 32-77 yrs) and 18% had completed low, 40% medium and 30%

higher-level education, of the remaining 12% the educational level was unknown. A total of 81% were spouses of the patients and 14% were children of the patients.

The emotional burden caused by neuropsychiatric symptoms (NPI) decreased significantly ($P<0.01$) from baseline (mean=9.4; SD 6.8) to 24-months (mean=6.4; SD 4.9).

The overall caregiver burden for all caregivers decreased significantly ($P<0.01$) during the two years (baseline mean=5.6; SD 2.6 and 24-months mean=4.2; SD 2.8). There was a significant effect for domicile ($P<0.05$). Figure 2 demonstrates the average levels of general caregiver burden as experienced by FTDH caregivers, FTDN caregivers and caregivers of deceased FTD patients at baseline and 24-months. Although only the difference at 24-months between FTDH caregivers and caregivers of deceased patients was significant ($P<0.01$), Figure 2 clearly shows differing tendencies for caregiver burden. The FTDH caregivers tended to experience more burden over time whereas the FTDN caregivers and caregivers of deceased patients showed declining burden.

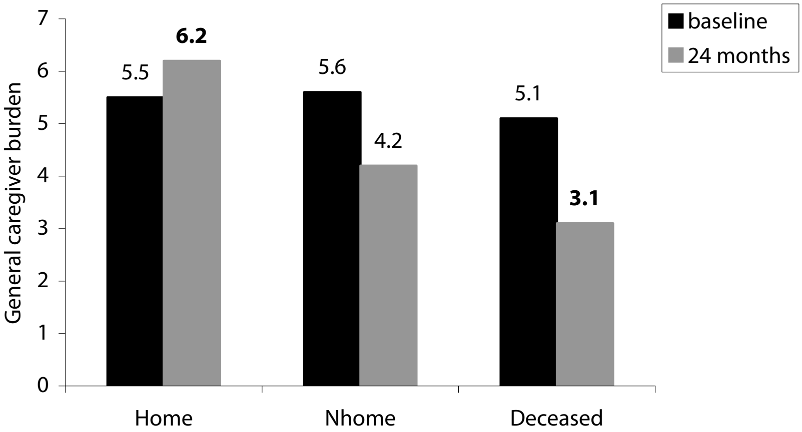

**Figure 2.** General caregiver burden differentiated by domicile, numbers in bold indicate significance.

Caregivers of patients living at home during the 2-year follow-up had an average burden of 5.8. Caregivers of patients who were admitted in a nursing home at some point during the follow-up had an average burden score of 6.4, whereas caregivers of patients living in a nursing home during the complete follow-up period had an average burden score of 5.4. Once patients were deceased their caregivers reported an average burden of 3.1.

Caregivers experienced significant ($P<0.05$) improvement in their physical health (baseline mean=6.9; SD 1.6, 24-months mean=7.3; SD 1.2) and mental health (baseline mean=6.7; SD 1.6; 24-months mean= 7.4; SD 1.2). At baseline 77% of caregivers reported a negative influence of caregiving on their mental health, as opposed to 56% at 24-months ($P<0.05$).

There was no significant change in psychological problems (SCL-90-R) during the follow-up. The sum score for the SCL-90-R was on average 125.5, which is above average compared to the general population but below average when compared to patients visiting a GP (119).
There was no significant change in the physical and mental components of health-related quality of life (SF-36).
With respect to coping strategies, all were used to a similar degree from baseline to 24-months except for depressive reaction, which increased significantly from baseline to 24-months (P<0.05). Emotional expression was used significantly more (P<0.001) by FTDN caregivers than FTDH caregivers.
Interactions with the environment did not change over time: social support and negative interactions caregivers were experienced similarly by caregivers, with more instrumental support than negative interactions (mean=73.4; SD 14.1 and mean=9.6; SD 3.2 at baseline). FTDN caregivers experienced more negative interactions than FTDH caregivers albeit marginally significant (P<0.07).

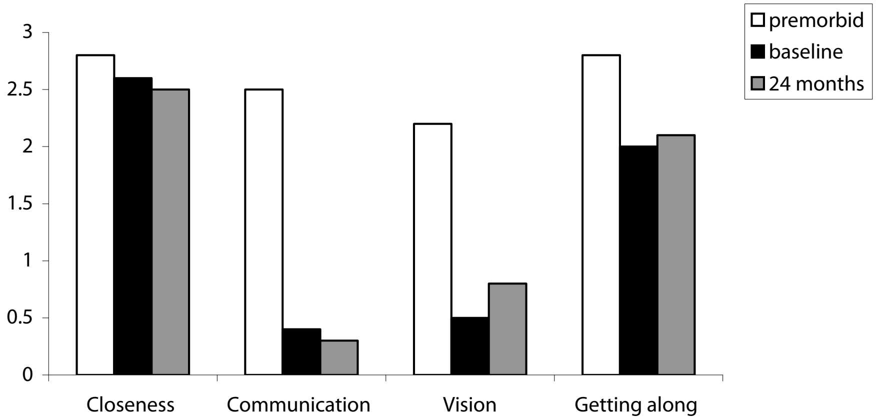

**Figure 3.** Course of the evaluation of the components of relationship quality rated retrospectively at time 1 and 2 and retrospectively for when the patient was unaffected.

Caregivers rated the premorbid relationship components of closeness (P<0.06), communication (P<0.001), viewpoint (P<0.001) and getting along (P<0.001) as better than baseline (see Figure 3). Between baseline and 24-months there were no significant changes in the aspects of the relationship. Caregivers rated the quality of the premorbid relationship as significantly (P<0.001) better than at baseline (mean=8.3; SD 1.6 and mean=5.6; SD 3.1 respectively). From baseline to 24-months the quality of the relationship was unchanged.

## DISCUSSION

In the current study we addressed the course of caregiver burden and relationship quality in family caregivers of frontotemporal dementia (FTD) patients over a period of two years. In terms of caregiver burden we specifically focused on the domains of psychological and social well-being.

Increasing neuropsychiatric disturbance and dementia severity are known to be associated with increased caregiver burden (120). During the two-year follow-up FTD severity progressed significantly. FTDH patients who still had knowledge of the most important facts of their lives and who did not require help with eating and toileting had progressed into unawareness of themselves and others and had become completely dependent with respect to ADL. FTDN patients approached the most severe level of dementia, meaning that from being completely dependent but still differentiating familiar from unfamiliar faces and being continent they progressed into incontinence, aphasia and loss of psychomotor skills. Despite the progress in dementia severity, the total load of neuropsychiatric symptoms patients presented remained stable. This contrasts the earlier described findings that neuropsychiatric disturbance increased as dementia worsened (111, 112). A possible explanation may be that the patients in our sample were no longer capable of presenting neuropsychiatric symptoms once they reached the highest measurable levels of dementia severity.

Furthermore, despite the increase in dementia severity both general caregiver burden and emotional burden caused by the patient’s neuropsychiatric symptoms decreased. There was, however, a moderating effect for patient residence; FTDH caregivers showed an increasing tendency in the overall caregiver burden they experienced which may be explained by the observation that FTDH patients showed the greatest deterioration in functional abilities. Other studies have also found stable levels of caregiver burden despite increased dementia severity and neuropsychiatric symptoms (114, 116). It may be that levels of burden decreased because levels of symptoms remained stable and caregivers learned to adapt to these symptoms during the observation period. Burden is known to peak around the process of nursing home admission (27, 29), but FTD caregivers rated their burden as a mere 6.4 on a scale of 0-10. Alternatively, this suggests that caregivers may have been reluctant to admit to caregiver burden because it would imply failure in the caregiving role. Caregivers of deceased patients reported the lowest burden although the burden did not disappear. Once the patient is deceased there is no more need for active coping. It is our clinical impression that these caregivers experience a burdening emptiness in which they are confronted with what they have been through during their caregiving years.

The literature on caregiver burden in Alzheimer’s disease (AD) reports stable levels of psychological well-being and quality of life over time [13-16]. However, given the more ‘frontal’ clinical features of FTD and our clinical impressions we did not assume that this would be similar in FTD. We found that psychological well-being in terms of psychological problems, health-related quality of life and received social support remained stable during the 2-year follow-up, which is congruent with the AD literature. In addition, both FTDH and FTDN caregivers reported improvement in their psychological and physical well-being and reported a decrease in the negative influence of their caregiving activities on psychological and physical well-being. Here we must mention that we observed a discrepancy between how caregivers present themselves face to face as opposed to through our questionnaires. Our impression from meetings organized especially for FTD caregivers, the clinic and our intuition is that FTD caregivers feel highly burdened and often state they are reaching their limits. However, as becomes clear from this study, we did not find maximum burden or deterioration in psychological well-being in our analyses. Therefore, instead of feeling encouraged by these results we must acknowledge the possibility that our results were masked by response shift; a means of psychological adjustment. Response shift implies that an individual adapts his internal standards, values and concept of quality of life to accommodate hardships in life such as disease (121). Thus, in the current study the caregivers may have adapted to increased burden and decreased psychological well-being by changing the internal standards used to rate these outcome variables, thereby ensuing stable or even slightly improved outcomes. The actual burden and adaptational process behind these scores then remain invisible to the researcher. The fact that studies into caregiver burden in other dementias report similar burden trends may also be suggestive of response shift. We therefore strongly recommended that future longitudinal research on caregiver burden incorporate research methods that take into account the response shift phenomenon. It is our expectation that the burden that caregivers do experience will then become apparent and also how caregivers adapt to this burden, thereby creating insights into how these caregivers may best be supported.

In the current study we furthermore inspected the evolution of coping to enhance our understanding of caregiver burden. All caregivers displayed an increased depressive reaction pattern during the study period. Another study also reports that depressive reactions were specifically noted in FTD spouses, when compared with other dementia spouses (122). The depressive reaction includes depressive feelings about the future, and feeling oneself both preoccupied but incapable to deal with the situation. In addition, we found an increased use of emotional expression, particularly in FTDN caregivers. FTDN caregivers furthermore experienced an increase in negative social interactions. Emotional expression concerns the venting of negative emotions such as frustration and anger, which may have damaged potentially supportive social relationships. It would thus seem that FTD caregivers would benefit from support in employing adequate coping strategies. We recommend that psychosocial workers who encounter FTD caregivers pay attention to how they cope with their negative emotions in a social context.

Finally, we explored the evolution of quality of the caregiver-care recipient relationship. FTD caregivers reported high quality of the premorbid relationship, which may have had a buffering effect on caregiver burden (117). Similar observations were reported in AD caregivers (38). Strikingly, the overall quality of the relationship, closeness and getting along were unaffected during the follow-up. Communication and sharing viewpoints on life with the patient, however, were dramatically reduced. For these latter aspects, active communication and input of the patient is required, whereas for the aspects of closeness and getting along caregivers may rely mostly on their own feelings of closeness and their unidirectional efforts to get along with the patient. The preservation of these aspects of the relationship, independently of the patient, might have nourished the caregiver's ability to provide such intense care. More research is needed to validate these exploratory findings on the possibly favorable impact on the caregiver of preserving some aspects of the partner relationship.

A few important limitations to our study need to be mentioned. The sample size of our study was small due to the low prevalence of FTD in our population, which is unfavorable for detecting significant differences in statistical analyses. Furthermore, a total of 24 out of 63 caregiving dyads dropped out of the study. Ten dropped out for unknown reasons and these dyads had higher scores on neuropsychiatric disturbance and subsequent burden, which is suggestive of selective dropout and therefore a threat to the generalizability of our results.

## Conclusions

In inspecting FTD caregivers over a two-year period we may conclude that contrary to our expectations caregiver burden, psychological well-being, health-related quality of life and relationship quality remained remarkably stable during the observation period. This might be indicative for caregiver adaptation, however future research should adopt methods that reveal response shift in order to validate these findings. Furthermore, FTD caregivers require support in dealing with the increasingly hopeless situation of the patient and in constructively coping with negative emotions.

# Chapter 8

## *Sense of Competence in a Dutch Sample of Informal Caregivers of Frontotemporal Dementia Patients*

Riedijk SR, Duivenvoorden HJ, Van Swieten JC, Niermeijer MF, Tibben A. Dement Geriatr Cogn Disord 2009, 27:337-343.

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## ABSTRACT

Background: The sense of competence (SC) of informal caregivers of frontotemporal dementia (FTD) patients is important for their task but was rarely assessed. Here, the relationship between caregiver burden and SC and the differential value of SC in understanding caregiver suffering were assessed.

Methods: At 24-months follow-up patient behavioral problems, dementia severity, caregiver SC, burden, psychological problems and quality of life were inspected cross-sectionally in 46 caregiver-care recipient dyads.

Results: SC was unrelated to dementia severity and patient behavioral problems. Principal components analysis of SC revealed three dimensions: Emotions, Attributions and Sacrifice. Sacrificing one's personal life to caregiving was associated with more psychological problems and worse physical and mental quality of life, as found in structural equations modeling.

Conclusions: Caregiver suffering comprised an unbalance between selfcare and caring for the FTD patient. FTD caregivers may benefit from psycho-education on selfcare and methods to create time for their personal needs.

## INTRODUCTION

Frontotemporal Dementia (FTD) is the second most common type of presenile neurodegenerative dementia after Alzheimer's disease (AD) and has an estimated prevalence of 2.7 per 100.000 inhabitants in the Netherlands (6). The early clinical features of FTD include decline in interpersonal functioning, i.e., increasing disinhibition, impairment in regulation of personal conduct, emotional blunting and loss of insight. FTD patients progressively develop memory decline, disturbance of executive functions, loss of initiative, deficit of mental flexibility and organization, and aphasia (1).

Caregiver burden encompasses the strain of caregiving on psychological, physical, spiritual, social and financial well-being (25). The family caregivers of FTD patients, studied in our group, experienced a higher burden (max 6,4 on a 10 point scale) than AD caregivers just before nursing home placement (123). However, such a peak burden is rather low since the period of nursing home placement is recognized as a stressful, crisis-like time for the caregiver (27, 29). It confronts him with the limitation of his abilities to care for the patient himself. Paradoxically, later on, caregiver burden tended to decrease while the severity of dementia increased. Other studies also report stable levels of caregiver burden despite increased dementia severity (114, 116). However, in our clinical experience FTD caregivers sometimes literally cry for help, because the caregiving situation is overwhelmingly demanding. It seems that the concept of caregiver burden does not capture sufficiently the intrusive and never ending nature of the (FTD) caregiver task.

In the dementia literature the concept of sense of competence (SC) is used to address a caregiver's feeling of being capable in effectively meeting caregiving challenges (59). Conceptually, SC and caregiver burden seem complementary and this is also what Meiland and colleagues found in their study (124). They used the sense of competence questionnaire (SCQ) (60) which is nearly identical to the well-known Zarit Burden Interview that measures caregiver burden. Both instruments were derived from the family crisis model (125) and the SCQ has 22 items in common with the Zarit Burden Interview (126). This explains why in the literature the terms sense of competence and burden are often used interchangeably. Clinically, however, SC and caregiver burden are clearly distinct concepts. Caregivers feel burdened predominantly by behavioral problems of the patient (63-67), whereas SC refers to the caregiver's ability and resources to deal with this burden. For instance, caregivers may feel incompetent when, irrespective of their efforts, the patient repeatedly refuses to signal the need for toileting, or persistently attempts to cook.

In the current study we first investigated to which degree FTD caregivers felt competent as caregivers. Second, we explored the relationship between SC and caregiver burden. Third, we aimed to assess how SC may contribute to our understanding of caregiver well-being in terms of health related quality of life (HQoL) and psychological problems.

# METHODS

## Participants

Neurological and psychiatric outpatient clinics, and psycho-geriatric nursing homes in the Netherlands were inquired annually about the presence of suspected FTD patients between January 1994 and June 2002. The clinical diagnosis was established according to the Lund-Manchester criteria (80) and supported by neuroimaging and neuropsychological assessments (96). Between December 2001 and June 2002 FTD patients and their primary family caregivers at home and in nursing homes were recruited for participation in our prospective study on caregiver burden.

The Medical Ethics Committee of the Erasmus Medical Center approved of the study. At the time of the study 111 patients were eligible; 24 of their primary caregivers could not be contacted because of death or departure from the country. Of the remaining 87 caregivers, 17 refused participation, four were ill, and three did not respond to our letter. All in all, a total of 63 FTD patients and their primary family caregivers could be included in the study, representing a response rate of 72.4%. All caregivers consented to participate and their signed consent was also obtained for the investigation of their patients' characteristics.

Patient and caregiver assessments were carried out at baseline and 24-months follow-up and consisted of administering a questionnaire and a structured interview. Here we present the cross-sectional data of the 24-months follow-up measurement.

A total of 46 caregivers were included at follow-up. Of the seventeen caregivers who were no longer included in the study at 24-months ten were lost to follow-up and seven could not be contacted. There were no significant differences between participants and dropouts at baseline with respect to patient and caregiver age, gender, patient dementia severity and duration, domicile, relationship between caregiver and patient and caregiver educational level.

## Measures

### Patient characteristics

Socio-demographic characteristics included gender, age, duration of dementia in months and patient's domicile (home or nursing home). Severity of dementia was measured by the Global Deterioration Scale (GDS) (49). Scores range from 1 "not at all" to 7 "highest level of severity" and correspond to the 7 stages of dementia. Behavioral problems were assessed using the Neuropsychiatric Inventory (NPI) (50), which measures 10 domains of neuropsychiatric disturbance with scores ranging from 1 'slightly' to 12 'extremely': delusions, hallucinations, agitation, depression, anxiety, euphoria, apathy, disinhibition, irritability, and aberrant motor behavior, and adds up to a total score for neuropsychiatric disturbance. To minimize administration time the screening strategy of exploring in-depth only behavioral problems with positive responses was applied. The Dutch version of the NPI was proven to be reliable and valid (51). The NPI and GDS were administered only for living patients.

### Caregiver characteristics

Socio-demographic characteristics included gender, age, relationship to the patient and educational level.

Sense of competence was measured with the Sense of Competence Questionnaire (SCQ), comprising 28 items rated on a 4-point response format ranging from 1 'very strongly agree' to 4 'very strongly disagree' and higher scores indicate greater sense of competence (59). The SCQ has been validated (60) and its internal consistency in the current study was 0.88 (Cronbach's alpha). The SCQ may be used as a one-dimensional scale for which sum scores have been calculated; ranging from 27-135 (59). The SCQ has also been interpreted by means of principal component analysis in varying populations, resolving in three underlying dimensions (60, 127). In the current study we have opted to apply both methods in order to gain as much information as possible from the SCQ. Furthermore, caregivers of deceased patients were also asked to fill out the SCQ using the point of reference of when the patient was still alive.

Caregiver burden was measured by the NPI (50) subscale of emotional burden due to neuropsychiatric disturbance of the patient (minimum 0 and maximum 19) and burden of caregiving in general was measured by rating the question: 'How is taking care of the patient burdening you?' on a visual analogue scale ranging from 0 'not at all' to 10 'extremely'. Caregivers were also asked to rate this burden when the patient was already deceased.

The Symptom Checklist-90-Revised (SCL-90-R) (52) was used to measure general psychopathology during the preceding week. In the current study only the general psychopathology score was used, which comprises the eight dimensions of psychological symptoms (interpersonal sensitivity, depression, anxiety, hostility, agoraphobia, somatization, insufficiency of thoughts and actions and sleeping disturbances). Internal consistency was good (alpha 0.97).

The 36 items of the Short Form 36 health survey questionnaire (SF-36) measured health related quality of life (HQoL) (53) and add up to a Physical Component Summary (PCS) and a Mental Component Summary (MCS). Scores on each dimension range from 0 (worst possible health state) to 100 (best possible health state). The SF-36 has been tested and has satisfactory validity (54). PCS and MCS internal consistencies were satisfactory: at baseline were 0.82 and 0.85, respectively, and 0.83 and 0.71 respectively.

## Statistical analyses

The SPSS 11.0 statistical package was used to analyse data. Frequencies were inspected to assess the overall score on the SCQ to answer to first research question. To identify the underlying structure of sense of competence principal components analysis with VARIMAX rotation was performed. In another study (118) we only found marginal differences between caregivers of patients living at home or in a nursing home. Therefore the results for caregivers of patients at home versus in a nursing home are not presented separately. We did not adjust the analyses of caregiver variables for patient domicile because domicile was strongly associated with dementia severity. Adjustment then would have resulted in multicollinearity. Pearson correlations were used to estimate the association between the SCQ dimensions on the one hand and dementia severity, caregiver burden, NPI emotional burden, HQoL, and the SCL-90 on the other hand. Only the significant correlations were entered into the multiple regression analyses with the components of SC as outcome variables. To that end, the method of Structural Equation Modeling (SEM) was performed. Two models were tested. The first model investigated the relationships between SC and burden, both general and NPI-specific to answer the second research question. The importance of SC in terms of common factors to be derived from structure analysis, were explored. The second model, explored the relationship between components of SC and psychological problems to answer the third research question. To provide for reliable evaluations of the model, we used the Comparative Fit Index (CFI>0.95), the Tucker-Lewis Index (TLI>0.95), the Root Mean Square Error of Approximation (RMSEA≈0.05) and the Standardised Root Mean Square Residual (SRMR<0.05). The standardised regression coefficients represent the relative importance of the relationships between the determinants and outcome variables, as well as between the different outcome variables. Also, the corresponding P-values are presented. The software program Mplus, version 5.0 was used (128).

## RESULTS

### Patient characteristics

As displayed in Table 1, a slight majority of patients was female and patients were on average 61 years old (range 43-76 yrs) at 24-months. Patients had been demented for eight years on average (range 4.1-16.2 yrs). A total of 46 caregivers were included at follow-up, 8 cared for their patient at home, of 24 caregivers the patient was placed in a nursing home and 13 of the patients were deceased and of one patient the domicile was unknown to us.

**Table 1.** Patient and caregiver characteristics

| Patients (n=46) | | |
|---|---|---|
| Male n (%) | 18 | (46) |
| Mean age (SD) | 61.4 | (8.0) |
| Mean duration of dementia yrs (SD) | 8.1 | (2.8) |
| Mean dementia severity (SD) | 6.5 | (0.7) |
| Domicile | | |
| Home n (%) | 8 | (17) |
| Nursing home n (%) | 24 | (53) |
| Deceased n (%) | 13 | (28) |
| Unknown n (%) | 1 | (2) |
| Caregivers (n=46) | | |
| Male n (%) | 20 | (43) |
| Mean age (SD) | 59.1 | (8.0) |
| Educational level | | |
| Low n (%) | 16 | (35) |
| Medium n (%) | 18 | (39) |
| High n (%) | 12 | (26) |
| Relationship to patient | | |
| Spouse n (%) | 36 | (78) |
| Child n (%) | 8 | (18) |
| Other (%) | 2 | (4) |

Dementia severity as measured by the GDS was on average 6.5 (SD 0.7; range 5-7). The total score of neuropsychiatric symptoms was on average 20.4 (SD 7.7) and had no association with the SCQ sum score. Table 1 displays the characteristics of those patients who were alive.

## Caregiver characteristics

Table 1 displays the socio-demographic characteristics of the caregivers. Forty-three percent of caregivers were male. Caregivers were on average 59.1 years old (range 32-79 yrs). Thirty-five percent of the caregivers had completed low, 39% medium and 26% higher-level education. A total of 78% were spouses of the patients and 18% were children of the patients, the remaining 4% had a different relationship to the patient. The caregiver characteristics in Table 1 concern all caregivers, including caregivers of deceased patients.

Table 2 displays the univariate scores on the SCQ; higher scores indicate greater sense of competence.

**Table 2.** Univariate scores and factor solution of Sense of Competence

| N=43 | Mean (SD) | Emotions | Attributions | Sacrifice |
|---|---|---|---|---|
| 1. I feel stressed between trying to give to my .... as well as to other family responsibilities, job etc. | 1.8 (0.9) | (0.35) | | |
| 2. It is not clear to me how much care I should give to my .... | 3.6 (0.7) | 0.50 | | |
| 3. I don't feel capable to care for my .... | 3.1 (0.9) | 0.69 | | |
| 4. I feel that I am not doing as much for my .... as I should do. | 3.6 (0.7) | | | 0.40 |
| 5. I feel angry about my interactions with my .... | 3.2 (0.9) | 0.55 | | |
| 6. I feel that in the past, I haven't done as much for my .... as I could have or should have. | 3.5 (0.9) | 0.56 | | |
| 7. I feel guilty about my interactions with my .... | 3.6 (0.8) | 0.48 | | |
| 8. I feel embarrassed over my .... behavior. | 3.2 (0.9) | 0.71 | | |
| 9. I feel nervous about my interactions with my .... | 2.7 (1.0) | 0.77 | | |
| 10. I feel depressed about my interactions with my .... | 2.6 (1.1) | 0.64 | | |
| 11. My .... appreciates my constant care less than the care others give him/her. | 2.7 (1.1) | 0.44 | | |
| 12. I feel that my .... does not benefit from what I do for him/her. | 3.2 (0.9) | 0.66 | | |
| 13. I feel that I cannot leave my…alone, s/he needs me continuously. | 3.3 (0.9) | | | (0.44) |
| 14. I worry all the time about my .... | 1.4 (0.7) | | | 0.60 |
| 15. I feel that my .... makes requests, which I perceive to be over and above what s/he needs | 3.0 (1.0) | | 0.67 | |
| 16. Because of my involvement with my .... I don't have enough time for myself. | 2.3 (1.0) | | | 0.82 |
| 17. I feel resentful about my interactions with my .... | 3.1 (1.1) | 0.58 | | |
| 18. I feel pleased about my interactions with my .... | 2.6 (1.2) | 0.71 | | |
| 19. I do not feel useful in my interactions with my .... | 3.5 (0.8) | 0.73 | | |
| 20. I feel strained in my interactions with my .... | 2.6 (1.2) | 0.60 | | |
| 21. I feel that my health has suffered because of my involvement with my .... | 2.9 (1.1) | | | 0.58 |
| 22. I feel that my present situation with my .... doesn't allow me as much privacy as I'd like. | 2.0 (0.9) | | | 0.75 |
| 23. I feel that my social life has suffered because of my involvement with my .... | 2.3 (1.1) | | | 0.49 |
| 24. I wish that my .... and I had a better relationship. | 2.3 (1.3) | 0.49 | | |
| 25. I feel that my .... seems to expect me to take care of him/her as if I were only one s/he could depend on. | 2.3 (1.2) | | 0.47 | 0.40 |
| 26. I feel that my .... behaves the way s/he does to have her/his own way. | 3.4 (1.0) | | 0.87 | |
| 27. . I feel that my .... behaves the way s/he does to annoy me | 3.6 (0.9) | | 0.93 | |
| 28. I feel that may .... tries to manipulate me. | 3.6 (0.9) | | 0.91 | |
| Internal consistency cronbach's alpha | Overall 0.88 | 0.89 | 0.87 | 0.76**(0.72) |

Legends to table 2

Figures in bold indicate statistically significant differences.

Subscales of the NeuroPsychiatric Inventory (NPI)

Del: Delusisions; Hal: Halucinations; Agi: Agitation; Dep: Depression; Anx: Anxiety; Eup: Euphoria; Apa: Apathy; Dis: Disinhibition; Irr: Irritability; Abb: Abberrant motor behavior

Na= not applicable

SD = standard deviation

Exploratory principal components analysis resulted in the extraction of three components; Emotions, Attributions and Sacrifice (see Table 2), explaining 49 % of the variance. A threshold of .40 for inclusion was maintained. Item 13 was removed from component three to increase internal consistency**. All components had satisfactory internal consistency ($\alpha^1$=0.89; $\alpha^2$=0.87; $\alpha^3$=0.76). The first component 'Emotions' comprised all items referring to emotions the caregiver experienced towards the patient or in the caregiving process. The second component 'Attributions' contained items referring to the caregiver's attribution of the behavior of the patient. The third component 'Sacrifice' contained items referring to the losses the caregiver suffered in his or her privacy as a consequence of caring for the patient.

The total score on the SCQ was associated with its underlying dimensions Emotions (r=0.83; P<0.001), Attributions (r=0.44; P<0.01) and Sacrifice (r=0.44; P<0.05).

The SC dimensions were not associated with dementia severity, implying that greater dementia severity did not make caregivers feel less competent.

The overall caregiver burden was on average 4.2 (SD 2.8). The emotional burden caused by neuropsychiatric symptoms (NPI) was on average 6.4 (SD 4.9). Figure 1 demonstrates the models explored in structural equations modeling.

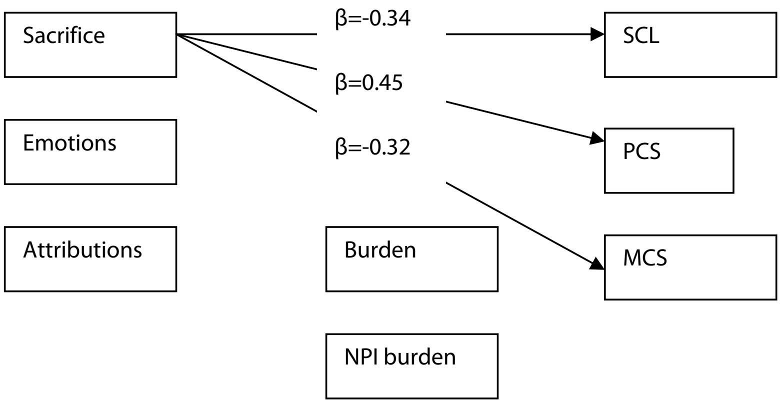

**Figure 1.** Model 1 and 2 of the path analysis: competence had no effect on burden, whereas only the dimension of Sacrifice had an effect on psychological problems and health related quality of life.

The first model in which the impact of the components of competence on burden, both in general and NPI-specific, were explored showed that neither component of SC had any effect. In terms of health related quality of life (HQoL), caregivers scored on average 54.7 (SD 9.8) on the physical component scale (PCS) and 55.4 (SD 9.5) on the mental component scale (MCS). The general psychopathology score as generated by the SCL-90 was on average 123.1 (SD 25.4), which was average compared to the general population (119). In the second model it was explored whether the components of SC affected quality of life and psychological problems. Of the components of SC only Sacrifice turned out of importance. Sacrifice had the greatest effect on the physical component of quality of life (β=0.45;P=0.001); the effect on the mental component of quality of life and psychological problems were slightly lower (β=-0.32, P=0.03 and β=-0.34, P=0.03). There were no differences in Sacrifice between caregivers of living or deceased patients.

## DISCUSSION

In the current study we focused on the sense of competence of FTD caregivers. We present the data of the last measurement of our 24-months follow-up study into burden in FTD caregivers. We aimed to answer three research questions. First, we assessed to which degree FTD caregivers felt competent in caregiving. Second, we aimed to assess the relationship between SC and caregiver burden. Finally, we aimed to explore how SC could contribute to our understanding of caregiver well-being.

The FTD patients in our study were on average 61 years old and had been demented for on average 8 years. Dementia severity scores indicated that most FTD patients remembered little of their personal history, were largely unaware of their daily surroundings and were dependent with respect to their ADL. Caregivers were mostly spouses of the patient and were on average 59 years old.

Analysis of FTD caregivers' competence showed they felt capable of caring for their patient and of estimating their required level of care. Caregivers experienced few negative emotions towards the patient and felt neither annoyed nor manipulated by their patient. Caregivers were, however, expressively conscious of the heavy responsibility of caring for the patient. Most caregivers experienced continuous worries, and had difficulty balancing the care for the patient with other responsibilities. Most caregivers deplored the limited aspects of the relationship with the patient. Moreover, caregivers felt their personal life suffered from their involvement in caring.

Regrettably, to our knowledge there are no publications with comparable sum scores for the version of the SCQ we employed. Other studies did investigate the underlying structure of the SCQ (127, 129), and in order to create a more feasible understanding of caregiver SC we followed their example. We identified three components underlying SC through principal component analysis, which we termed: Emotions, Attributions and Sacrifice. Emotions are the feelings the caregiver experienced with regard to the patient; Attributions are the caregiver's interpretation of the behavior of the patient and Sacrifices are the losses of the caregiver's personal life while caring for the patient. Vernooij-Dassen et al (1996) also found three dimensions to underlie SC in a sample of Alzheimers's disease and multi-infarct dementia patients: satisfaction with the demented person as a recipient of care, satisfaction with one's own performance as a caregiver and consequences of involvement in care for the personal life of the caregiver which were reproduced by and Scholte op Reimer et al (2007) in a sample of caregivers of stroke patients (59, 129). The latter dimension: consequences of involvement in care for the personal life of the caregiver is comparable to the Sacrifice dimension we identified in FTD caregivers.

Our second research question led us to explore the association between SC and caregiver burden. Strikingly, we found that SC and its underlying dimensions were not directly associated with emotional burden caused by neuropsychiatric symptoms nor with overall general caregiver burden. In our study caregiver burden and SC were distinct concepts. We have thus confirmed our hypothesis that SC and caregiver burden are concepts that should not be used interchangeably but complementary. A limitation of our study is that our sample was rather small; therefore more research to validate the finding that SC and caregiver burden are unrelated is needed.

Finally, we aimed to assess how SC could contribute to our understanding of caregiver well-being in terms of health related quality of life (HQoL) and psychological problems. We found that the FTD caregivers in our study reported better quality of life than one other similarly assessed group of dementia caregivers (130). The latter group, however, was on average 15 years older and therefore probably had worse physical quality of life. The general psychopathology score as generated by the SCL-90 was average compared to the general population (119). The impression of self-confidence and strength of our caregivers, however, is not reflected in their continuous worry about their patient (see Table 2 items 14, 24 and 25) and lack of time for oneself (items 16,22,23). In addition, we did a major finding with important ramifications for the FTD caregiver.

The Sacrifice dimension of SC showed a substantial effect on caregiver well-being. Sacrificing one's personal life to caregiving was associated with more psychological problems and reduced physical and mental quality of life. In other words, the FTD caregiver suffers when he is sacrificing too much of his personal life to caring for the patient. A Sacrifice dimension for aspects of the SCQ was reported earlier but not its association with caregiver well being (59, 129, 131). SC was furthermore not related to behavioral disturbance or dementia severity of the patient. This suggests that sacrifice-related suffering has its focus primarily in the caregiver who has difficulties maintaining a balance in caring for the patient and caring for himself.

This is a major insight, indicating the differential value of SC, which may easily be applied to support FTD caregivers. FTD caregivers need to know that it is important to maintain a personal life even though they are the primary caregivers of their patient. Previous studies also reported that caregivers find selfcare a difficult aspect of caregiving (132, 133). It needs to be pointed out to caregivers that it is not selfish, nor a sign of failure but essential to spend time charging their battery. In practical terms, FTD caregivers need to be enabled to create time to attend to their personal lives. There are numerous manners by which the creation of time for the caregiver may be accomplished and we suggest that each case be considered individually to find the solution that fits best. We expect that short psycho-educative sessions for the caregiver on selfcare and offering the means to create personal time may greatly diminish the experience of sacrificing oneself to caregiving.

One important aspect of selfcare is for caregivers to stand still and experience their feelings and subsequently process these emotions. In our clinical view the psychological dynamics of sacrifice are that some caregivers frantically devote themselves to caregiving in order to avoid feeling what they feel with respect to the patient. It may well be that caregivers neglect their emotional needs because they are too scared of the grief they will find within themselves once they focus on their emotional life. We expect that there is a major role for unprocessed grief in the psychological well-being of caregivers (134), which should be addressed in future research.

A few important limitations to our study need to be mentioned. The sample size of our study was small due to the low prevalence of FTD in our population and a total of 24 out of 63 caregiving dyads dropped out of our study during follow-up, thereby threatening the generalizability of our results. Furthermore, we have only used the data from the 24-months follow-up, thereby employing a cross-sectional study design. Cross-sectional designs do not permit inferences about causality.

In concluding, sacrificing one's personal life to caregiving was accompanied by psychological problems and reduced quality of life in the FTD caregivers in our study. Psycho-educative sessions on selfcare and offering means to create time to attend to personal needs seem promising tools for the relief of caregiver suffering.

# Part IV

## *Impressions on clinical genetic testing for FTD*

# Chapter 9

## *A decade of genetic counseling in frontotemporal dementia affected families: Few counseling requests and much familial aversion*

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## ABSTRACT

A decade of genetic counseling of frontotemporal dementia (FTD) affected families has generated two important observations. First, the uptake rate for presymptomatic testing for FTD is low in our department of Clinical Genetics at the Erasmus Medical Center in the Netherlands. Second, FTD at-risk counselees reported substantial familial opposition to genetic testing, which is distinct from the attitude in Huntington Disease affected families. We hypothesize that the low acceptance for FTD genetic counseling is consequential to the familial opposition and explain this within the theoretical framework of separation-individuation. Furthermore, we hypothesize that separation-individuation problems do not similarly influence the acceptance of HD genetic counseling, due to the educative role of the well-organised patient organization for HD in the Netherlands. We offer counseling recommendations that serve to facilitate the individuation of the counselee with respect to the FTD genetic test.

## Frontotemporal dementia

Frontotemporal dementia (FTD) is a severe neurodegenerative disorder with onset at middle-adult age. Patients present with decline in interpersonal conduct, emotional blunting and loss of insight, all preceding memory decline (1). As FTD advances, patients develop progressive disturbance of executive functions, loss of initiative, mental flexibility and organization. Language becomes impaired, eventually resulting in aphasia. FTD is the second most common presenile dementia, with a prevalence of 10-15 per 100.000 individuals of 45-65 years (6, 135, 136). There are identical risks for male and female offspring of an affected parent in the familial forms, which are estimated at 30-50% of total FTD (6, 137).

Mutations are found in 30-40% of cases with a positive family history (4, 6, 138). There are at least five genes associated with FTD and its subtypes, and even more when one considers the overlap with Alzheimer disease and motor neuron disease (138). The microtubule associated protein tau gene (*MAPT*) was the first FTD gene identified in 1998 (139), followed by the progranulin gene (*GRN*) in 2006. The *MAPT* and *GRN* mutations are variably found in some 10-20% of familial FTD series (10, 140). The mean age of onset of FTD with a *MAPT* mutation is 52.4±5.9 years (4) and with a GRN mutation it is 61.8±9.9 years (137, 140). For both diseases, the penetrance is high, that is, 90-95% of mutation carriers will become affected by 70 years. The clinical spectrum seen with identical mutations may vary from Alzheimer disease, Lewy Body disease, corticobasal syndrome, frontotemporal dementia, frontotemporal lobar dementia, FTD-ALS to primary progressive aphasia, etc.

When the disease-causing gene is identified in a family, presymptomatic genetic testing becomes available. With the discovery of FTD causing genes (9) gradually more families will be able to opt for genetic testing of patients, at-risk relatives and prenatal testing. However, the number of families tested for the less frequently observed mutations is still limited, which implies insufficient knowledge on the clinical variability of these mutations.

## Genetic counseling in the Netherlands

In presymptomatic genetic testing, healthy relatives, usually siblings or children of identified FTD probands, are enabled to obtain testing for the mutation causing FTD in their family. Family-specific and mutation-specific data on variability in age at onset and progression of the behavioral problems of FTD will be given, emphasizing the remaining uncertainties for newly identified gene carriers. The genetic counseling approach for FTD is similar to that for Huntington's disease (HD) (141) and involves three steps: intake, blood withdrawal, and test result disclosure in two or three sessions depending on the extent of information and decision process prior to the first visit. The counselee is seen by a clinical geneticist and a psychosocial counselor at all visits.

At intake, the clinical geneticist informs the counselee about FTD, the specific FTD related problems in the family, and the possible implications of testing. The geneticist aims to facilitate the counselee's decision-making about the choice for the test and its implications for his or her future. Special attention is given to social support in- or outside the family and to possible problems of obtaining employment and life- or other insurance when an FTD carrier status is found. Referral to specific information services is offered. At test disclosure the geneticist facilitates counselee expression of initial emotional reactions to the news and offers follow-up to support the counselee in coping with his or her new status, either as disease free or as a mutation carrier. The goal is adequate integration of the counselee's new status in daily living.

Psychosocial counselors, at intake, explore in-depth the motivation to seek testing, in order to raise awareness of the counselee's expectations with respect to testing. Counselees are encouraged to think about what a favorable or an unfavorable test result would mean to them personally, in order to make a head start in psychological processing of any test outcome. How does the counselee expect to feel upon hearing that she or he is or is not a carrier of the gene? What would change? How will either outcome affect the bonds within the family? How will the counselee maintain quality of life awaiting a future of FTD? Preparing for the outcome means anticipating a rather dramatic change: from uncertainty and hope towards certainty, with either a future with increasing distress, or liberated from the disease but possibly burdened for some period by guilt feelings towards affected relatives. In addition, the geneticist provides technical information on the genetics of FTD, the phenotype and penetrance, whereas the psychosocial counselor explores in-depth the psychological make-up and motivation of the counselee and the family dynamics with regard to the hereditary disorder, and discusses how this counselee may best adapt to either test outcome. Furthermore, the psychosocial counselor provides follow-up, and if necessary, referral to psychotherapy.

## Clinical experience with genetic counseling for FTD in Rotterdam

Mutation analyses for presymptomatic testing for FTD in the Netherlands were performed exclusively in our Rotterdam diagnostic laboratory until 2007. The diagnostic laboratory of the Free University in Amsterdam has performed a few analyses since 2007. Nearly all counselees were seen at the department of Clinical Genetics of the Erasmus Medical Centre in Rotterdam. We made several important observations about clinical genetic testing for FTD. First, the uptake rate seemed to be quite low. After the identification of pathogenic *MAPT* mutations in 1997, 80 members of three large families who were at 50% risk and > 18 years of age, were informed of the discovery of the pathogenic genes and were offered genetic counseling (142). We estimated that this information would also reach another 100 adults at 50% risk in these families, and possibly more relatives at lower risk. Only thirteen individuals from this potential group of 180 people that were at 50% risk of being carriers requested genetic counseling between 1999 and 2002. Since we cannot be certain that the additional 100 adults were actually reached, the acceptance of counseling ranges somewhere between 7 and 17%. The 13 counselees were on average 34 years of age (Range: 19-54), and of these counselees, 6 pursued the test. Five of these testees stated that resolving unbearable uncertainty with regard to carrying the mutation was an important motive for testing.

Since then, despite the discovery of other pathogenic FTD genes (11, 137), a mere 13 additional individuals have been counseled for FTD in our center between 2003 and 2008. Furthermore, during this decade (1999-2008) we received only one request for prenatal diagnosis (PND) in 1999, and no requests for pre-implantation genetic diagnosis (PGD) for FTD. The low uptake for FTD presymptomatic testing is in great contrast with the 24% uptake rate for Huntington's disease (HD) in the Netherlands in 2000 (143), but it is comparable to low uptake rates for HD in other countries (144).

In our clinical work we have made some characteristic observations about our FTD population that warrant special note. Two of us (SR and AT) have counseled all at-risk individuals who presented themselves in our department for FTD counseling since 1999. All of these counselees reported experiencing clear opposition to genetic testing from their family members. Healthy parents of counselees disapproved of testing and siblings attempted to dissuade them from testing; they were resentful about the counselees' wish to discuss the hereditary nature of FTD within the nuclear family. Some counselees indicated that they consciously used the genetic test to liberate themselves from their oppressive and restrictive family. For them, genetic testing for FTD would either enable an independent, disease free life, or anticipation of a future disease without the additional burden of problematic family dynamics.

### Possible explanation for few FTD genetic test requests: the importance of separation-individuation

Family members play an important role in the decision whether or not to pursue genetic testing (145, 146). The low uptake for FTD genetic testing may result from a high prevalence of enmeshed family structures and its effects on separation-individuation processes. The concept of separation-individuation was originally formulated by Margaret Mahler and refers to an intra-psychic process that infants go through in early childhood in ending their symbiotic relationship with their mother (147). Separation refers to the realization of self versus not self, and individuation pertains to the process of determining who and what the self is.

A second separation-individuation phase begins in adolescence and is generally seen as a transition of major importance in the family life cycle (148). Therein, young adults gain their independence from their family of origin while continuing to have a function in the family. During this phase adolescents develop relationships with peers, or a partner that become equally important as the relationship with the parents (149). Generally, the second phase of separation-individuation is thought to start in adolescence, but it remains a lifetime task (150).

From this family systems perspective separation-individuation is seen as the interchange between individuality and connectedness between the individual and the nuclear family members. We consider the separation-individuation process to be of major importance in the clinical genetics setting. A counselee who is sufficiently individuated is able to distinguish his or her feelings and wishes from the feelings and wishes of the nuclear family. A desire to pursue genetic testing then, is a wish that has its origin in the counselee and the counselee is free to assume the responsibility for processing the information and emotions surrounding the test and to cope with the result. Self-determination is combined with respectful acceptance of and disengagement from the feelings and reactions of the nuclear family. The counselee is able to tolerate that other family members deal with the genetic risk in her or his own way.

When counselees have not adequately accomplished the separation-individuation task, relations with the nuclear family are either enmeshed or disrupted. In enmeshed families the counselees' motivations for testing tend to be fused with the normative values of their family. These counselees may pursue testing because the nuclear family pushes them in that direction or, on the contrary, refrain from testing under familial pressure. In enmeshed families taboo and secrecy frequently surround the disease. Genetic testing in such families may be instrumental in allowing counselees to "escape" from family enmeshment. An unfavorable test result might excuse them from caregiver obligations, whereas a favorable outcome might empower them to build a new life.

Based on our decade of experience, FTD families seem to be particularly enmeshed. Several processes threatening adequate separation-individuation in FTD families may promote such enmeshment. First, in dealing with illness, families tend to become more cohesive to carry the burden together (151). Such cohesion implies that in the face of a common threat families tend to stick together to support each other. To a certain degree family members will benefit from this cohesion. However, as Olson's (2000) Circumplex Model of family functioning describes, when the cohesion becomes too strong individual family members have less space to cope in their unique way, and the family becomes enmeshed. Enmeshed families become normative and exert pressure on members who deviate from this norm. Such enmeshment interferes with adequate separation-individuation.

Second, Goldman and colleagues (2004) noted that families affected by FTD seem to be psychologically damaged. Psychological damage may occur as a consequence of having an FTD-affected parent; FTD patients have inhibition problems. Their behavior is therefore a product of their impulses, which may cause them to be aggressive, promiscuous, unpredictable, etc. They lack disease insight, which results in their denial that anything is wrong. In addition, they become emotionally blunted and are unable to care about others. Furthermore, their executive functions are damaged, and therefore their ability to organize and plan activities is impaired. Clearly, FTD patients are unable to provide a stable and safe environment for their children in practical and emotional terms (152).

One of the most damaging aspects of FTD for family members is that these symptoms occur early in the disease process. Depending on the age of the children who are faced with a parent with FTD, they will be more or less prone to psychological damage. Children in the preverbal phase are especially prone to develop an insecure attachment style as has been demonstrated in HD families (153). For these children, their parent's behavior will be particularly threatening. Insecure attachment combined with traumatic experience will lead to dysfunction with respect to several developmental processes, including separation-individuation (154).

If the parent develops FTD when the child is in adolescence, the separation-individuation process is at-risk. For adequate separation-individuation it is important that adolescents are able to rely on a stable relationship with their parents. Adolescents need the space to find out who they are and who they are not, but they also need to feel sufficient connectedness with their parents so that in this "letting go" process they do not lose their foundation (155, 156). Adolescents with an FTD-affected parent may feel isolated because they are too embarrassed about their parent's behavior to bring friends home, and they may be unable to share their grief with their peers because generally adolescents do not have to deal with losing a parent. Given this complex situation at home, it may be more difficult to allow peers to become equally important as the nuclear family members (157).

Finally, it may be hypothesized that preoccupation with the future disease threatens adequate separation-individuation. In families affected by genetic disease young people may be preoccupied with the apprehension they will develop the disease in the future. This might be considered as "anticipatory loss" and a way to gain control over the future threat (158). A few of the counselees who presented for the genetic test for FTD described how they had grown up feeling they would be next. They had refrained from investing in significant relationships with persons outside of the nuclear family because they did not want to burden a potential partner with having to care for them once they developed FTD.

In summary, the separation-individuation task for persons in FTD-affected families may thus be corrupted by at least three phenomena. These include: family enmeshment in response to a common threat, psychological damage due to growing up with an FTD-affected parent, and preoccupation with the possibility of becoming symptomatic for FTD in the future.

### A case example of impaired separation-individuation

A woman in her twenties, Eva (pseudonym) presents herself for genetic counseling for FTD in our center. She is very ambivalent about the test. On the one hand she finds herself unable to deal with the uncertainty about her own genetic status. Eva closely monitors her behavior and cognitive functions, searching for any symptoms of FTD, which would confirm her greatest fears. She has refrained from investing in a "real relationship" because she would not want to burden a potential partner with her possible FTD. She believes that in order to know which turn her future will take, she needs to learn whether or not she will develop FTD. On the other hand, Eva worries that if she pursues testing, she is upsetting and betraying her healthy parent, her mother. Her mother has taken care of her FTD-affected father for many years and she is terrified of losing her daughter to FTD as well. Because of her fears she is unable to support Eva's pursuit of genetic testing. On the contrary, the mother wants Eva to support her by refraining from testing. Eva is afraid of damaging her relationship with her mother because she realizes that if she has FTD, she will need her mother to take care of her in the future.

Eva lost her father to FTD in early adulthood, implying that her father had FTD during her adolescence. During this period she was ashamed of her father's behavior and found it difficult to understand and accept that his emotional bluntness was due to the disease and not a rejection of her as a person. Because her mother had a hard time caring for her father and managing the household, she assisted her mother with many tasks. Eva felt quite lonely because her friends were mostly going out and dating whereas she was continuously worrying about and feeling responsible for the situation at home. She felt so different from her peers that she was unable to invest in friendships. When her father was institutionalized she stayed with her mother because she did not want to abandon her.

When finally her father died of FTD, Eva allowed herself to fully consider that she too was at-risk of developing this disease, and her attention shifted from her parents to herself. Based on her physical resemblance to her father she started to believe that there was a real chance that she would be the next person to develop FTD. Now that her father had died, Eva suddenly had to start building her own life. But FTD was looming behind every important decision she had to make. For five years she has found herself unable to make decisions and build a life of her own. This is why Eva has presented for genetic counseling. However, her mother's disapproval is greatly upsetting her. Eva believes that she will only be able to start living if she hears that she is not carrying the mutation, and that a negative test result would also greatly relieve her mother.

In HD the strong impact of a devastating dementia on familial relationships was amply demonstrated (159-161). Members of HD affected families present more often with insecure attachment styles than the general population as a result of growing up with an affected parent (153). Insecure attachment is a risk factor for adult psychopathology (162) The uptake rate for HD genetic counseling in the Netherlands is relatively high, and it has been noted that a self-selected group of resourceful and psychologically "healthy" individuals presents for genetic counseling (144, 163). Therefore our impression of HD counselees may be biased, making comparisons to FTD counselees difficult. Still, among the small number of FTD counselees we have observed, familial opposition to testing has been particularly overt whereas we are no longer gathering similar impressions from HD counselees.

The first generation of testees for HD did report experiencing similar familial opposition to testing (164). However, HD became a paradigm for genetic testing and a very active patient organization emerged. The amount of attention in the medical, clinical and research settings and in the media have paved the way for at-risk family members to seek genetic counseling. In particular, the HD patient organization is helpful to HD at-risk family members. The HD patient organization works closely with families and medical professionals, providing information and guidance regarding long term care and genetic counseling needs, based on data from longitudinal studies. The organization serves an educative function in that it offers guidance as to how families might deal with genetic testing. Although we do not believe that a patient organization such as the one for HD in the Netherlands will guide family members through the entire separation-individuation process, we do think it may provide some support for that process. Even a highly enmeshed, damaged family that might at first not welcome genetic testing, might learn from the patient organization that individual members should be allowed to make their own choices with respect to genetic testing. In the Netherlands, such a patient organization is lacking for FTD. Given the absence of an educative patient organization, assisting counselees with individuation regarding genetic test wishes is a key task for the psychosocial counselor in the clinical genetics department.

## Counseling recommendations

In FTD genetic counseling we recommend that the counselor address the degree of separation-individuation of the counselee and her or his wish for genetic testing. Questions that may be helpful in assessing the degree of individuation regarding a test wish are: Has the counselee confided in any family member that she or he wishes to pursue genetic testing? Are the counselee's parents involved? How did siblings react? Has the counselee experienced support from the nuclear family? Is there openness or secrecy with regard to FTD in the nuclear family? How did the counselee reach the decision to come for genetic counseling? The answers to such questions will reveal the extent to which the counselee's wish for genetic testing has evolved in a sufficiently individuated manner. These questions will raise both the counselor's and the counselee's awareness of the context in which the wish for testing was shaped. If a wish for testing seems mostly reactive to family dynamics then this may be discussed as such. The counseling subsequently needs to address what consequences the genetic test may precipitate other than freeing oneself of the nuclear family, and whether the counselee is willing to accept these consequences as well.

Inherent to the wish to escape family enmeshment is the observation that mobilizing social support from the family may be particularly difficult for these individuals. Occasionally the psychosocial counselor may be the counselee's sole source of support, and if that is the case, then more than the standard three sessions should be offered.

Genetic counseling is not psychotherapy. Hence, we do not expect that geneticists will guide counselees completely through the process of adequate separation-individuation. However, addressing these issues might increase their awareness of the need for an independent decision with regard to testing. Subsequently, adverse effects of deciding in favor of the test and of either test outcome may be minimized. If needed, referral for additional psychotherapy may be offered.

Our impressions are based on a small number of testing cases and their families. Given the low uptake rate it is difficult to gather empirical data on this particular population. We have chosen to share our clinical impressions, and we invite others to provide their experience with genetic counseling and testing in FTD families. Through this discussion we aim to contribute to enhanced genetic counseling, testing and enriched psychological support of individuals at-risk for FTD and their families.

In summary, in our department of Clinical Genetics in Rotterdam, a mere 26 individuals at-risk for FTD have presented for genetic counseling over the last decade. We have observed that these counselees experienced pronounced familial opposition to genetic testing. We hypothesize that the low amount of requests for FTD genetic counseling is due to inadequate separation-individuation of the members of FTD affected families. In FTD families three processes may impair separation-individuation; 1) family cohesion that becomes too strong in the face of a threatening illness, leading to enmeshment, 2) growing up with an FTD-affected parent may lead to inadequate separation-individuation, and 3) preoccupation with the future disease may cause at-risk individuals to refrain from separating from the nuclear family. Furthermore, we hypothesize that separation-individuation problems do not similarly influence the acceptance of HD genetic counseling, due to the educative role of the well-organized patient organization for HD in the Netherlands. Geneticists should thus pay attention to the degree of separation-individuation evident in counselees' testing wishes. Geneticists should also be aware that they may represent a major source of support for FTD counselees, and tailor their approaches, accordingly.

# Part V

## *General discussion*

# Chapter 10

## *Discussion, conclusions and directions for future research*

At the onset of FTD research in Rotterdam, investigators and clinicians were impressed by the severity and progression of FTD symptoms and their impact on caregivers and family. FTD caregivers were suffering because the personality of their loved one was changing; because the FTD patient was behaving inappropriately in social situations and because their loved one transformed from an emotionally involved person into an emotionally blunted person. On top of it all, the FTD patient was denying that anything was amiss. Until recently, programs for caregivers of dementia patients were concentrated on Alzheimer's disease (AD). FTD is a type of dementia as well, but with a quite different clinical presentation and course (68). Not surprisingly, the health care provisions for often much older, AD caregivers were not meeting the needs of the FTD caregivers. A major problem was that few professionals knew of FTD and therefore did not know how to best support FTD caregivers. We initiated this study to assess the particular needs of FTD caregivers.

## FTD vs. AD

What was known of caregiver burden came from studies on AD caregivers. We expected FTD caregivers to be different from AD caregivers, because of the differences between these types of dementia (68). Comparative profiling of AD and FTD patients and caregivers was possible in the Netherlands through cooperation with the Maasbed Study on AD patients and their caregivers in Maastricht (Southern Netherlands). We examined differences between FTD and AD patients to better understand the differences in caregiver burden.

We found that FTD patients were more affected in terms of dementia symptoms (chapter 4 & 5). FTD patients cared for in their home had significantly more aberrant motor behavior, disinhibition, apathy and euphoria whereas AD patients had significantly more depressive symptoms (39, 40, 44, 73).

Behavioral problems related to the frontal system are particularly burdening (12, 42, 43). Also, a diagnosis of dementia at an early age is more stressful to the patient and his family (165).

Accordingly, we found that FTD caregivers felt more burdened by the caregiving situation and more distressed by the behavior of the patient than AD caregivers. A recent study also found FTD caregivers to be more burdened than AD caregivers (44). We therefore concluded that one dementia is not the other dementia and the impact of FTD on caregivers was more severe than the impact of AD. FTD caregivers would thus not be helped sufficiently by facilities that were intended for AD caregivers (166). A recent review suggested that FTD caregivers should be educated about the characteristics of FTD and should be helped with social management (12). In line with a study on caregivers of patients with Huntington's disease (167), we concluded that the individual FTD caregiver should receive tailor-made support. A promising model that merits further studying is the A-B-C model; Antecedent-Behavior-Consequence model (13). This model is a method that teaches caregivers how to manage the patient's behavioral symptoms.

Clinical implications:

This part of our study served to demonstrate that FTD caregivers differ from AD caregivers. Health care professionals should not send FTD caregivers into AD support programmes without considering the tremendous differences between FTD and AD. Furthermore, health care professionals should be aware that most support services are established for the geriatric population and therefore the younger FTD group may not have sufficient access to these services (chapter 5). In addition, the group of young FTD patients needs a similar age group to share their institutional life.

## Caregiver burden analysed

When the differences between FTD and AD caregivers were established, we continued our study by zooming in on the burden FTD caregivers experienced.

In our sample of FTD caregivers some caregivers were able to care for their patients at home (FTDH) until the end stages of FTD whereas others were not. It made us wonder what enabled caregivers to persist in their caregiving role. In chapter 6 we assessed the differences between FTD caregivers caring for their patients at home and caregivers of patients already in a nursing home (FTDN). The FTDH patients displayed more intense and diverse neuropsychiatric symptoms than patients in a nursing home. Accordingly, FTDH caregivers experienced more burden from the neuropsychiatric disturbance of the patients than FTDN caregivers. However, the overall burden was experienced as similar in FTDH and FTDN caregivers. Given the lack of differences between FTDH and FTDN caregivers we concluded that it was probably mainly the differences in patient characteristics rather than caregiver characteristics that explained why some caregivers were able to take care of their patients at home until the latest FTD stages. However, the absence of differences between FTDH and FTDN caregivers also indicated that caregivers lacked a sense of relief after nursing home placement of the patient (107, 108). The period around institutionalisation brings great emotional ambivalence to the caregiver (27, 29). Caregivers experience feelings of guilt and failure when they are no longer able to continue caregiving but also know that institutionalisation is the only sensible solution. FTDN caregivers often remained with longstanding mental health problems. After placement of the patient in a nursing home caregivers even experienced more mental health problems than the FTDH caregivers (chapter 6).

Clinical implications:

Support should be provided to caregivers who care for the patient at home as well as caregivers of institutionalised patients (168). Some nursing homes offer FTD caregivers group sessions guided by a trained psychologist. This kind of support targets the loneliness and feelings of isolation by meeting other FTD caregivers. The presence of the trained psychologist warrants psycho-education and guidance of psychological processes. These kinds of support groups seem promising interventions for relieving the burden of FTD caregivers (169) even after nursing home placement of the patient.

## The evolution of psychological well-being

Another major question we addressed in chapter 7 was how caregiver burden and psychological well-being evolved in the face of ever worsening FTD. We expected that when FTD progressed, the burden of care would also become heavier. We expected the increase in burden to be accompanied by a decrease in caregiver psychological well-being. Instead, caregivers proved to be resilient. While the disease progressed and the patients' condition worsened, both caregiver burden and burden from the patients' behavior remained stable. At the same time, caregivers had unaltered levels of psychological problems. Furthermore, their mental and physical quality of life remained stable. As noted in some AD caregivers, FTD caregivers' experienced improvement of their physical well-being (113-116). We found this proof of resilience (170) to be quite impressive.

We think caregivers report stable levels of well-being because they are able to continuously adapt to the caring demands. Despite having to give up ever more pieces of their partner and the life they used to share they are able to maintain a certain level of well-being. The higher HQoL in both FTD and AD caregivers of patients with longstanding dementia (chapter 4) appears to be another example of adaptation.

This adaptation is also known as the response shift phenomenon and it applies to self-report measures such as quality of life, burden and well-being (121). People adapt to the hardships of life by adjusting their internal standards. For instance when everyone was in good health, before FTD started, a caregiver may have rated his life as 8 on a scale from 1 to 10. An 8 because he had a fairly good relationship with his partner, a nice job, a few good friends he had dinner with monthly and a hobby. His children were doing well and everyone was healthy. Now, he still rates his life as 8 out of 10. Yes, he provides intensive care to his FTD affected partner but at least she is still living at home. The FTD of his partner has brought him and the children closer together and seeing the deterioration in his partner had made him appreciate the small things in life. A beautiful sunrise, a nice cup of coffee, an unexpected phone call from a friend. The many things he had to give up became replaced by smaller things he rates equally high. This is psychological adaptation at work.

Clinical implications

This capacity of psychological adjustment is encouraging and hopeful for caregivers to come. In the clinic people often ask: how do others deal with this situation, what is their experience? With the results of this study health care professionals will be able to inform them that in time most caregivers adapt and are able to maintain a certain level of quality of life and well-being despite the progress of FTD.

## The quality of the relationship between caregiver and FTD patient

In chapter 7 we hypothesized that the quality of the relationship was important to caregiver well-being. On the one hand, if the relationship between the caregiver and the patient was good prior to the onset of FTD, this may buffer against caregiver burden (94, 95, 117). On the other hand, loosing a loved one represents a loss that severely affects the caregiver. Also, when the premorbid relationship was troubled by dysfunctional communication and badly defined roles, caregiver burden is elevated (92).

Interestingly, we did not find a buffering nor a magnifying effect of relationship quality on caregiver burden. However, we observed a constancy in the perceived quality of the relationship. Caregivers rated the quality of their premorbid relationship as 8 on average on a scale from 0 to 10. Another study also reported relatively high levels of premorbid relationship satisfaction in dementia caregivers (87). During our study caregivers rated their relationship as 6 on average, which is still sufficient. The partner relationship had in fact gradually transformed from an equal into a caregiver-care recipient relationship and yet caregivers indicated they still experienced sufficient quality from their relationship.

During our study most patients progressed into the end stages of FTD. However, the quality of the relationship remained stable during the two years of our study. In a recent Italian study female AD caregivers experienced an improvement in their affective relationship after the diagnosis (171). In addition, FTD caregivers reported to us that some important aspects of their relationship were preserved during the study. The extent to which they felt close to their partner and the degree to which they felt they were getting along did not change, whilst FTD got worse in the patient. What was lost was the possibility of sharing viewpoints on life and communication. Obviously, here the aphasia of FTD is the cause.

Clinical implications:

The robustness of the quality of the caregiver-care recipient relationship is another example of caregiver adaptation. To caregivers, experiencing quality from their relationship may serve as a motivational force. In practice, we may use this knowledge to empower individual caregivers. When caregivers are struggling to keep up, we may help them by focusing on the quality of the relationship and the aspects they may still experience as sufficient. The lessons of other caregivers may serve as a major source of support.

### Caregiver motivation

Concerning motivational forces, we asked caregivers what kept them going as a caregiver (chapter 6). We wanted to gain insights that might enhance the support to FTD caregivers.

The in-depth interviews showed four types of motivation. First, most of the caregivers stated that they did it all because they had vowed to stay with their partner in sickness and in health; marital duty. The second most prevalent motivation was the love felt for the patient. The love for the patient got them through their caregiver hardships. The third category stated they had no specific motivation, but followed their nature in the care of their patient; virtue. Still others revealed that it was only by seeking enough distraction they could keep up as a caregiver. These motivations are very different and imply different motivational forces. We analysed which motivation was most beneficial for caregiver well-being.

The 'marital duty' and 'virtue' motivations were associated with the fewest physical and mental health problems. Marital duty and virtue of the caregiver seem to allow some emotional distance from the patient and such emotional distance from the patient seems beneficial to both the mental and physical well-being of the caregivers.

Clinical implications:

This is, to our knowledge, the first analysis of FTD caregiver motivation. Indications ensuing for clinical practice might seem premature. However, when a caregiver presents with mental and physical health problems it may be worthwhile to check on caregiver motivation and assess the degree of emotional involvement caregivers display. If a caregiver is emotionally overinvolved in the patient it may well be that the caregiver is not paying enough attention to himself. Some emotional distance may then be obtained by seeking ways to lessen the focus on the patient and increase the focus on the caregiver.

## Coping

In chapter 7 we inspected the evolution of coping. All caregivers experienced increasing depressive reactions during the 2-year study period. The depressive reaction pattern includes pessimistic feelings about the future, and being both preoccupied and incapable to deal with the situation. Another study also reported that depressive reactions were specifically noted in FTD spouses, as compared with other dementia spouses (122). In addition, we found an increased use of emotional expression during the 2-year follow-up, particularly in caregivers whose patients were in a nursing home. Emotional expression concerns the venting of negative emotions such as frustration and anger, which may damage supportive social relationships. Other studies found that avoidant coping was associated with depressive symptoms in the caregiver and problem behaviors in the patient (172). In chapter 4 we found that the depressive reaction pattern contributed significantly to decreased quality of life.

Clinical implications:

Adequate coping is beneficial for FTD caregivers. Education on adequate coping can effectively improve caregiver psychological health (173). We therefore recommend that health care professionals evaluate the coping strategies caregivers employ and if necessary teach them to employ more adequate coping strategies.

## Sense of competence

Another important aspect of caregiving is sense of competence (chapter 8). Sense of competence refers to the feeling of being able to handle the caregiving task (59). A caregiver may feel burdened to a certain degree but still feel competent in handling that burden quite well. Sense of competence was unrelated to caregiver burden in our study. We identified three underlying dimensions, of which Sacrifice was the most influential.

Sacrifice refers to the process of the caregiver giving up his personal life to be replaced by caregiving activities. Sacrificing more was accompanied by more psychological problems such as feeling more nervous, anxious, depressed, hostile and having trouble sleeping. Sacrifice was also associated with reduced mental and physical quality of life. In other words, too much caregiver sacrifice leads to reduced psychological well-being and quality of life. Caregivers find selfcare a difficult aspect of caregiving (132) and they may benefit from maintaining a balance between caregiving activities and their personal lives (133).

Selfcare is taking care of the self. Charging one's batteries from time to time. Being mindful of one's emotional life and personal needs. When the partner is dying of FTD selfcare may seem like a trivial thing or a selfish act. The contrast between caregiver and patient increases when the caregiver may still enjoy things in life while the patient's condition is continuously worsening. The injustice of it all is aching. 'My partner is dying of FTD and here I am wanting some time off, wanting to see my friend; wanting a walk on the beach.' Greater amounts of personal sacrifice, however, do not diminish the magnitude of the disease.

Clinical implications:

These caregivers need to learn that it is essential to maintain a personal life even though they are the primary caregivers of their patient. We expect that short psycho-educative sessions for the caregiver on selfcare; what it implies and how to do it, and offering the means to create personal time may improve the balance between caring for the patient and caring for the self.

## What makes selfcare difficult?

However, there may be more barriers to selfcare. If selfcare implies being mindful of one's emotional life and personal needs then selfcare also implies having to stop running and feel what there is to feel. And if selfcare is feeling what there is to feel then selfcare is also grieving.

The FTD caregivers are continuously confronted with losses. The loss of their loved one's personality; his compassion and emotional involvement. The sharing of a life together, the house and family they have built together. Looking back on their past, sharing memories. Sharing the pride and joy they feel for their children. Simply talking, how was your day dear? Looking forward to retiring together. In allowing themselves to feel what they feel they will encounter how they feel about their losses. A study in the field of Alzheimer's disease demonstrated that family caregivers experienced anticipatory grief that was equivalent in intensity to death-related grief (174).

It is my clinical experience that people are often afraid to attend to their personal needs. They are afraid that their grief is too much to handle. Sometimes people keep running, wearing themselves out in order to avoid drowning in their grief. For these caregivers, taking good care of themselves implies allowing themselves to grieve their losses along the way, as is meant by "actively grieving". However, such can be a complicated and painful task.

First, the one to grieve is not deceased. Our culture knows rituals for grieving the dead, not the dementing. The grief the FTD caregivers carry along is one of the most underrecognized forms of grief. Second, grief is hard work and it happens on an emotional, cognitive and physical level and it may well be the most burdening aspect of caregiving (134). When the caregiving activities already consume most of a caregiver's energy then not a lot remains for the process of grieving. However, processing grief also ensues an opportunity for personal growth (175).

Clinical implications:

When caregivers have trouble in maintaining a balance in caring for the patient and caring for themselves then health care professionals may focus on the barriers caregivers experience in selfcare. Active attention should be given to acknowledging the caregiver's losses (176), feelings of grief and on providing support in grieving.

An example of possible caregiver burden dynamics:

*Caregiver: 'I feel burdened'*
*How come?*
*'I don't get around to attending my own needs'*
*What's withholding you?*
*'I'm too busy taking care of my loved one'*
*What have you undertaken so far in order to create some time for yourself?*
*'....Mmmm...not really much I would say...but no time really,,,,'*
*Is it really impossible for you to arrange a couple of hours a week for yourself?*
*'Maybe not, but I guess I would feel guilty about taking some time off.'*
*What exactly would you feel guilty about?*
*'About taking time for myself, while my loved one would have to go into the care of someone else.'*
*But you do need some time for yourself from time to time.*
*'Yes, I do.'*
*But?*
*'But I am afraid.'*
*Afraid of what?*
*'Afraid that if I take some time for myself I will have to face all these emotions.'*
*Which emotions?*
*'Well, everything, the frustration, the anger, the powerlessness, the sadness…'*
*How come you are afraid of those emotions?*
*'I am afraid that once I open that door, I will never again be able to shut it. I am afraid that in facing those emotions I will fall apart, and I don't know whether I will be able to piece myself together again. And if I fall apart, who then will take care of my beloved?'*

## Clinical genetic testing of hereditary FTD

Genetic testing for FTD has been available for families with an identified mutation for about a decade in our department of clinical genetics. In assessing the acceptability for presymptomatic genetic testing for FTD (Chapter 9), 27 out of 40 individuals at-risk indicated they would opt for such testing if it became available (46). The uptake rate to date is estimated to range between 7 and 17%. From the counselees who did present in our department we gathered the impression that this low uptake rate may be due to familial processes. The counselees often encountered familial opposition against testing. Counselees displayed problems with their separation-individuation tasks while relations with the nuclear family were often enmeshed. In enmeshed families the test motivation of the counselee tends to be fused with the normative values of the family. As a consequence, individuals from families with a known genetic mutation may withhold from seeking genetic counseling under familial pressure, which might explain the low uptake.

Clinical implications:

In FTD genetic counseling we recommend that the counselor address the degree of separation-individuation of the counselee and his wish for genetic testing. Addressing these issues might increase awareness of the need of an independent decision with regard to testing. Subsequently, adverse effects of deciding in favor of the test and of either test outcome may be minimized. Furthermore, FTD counselees may need additional support from the psychosocial counselor of the clinical genetics department because it is more difficult to mobilize support from an enmeshed family.

## Conclusion: Tailor-made support for FTD caregivers implies…

When FTD caregivers are in need of support the health care professional should address several issues. Behavioral problems of the patient represent a significant burden to FTD caregivers. These behavioral symptoms can sometimes be treated with the appropriate medication (13-16).

Concerning the support of FTD caregivers, three issues may be addressed. First, the adequacy of the coping strategies the caregiver employs in dealing with the care demands should be assessed. In particular depressive reaction pattern and emotional expression are inadequate coping strategies. Caregivers who employ these coping strategies would benefit from psycho-education on coping. Second, the health care professional may evaluate the balance the caregiver maintains between caring for the patient and caring for himself. If a caregiver neglects his personal needs then he may benefit from psycho-education on the importance of selfcare. Support in selfcare may consist of an individualized plan on how to take care of oneself and providing means for selfcare. Third, we recommend an assessment of the processing of grief. Such an assessment serves a twofold function in that it acknowledges the legitimacy of grief and it provides insight into the impact of the grief process on the caregiver. If needed, support in grieving should be offered.

FTD caregivers in need of support may furthermore benefit from what we have learned from other caregivers. They may feel empowered by the findings that most caregivers are quite capable of adapting to their situation and are able to maintain a certain quality of life. They might extract hope from the message that other caregivers still experienced a sufficient degree of quality from their relationship in the face of end-stage FTD. Simply informing caregivers of the motivation other caregivers had to keep going may provide a framework to consider oneself as a caregiver and thereby relieve feelings of isolation.

Finally, when FTD family members seek genetic counseling it is important to be aware of the often-enmeshed familial context in which the wish for genetic testing was shaped. Counselors should address the extent of separation-individuation of the counselee and adopt a proactive attitude in the offering of psychosocial support.

## Directions for future research:

In chapter 7 we found that caregivers may have adapted to increased burden and decreased psychological well-being by changing the internal standards used to rate these outcome variables, thereby ensuing stable or even slightly improved outcomes. In terms of coping, however, we found that all caregivers displayed an increased depressive reaction pattern during the study period. The coping questionnaire is not prone to response shift because individuals do not use an internal standard to rate their coping. We strongly suspect that the actual burden and adaptational process behind well-being and burden scores have remained invisible. We therefore recommend that future longitudinal research on caregiver burden incorporate research methods that take into account the response shift phenomenon. It is our expectation that the real burden of caregivers will become better defined as well as their adaptation to this burden. Such insights are helpful in improving caregiver support.

There is a bulk of literature on caregiver burden (177). However, the processing of grief is barely addressed (175). It may well be that grief is the most burdening aspect of care (134). Interestingly, the American Alzheimer Association has a comprehensive fact sheet on grief and mourning on their website [http://www.alzla.org/dementia/grief.html]. The AAA apparently considers grief and mourning to be of major importance. Future research on the psychological dimensions of caregivers and relatives of dementia patients might focus on the processing of grief and its specific psychotherapy.

Furthermore, from this study we learned that caregivers are quite capable of adapting to their caregiver circumstances. From the clinic we also know that caregivers are mostly in need of support in the early stages of FTD when the diagnosis is yet to be made. Moreover, caregivers benefit most from interventions aimed at relieving burden early in their caregiving career (178). Recently, an FTD expert group has been initiated in the Netherlands. One of the main goals of the group is to enhance early diagnosis of FTD (179). The group aims to acquaint general practitioners with FTD because they are the doctors whose referral makes the difference. When FTD is diagnosed earlier researchers are enabled to include FTD caregivers earlier in the process. It would be worthwhile to study what kind of support would be most beneficial to caregivers in this early phase.

### Methodological considerations:

The current thesis has several strengths and weaknesses. A major strength is that despite the relatively low prevalence of FTD in the Dutch population (6) and the difficulties with respect to diagnosis (179) we have included 63 FTD caregiver-patient dyads that were assembled nationwide. In addition, to date this is the only study focusing solely on the burden of FTD caregivers. Furthermore, we followed these dyads during a period of two years, which enabled the inference on causality. Yet another strength was the use of quantitative as well as qualitative data, which enables the interpretation of data in a broader sense (180). The last strength of this thesis we mention here is our collaboration with the MAASBED study, which enabled the differentiation of FTD burden from AD burden.

A weakness of this thesis is the small sample size in all statistical analyses, which is unfavorable for detecting significant differences and for the generalizability of results. Furthermore, a selection bias might have occurred in the inclusion of caregiver-patient dyads. Caregivers with more problems may have chosen not to participate. It is also likely that selective drop out occurred. Patients dropping out of the study had significantly higher levels of behavioral problems at baseline and their caregivers felt emotionally more burdened. Inclusion bias and selective dropout represent serious threats to the generalizability of our results.

Since our study was conducted in the Netherlands and cultural differences in the experience and report of caregiver burden have been described (33) the external validity of our results is also limited. Yet another limitation of the study was the use of self-report measures, which are prone to social desirability. As a consequence we may have underestimated the actual burden. Proxy interviews were used to assess neuropsychiatric symptoms in FTD patients. Caregiver reports may be influenced by denial and guilt, which may have blurred their interpretation and understanding of symptoms. And finally, we have assessed caregiver burden using several measures. However, caregiver burden is a term encompassing a wide scope of facets. Since the definition of caregiver burden is rather wide, the content validity of our study may be limited.

### Value of the current study:

The current thesis contributes to FTD caregiver well-being at various levels. First, the fact that a study has been devoted solely to the burden of FTD caregivers has a therapeutic effect on these caregivers. The study acknowledges their burden, their strengths and weaknesses. Second, patient and caregiver organizations may use the results of the study as a message to caregivers that they are not alone in their hardships; that there are others out there who are in the same situation. Moreover, it indicates that health care professionals are working towards better care for them. Third, when health care professionals encounter FTD patients and their caregivers, they may use the results of this study to inform themselves of the nature of the support they should provide. And finally, the results of this thesis underscore the importance of offering support to FTD caregivers. In the Netherlands, the health care system is prone to much reorganization. The findings of this study demonstrate that support for FTD caregivers should be available and funded.

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# *Samenvatting*

## Frontotemporale dementie

Frontotemporale dementie (FTD), ook wel bekend als de ziekte van Pick, is een degeneratieve ziekte van de hersenen. In tegenstelling tot de ziekte van Alzheimer (AD) staat niet het geheugenverlies centraal maar ondergaan patiënten persoonlijkheidsveranderingen, vertonen ontremd gedrag, raken emotioneel afgevlakt en krijgen problemen met het plannen en uitvoeren van handelingen. Kenmerkend is verder het gebrek aan ziekte besef. In een latere fase raken FTD patiënten veelal afatisch. Gemiddeld ontstaat FTD op de leeftijd van 55 jaar met een ziekteduur van 8 jaar vanaf de diagnose tot aan overlijden.

## Achtergrond

In de zoektocht naar ziekteveroorzakende genen waren onderzoekers van het Erasusmus MC getroffen door het klinische beeld van FTD. Patiënten uit het hele land werkten mee en velen kwamen met hun mantelzorger naar Rotterdam om de klinische diagnose te bevestigen en bloed af te staan voor de wetenschap. Mantelzorgers vertelden over de moeilijkheden die zij ervaarden als mantelzorger. Het gedrag van de patiënt was een prominent pijnpunt, vooral in de periode dat de (juiste) diagnose nog niet was gesteld en het voor mantelzorger en sociale omgeving moeilijk te begrijpen was waarom de patiënt zich afwijkend gedroeg. Was de diagnose eenmaal gesteld dan nog was het uitleggen van de oorzaak van het afwijkende gedrag aan de omgeving moeilijk vanwege de onbekendheid van de ziekte. Er bestonden wel hulpprogramma's voor mantelzorgers van dementerenden, maar deze waren gericht op oudere mantelzorgers van patiënten met de ziekte van Alzheimer. Geen wonder dat de FTD mantelzorgers aangaven de voor hen broodnodige steun niet te kunnen vinden.

Wij startten ons onderzoek naar de zorgbelasting van FTD mantelzorgers om in kaart te brengen hoe het met deze groep mantelzorgers was gesteld, en om te komen tot aanbevelingen hoe hen het beste te ondersteunen. De term zorgbelasting refereert aan de belasting die het verlenen van mantelzorg aan de patiënt uitoefent op het psychisch, lichamelijk, financieel en spiritueel welbevinden van de mantelzorger. In totaal werkten 66 FTD patiënten en hun mantelzorgers uit het hele land mee aan ons twee jaar durende vervolgonderzoek. Dit leverde een aantal belangwekkende bevindingen op.

## Appels en peren

Allereerst vergeleken we de FTD mantelzorgers en patiënten met een groep AD mantelzorgers en patiënten om te controleren of onze indruk dat FTD mantelzorgers verschilden van AD mantelzorgers klopte. We vonden dat beide groepen zich even zwaar emotioneel belast voelden door het gedrag van de patiënt, alhoewel FTD mantelzorgers te maken hadden met ander gedrag dan AD mantelzorgers. Ook vonden we geen verschillen tussen de strategieën die FTD en AD mantelzorgers aanwendden om met hun situatie om te gaan. Wel vonden we dat FTD mantelzorgers zich in het algemeen meer belast voelden door hun zorgsituatie dan AD mantelzorgers. We concludeerden hieruit dat FTD mantelzorgers een grotere behoefte hebben aan ondersteuning dan AD mantelzorgers.

## Nazorg

Van de FTD patiënten in ons onderzoek waren 34 woonachtig in een verpleeghuis terwijl 29 patiënten nog thuis werden verzorgd. Alhoewel de groep mantelzorgers wier partner reeds in een verpleeghuis woonde vaak nog wel een aantal zorgtaken had, zoals bijvoorbeeld 's avonds zelf eten geven aan hun partner, waren deze mantelzorgers vanwege de verpleeghuisopname voor een groot deel ontlast van zorgtaken. Toch rapporteerden beide groepen mantelzorgers gelijke zorgbelasting. Mogelijke verklaring is dat ondanks dat de mantelzorgers minder hoefden te verzorgen, zij zich toch niet minder zorgen maakten. In ieder geval geeft deze bevinding aan dat ook mantelzorgers van in verpleeghuizen woonachtige FTD patiënten nog behoefte hebben aan ondersteuning. Er bestaan in Nederland verpleeghuizen die speciale afdelingen hebben voor jong-dementerenden, die mantelzorgers lotgenotencontact en begeleiding bieden in de vorm van door een psycholoog begeleide praatgroepen. Onze bevindingen onderschrijven de noodzaak van dergelijke voorzieningen.

## Coping

De mantelzorger kan op tal van verschillende wijzen met zijn situatie omgaan. We vonden een aantal strategieën die er op negatieve wijze uitsprongen. Zo vonden we dat vrijwel alle mantelzorgers in de loop van de twee jaar van het onderzoek meer geneigd waren er een depressief reactiepatroon op na te houden. Dit betekent dat mantelzorgers pessimistischer waren over de toekomst en zich niet in staat voelden om iets aan de hopeloosheid van hun situatie te veranderen. Ook zagen we een toename van emotionele expressie van negatieve emoties, zoals boosheid en frustratie. Tegelijkertijd rapporteerden mantelzorgers een toename in negatieve sociale interacties. Dat wil zeggen gebeurtenissen op het sociale vlak die als niet-steunend werden ervaren. Hieruit concluderend lijkt het ons aanbevelenswaardig om met een FTD mantelzorger in nood te exploreren hoe hij omgaat met zijn situatie. Gebruikt hij daarvoor niet adequate coping strategieën zoals het depressief reactiepatroon of coping strategieën die potentieel steunende relaties beschadigen zoals emotionele expressie? Het aanleren van meer doeltreffende coping strategieën kan deze mantelzorger wellicht een eind op weg helpen naar beter psychisch welbevinden.

## Zorgmotivatie

We hebben de mantelzorgers in een diepte interview de open vraag gesteld: wat maakt dat u de zorg voor uw partner volhoudt? Hierop kwam een groot scala aan antwoorden die in vier categorieën te verdelen waren. Veruit de meeste mantelzorgers gaven aan dat zij de mantelzorg als hun huwelijkse plicht zagen; in voor- en tegenspoed. De tweede meest genoemde motivatie was de liefde voor hun partner. Sommige mantelzorgers gaven aan dat het nu eenmaal in hun natuur zat om mantelzorg te verlenen terwijl anderen te kennen gaven het alleen maar vol te houden met voldoende afleiding. Opvallend was dat de mantelzorgers die huwelijkse plicht en hun aard als motivatie noemden minder problemen hadden met hun psychische en lichamelijke gezondheid. Voor zover wij weten zijn wij de eerste onderzoeksgroep die aandacht heeft besteed aan zorgmotivatie voor deze groep. Wij zouden graag zien dat andere onderzoekers zich ook richten op dit fenomeen om te kijken of anderen dezelfde types zorgmotivatie terugvinden en het concept verder uit te diepen.

## Aanpassingsvermogen

We volgden de FTD mantelzorgers en patiënten gedurende twee jaar. Twee jaar waarin de FTD bij de meeste patiënten de laatste fase bereikte. We waren in het bijzonder geïnteresseerd in de ontwikkeling van het psychisch en lichamelijk welbevinden van de mantelzorgers en de kwaliteit van de relatie tussen mantelzorger en patiënt. We ontdekten een groot aanpassingsvermogen. Niet alleen rapporteerden FTD mantelzorgers stabiele niveaus van psychisch en lichamelijk welbevinden, kwaliteit van leven en kwaliteit van hun relatie, zelfs waren hun lichamelijke klachten in de loop van de tijd wat afgenomen. We zouden graag meer vertellen over dit aanpassingsvermogen; hoe het werkt en wat het bevordert of bemoeilijkt. Maar daar hebben we niet de juiste onderzoeksmethoden voor gebruikt. We denken dat het fenomeen 'response shift' de stabiele rapportage van welbevinden en kwaliteit van de relatie verklaart. Response shift betekent dat mensen de interne standaard die ze gebruiken om hun welbevinden te beoordelen, aanpassen aan de omstandigheden waarin ze zich bevinden. Neem bijvoorbeeld kwaliteit van leven. Een FTD mantelzorger beoordeelde zijn kwaliteit van leven vroeger, voordat zijn partner FTD kreeg, misschien wel als 8 op een schaal van 1 tot 10. Een 8 omdat ze een prima relatie hadden, iedereen gezond was, hij een leuke baan had en een hobby. Nu dat zijn partner FTD heeft is het leven behoorlijk veranderd. Toch geeft deze mantelzorger zijn leven nog steeds een 8. Een 8 want de mantelzorger heeft in deze omstandigheden geleerd om de kleine dingen in het leven te waarderen, zoals een mooie zonsondergang, een goede kop koffie of een onverwachts telefoontje van een vriend. Bovendien put de mantelzorger voldoening uit wat hij voor zijn partner kan betekenen. Het cijfer is onveranderd, maar de criteria om tot de 8 te komen wel. Toekomstige onderzoekers die zich willen richten op zorgbelasting raden wij aan om onderzoeksmethoden te hanteren die response shift transparant maken opdat we over dit aanpassingsvermogen meer kunnen leren. In ieder geval kunnen we uit deze bevinding een hoopvolle boodschap halen voor prille mantelzorgers, en dat is dat zij in de loop van de tijd zullen leren om op andere wijze kwaliteit te ervaren in het leven en hun relatie en dat hun welbevinden zich zal stabiliseren ondanks het voortschrijdende ziekte proces bij hun geliefde.

## Balans

Tot slot ontdekten we dat de mantelzorgers die geneigd waren zichzelf op te offeren in de zorg voor de patiënt ook diegenen waren met de meeste psychologische problemen en de laagste kwaliteit van leven. Mantelzorgers die juist werk maakten van zorgen voor zichzelf en een balans hadden gevonden in de zorg voor hun partner en de zorg voor zichzelf voelden zich beter. We verwachten dat het geven van voorlichting over het belang van goed voor jezelf zorgen en het aanbieden van de mogelijkheid, hetzij in tijd, hetzij in financiële middelen om aandacht aan zichzelf te besteden de FTD mantelzorgers een eind op weg kan helpen.

## Onverwerkte rouw

Er zijn wellicht nog andere barrières die FTD mantelzorgers ervan weerhouden om goed voor zichzelf te zorgen. Het zou kunnen zijn dat deze zich opofferende mantelzorgers zich volledig toewijden aan hun zorgtaken omdat zij bang zijn om met zichzelf geconfronteerd te worden wanneer zij aandacht aan hun eigen behoeften en emoties besteden. Een mantelzorger zei eens: 'Het is alsof ik op een vulkaan zit die zal uitbarsten zodra ik loslaat. Ik ben bang voor die uitbarsting, bang om overspoeld te raken en er niet meer uit te komen.' Tijd voor jezelf, iets voor jezelf doen, aandacht voor je behoeften brengt de mogelijke confrontatie met die emoties gevaarlijk dichtbij. Wat zijn dat dan voor emoties? Alle emoties die men ervaart als het gevolg van verlies. FTD mantelzorgers verliezen hun geliefde gaandeweg. Veel mantelzorgers ervaren een innerlijk conflict wanneer zij rouwen om een geliefde die er nog wel is maar toch ook niet. En toch is het voor psychisch en lichamelijk welbevinden belangrijk om gaandeweg te rouwen, verlies per verlies. Een belangrijke bijdrage hieraan kunnen hulpverleners leveren door voorlichting te geven over rouw, het rouwproces te duiden als erbij horend en legitiem en mantelzorgers pro-actief hulp aan te bieden bij rouw.

## Erfelijke FTD

FTD kan ook in erfelijke varianten voorkomen. Nadat in de jaren '90 het ziekteveroorzakende gen was gevonden in drie grote families in Nederland, werd het voor de leden van deze families mogelijk om zich presymptomatisch te laten onderzoeken op dragerschap. Wanneer men drager blijkt te zijn weet men dat men met grote waarschijnlijkheid op een bepaald moment FTD zal ontwikkelen. Aan de leden van deze families was gevraagd of zij interesse zouden hebben in de genetische test wanneer deze beschikbaar werd waarop 27 van de 40 (68%) ondervraagden te kennen gaven dat zij dit zouden willen. Echter, de aanmeldingen voor genetische counseling voor FTD zijn over het afgelopen decennium lager geweest dan we verwachtten, we schatten dat tussen de 7 en 17% van de daarvoor in aanmerking komende familieleden zich hebben gemeld voor erfelijkheidsadvies. Uit de verhalen van diegenen die wel kwamen bleek dat zij veel weerstand ondervonden vanuit hun familie. Familieleden wilden liever niet dat de adviesvrager zich liet testen en adviesvragers hadden moeite om vanuit om families steun te mobiliseren. Wij hebben het idee dat het lage percentage aanmeldingen symptomatisch kan zijn voor een onderliggend separatie-individuatie probleem in FTD families. Wanneer dit soort problematiek speelt is het voor individuele familieleden moeilijk om zelfstandige beslissingen te nemen aangaande genetisch onderzoek omdat mijn en dein niet goed van elkaar is onderscheiden. Het gevaar hiervan is dat een adviesvraag voornamelijk voortkomt uit de wens zich los te maken van de familie, zonder dat de verdere gevolgen van een testuitslag voldoende worden overzien. Hier ligt een belangrijke taak voor genetische counselors om bij FTD adviesvragers de mate van adequate separatie-individuatie te exploreren en additionele begeleiding te bieden indien nodig.

## Beperkingen van het onderzoek

Aan ons onderzoek werkten landelijk 63 van de 111 FTD patiënten en hun mantelzorgers mee. Gezien de relatief lage prevalentie van FTD is dit een aardige instroom. Echter, voor het uitvoeren van statistische analyses is het relatief weinig. Een dergelijke kleine groep is ongunstig voor statistische analyses. Bovendien kan de onderzoeksgroep onderhevig zijn geweest aan selectieve inclusie; de mantelzorgers die overbelast waren hebben wellicht niet aan ons onderzoek meegedaan, en selectieve uitval; onze analyses toonden aan dat zij die gedurende het onderzoek afhaakten zich meer emotioneel belast voelden dan de mantelzorgers die de studie voltooiden, hetgeen de generaliseerbaarheid van de bevindingen bedreigt.

## Conclusies en aanbevelingen

Concluderend kunnen we stellen dat een aantal punten specifieke aandacht verdienen in de ondersteuning van FTD mantelzorgers. Allereerst moet worden geëxploreerd of de mantelzorger gebruik maakt van effectieve coping strategieën. Ten tweede, moet in kaart worden gebracht of de mantelzorger in staat is een balans te bewaren tussen de zorg voor de patiënt en de zorg voor zichzelf. Ten derde, raden wij aan om aandacht te besteden aan rouwverwerking als inherent onderdeel van het verliezen van een geliefde aan dementie. Ten slotte, adviseren wij dat genetische counselors aandacht besteden aan separatie-individuatie problematiek en de invloed van dergelijke problematiek op de motivatie om zich te laten testen.
Toekomstige onderzoekers raden we aan om onderzoeksmethoden te hanteren die het aanpassingsvermogen van mantelzorgers beter in beeld brengen. Verder zouden wij graag zien dat wetenschappelijk onderzoek de plaats die rouwverwerking inneemt in de zorgbelasting beter in kaart brengt.

# Summary

## Frontotemporal dementia

Frontotemporal dementia (FTD), also known as Pick's disease, is a degenerative disease of the brain. In contrast to Alzheimer's disease (AD), memory loss is not the central feature. In FTD, patients develop personality changes, disinhibited behaviour, emotional bluntness and problems with planning and executive functioning. Another feature of FTD is the lack of disease insight. In later stages of the disease patients develop aphasia. The average age of onset of FTD is 55 years with a mean course of FTD from diagnosis until death of 8 years.

## Background

In their search for disease causing genes, researchers of the Erasmus MC were struck by the clinical picture of FTD. Patients from all over the country participated in the study and many were accompanied by their informal caregivers when they visited the hospital in Rotterdam in order to clinically confirm their diagnosis and donate some blood for the research purpose. Informal caregivers revealed the difficulties they experienced as caregivers. The behaviour of the patient was most painful to caregivers, especially during the period when the (right) diagnosis was yet to be made. Caregivers and the social environment of the patient had great difficulty understanding the problematic behaviour of the patient. Even after the diagnosis was made it was hard to gain understanding from the social surroundings because of the fact that FTD was relatively unknown. Support programs for dementia caregivers did exist; however, these were focused on older caregivers of AD patients. Not surprisingly, the FTD caregivers indicated they could not find the support they needed.

We started our research into the burden of FTD caregivers in order to investigate how these caregivers were keeping up, and to generate recommendations regarding how to best support them. Caregiver burden refers to the strain caregiving exerts on the psychological, physical, financial and spiritual well-being of the caregiver. A total of 66 FTD patients and their caregivers participated in our two-year follow-up study. We did a number of significant findings.

## Apples and oranges

First of all, we compared the FTD patients and caregivers to a group of AD patients and their caregivers to find out whether our impression that FTD caregivers differed from AD caregivers was justified. We found that FTD and AD caregivers felt similarly burdened by the patients' behaviour, although the behaviour FTD and AD patients presented differed. Furthermore, we found no differences in the coping strategies FTD and AD caregivers employed in dealing with their situation.  However, we did find that FTD caregivers felt more burdened in general by their caregiving situation than AD caregivers. We concluded that FTD caregivers were in greater need of support than AD caregivers.

### Support after institutionalization

Of the FTD patients included in our study, 34 were living in a nursing home at the start of our study and 29 were living and cared for in their home. Even though the group of caregivers whose patients were already institutionalized were relieved of most of their tasks, many continued to provide care in the institution. Strikingly, both groups of caregivers reported similar caregiver burden. A possible explanation may be that despite the fact that caregivers had fewer tasks; they continued to worry over the patients. This finding illustrates the need to provide support to caregivers even after nursing home placement of the patient. In the Netherlands, some nursing homes offer group sessions to caregivers guided by a trained psychologist. Our findings support the need of such provisions.

### Coping

A caregiver may employ a variety of strategies in coping with the caregiving situation. We identified a few inadequate strategies. Remarkably, nearly all caregivers tended to increase their depressive reaction pattern during the two years we followed them. This pattern implies that caregivers felt more pessimistic about the future and felt unable to influence the hopelessness of their situation. Furthermore, we observed an increase in the emotional expression of negative emotions such as anger and frustration. Simultaneously, caregivers reported an increase in negative, non-supportive social interactions. Concluding, we suggest that professionals providing support to FTD caregivers assess the coping strategies the caregiver employs. Is the caregiver employing inadequate coping strategies such as the depressive reaction pattern or coping strategies that may damage potentially supportive relationships such as emotional expression? Teaching the caregiver to employ more adequate coping strategies may pave the way to enhanced psychological well-being.

### Caregiver motivation

In an in-dept interview we asked caregivers what motives they had for providing such intense care. From the many answers to this question we were able to distil four types of caregiver motivation. Most caregivers indicated they provided care because they felt this was their marital duty. The second most cited motivation was the love the caregiver felt for the patient. Some caregivers indicated that it was in their nature to provide care and others revealed that it was only by seeking enough distraction they were able to provide care. Noticeably, caregivers who stated marital duty and virtue as their motivation had less problems with their mental and physical health than caregivers motivated out of love or who needed distraction. To our knowledge we are the first research group to have paid attention to the phenomenon of caregiver motivation. We would like to see that other research groups also address this phenomenon in order to establish whether the same types motivation may be found and to further explore the concept of caregiver motivation.

## Adaptability

We followed the FTD caregivers and patients during a period of two years. During these two years most of the FTD patients reached the end-stage of the disease. We inspected the evolution of psychological and physical well-being and of the quality of the relationship between the caregiver and the patient. The caregivers displayed great adaptability. Not only did the FTD caregivers report stable levels of psychological, physical well-being and the quality of their relationship, physical health complaints had even decreased somewhat. We would like to provide more information on this adaptability, how it works and how it may be enhanced or impaired. However, our research methods were unfit for that purpose. We suspect that the 'response shift' phenomenon may explain the stable report of well-being and relationship quality. Response shift implies that people adapt to the hardships in life by resetting the internal standards they use to evaluate their quality of life. For instance when everyone was in good health, before FTD started, a caregiver may have rated his life as 8 on a scale from 1 to 10. An 8 may reflect that he had a fairly good relationship with his partner, a nice job, a few good friends and a hobby. His children were doing well and everyone was healthy. Now, he still rates his life as 8 out of 10. He is taking care of his FTD affected partner but at least she is still living at home. The FTD of his partner has brought him and the children closer together and seeing the deterioration in his partner had made him appreciate the small things in life. Moreover, the caregiver may experience a sense of fulfilment in being able to provide this care to his beloved. We recommend that researchers interested in studying caregiver burden adopt research methods that are fit to analyse response shift. We expect there is a lot to be learned with regard to response shift.

From these findings we may protract a hopeful message to caregivers at the beginning of their caregiving career, which is that in time they will find ways to experience quality of life and satisfaction from their relationship in spite of FTD.

## Balance

Finally, we discovered that the FTD caregivers who were inclined to sacrifice themselves in their caregiving role were those who had most psychological problems and least quality of life. Caregivers who actively paid attention to their own needs and who were able to maintain a balance in caring for the patient and caring for themselves were doing better with respect to their well-being. We expect that short psycho-educative sessions for the caregiver on self-care; what it implies and how to do it, and offering the means to create personal time may improve the balance between caring for the patient and caring for the self.

## Unprocessed grief

There may be other barriers withholding FTD caregivers from providing good selfcare. A caregiver once said: “It is as if I were sitting on a volcano, that will erupt as soon as I let go. I am afraid of that eruption, afraid to be submerged and unable to ever get out.” Spending time alone, attending one's needs brings the confrontation with one's emotions dangerously close. Caregivers have many emotions, emotions associated with the gradual loss of their beloved to a devastating disease. Many caregivers experience inner conflict when they mourn a loved one who is still alive. For psychological and physical well-being it is important to grieve along the way. Health care professionals may contribute by providing psycho-education on grieving and actively offering grief counseling.

## Hereditary FTD

FTD may also be hereditary. After the identification of the FTD causing gene in three large families in the Netherlands, the members of these families were offered the possibility of receiving a presymptomatic genetic test to establish their carrier status. Knowing one is a carrier implies knowing with great certainty that one will at some point develop FTD. The members of these families were asked beforehand whether they would be interested in taking the test once it became available and 27 out of 40 (68%) family members indicated that they indeed would be interested. However, the uptake of genetic counseling for FTD over the pas decade has been much lower than expected, ranging between 7 and 17 %. From the stories of those family members who did present for genetic counseling it appeared that FTD counselees experienced strong familial opposition against genetic testing. Family members did not want the counselee to be tested and counselees experienced great difficulty in mobilizing social support from the family. We hypothesize that the low percentage of counselees presenting for FTD genetic testing may be symptomatic for an underlying separation-individuation problem in FTD families. When this kind of family opposition is at hand, it is difficult for individual family members to reach independent decisions regarding genetic testing because counselees' motivations for testing tend to be fused with the normative values of their family. These counselees may pursue testing because the nuclear family pushes them in that direction or, on the contrary, refrain from testing under familial pressure. Genetic testing in such families may be instrumental allowing counselees to "escape" from family enmeshment, and other consequences of genetic testing may be overlooked. Here lies an important task for the genetic counselor in addressing the degree of separation-individuation of the counselee and her or his wish for genetic testing.

## Limitations of the study

A total of 64 out of 111 FTD patients and their caregivers nationwide participated in our study. Given the prevalence of FTD this is a satisfactory uptake. However, with regard to statistical analyses this is a relatively low number. Such a small sample size is unfavourable for statistical analyses. Moreover, our sample may have been subject to selective inclusion; those who were overburdened may have declined participation and selective dropout; those who dropped out of the study were more heavily burdened by the behaviour of the patient, thus threatening the generalizability of the results.

## Conclusions and recommendations

In concluding, a number of issues warrant special attention in supporting FTD caregivers. First of all, an assessment of the coping strategies a caregiver employs should be made. Second, it should be explored whether the caregiver is maintaining a balance in caring for the patient and caring for himself. Third, we recommend addressing the processing of grief as an inherent aspect of loosing a loved to dementia. Fourth, we recommend that genetic counselors address separation-individuation problems and their influence on the motivation for genetic testing in FTD counselees.

We suggest that future researchers employ research methods that may reveal the adaptability of caregivers. Finally, we would like to see that future researchers investigate the share of processing grief in the experience of caregiver burden.

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# *Curriculum Vitae*

Samantha Riedijk is in 1978 te Vlaardingen geboren. Tussen vier en vijf VWO verbleef ze een jaar in Zuid-Frankrijk alwaar zij op het Lycee Jean Aicard te Hyères de 'seconde' volgde. In 1997 behaalde zij haar VWO diploma op het Montessori Lyceum te Rotterdam. Alvorens te beginnen aan haar studie Psychologie aan de universiteit van Leiden reisde zij een jaar door Australië in het kader van een working holiday. In 2001 participeerde zij in het Honours Programme 'From genotype to phenotype' van de universiteit Leiden. In 2004 studeerde ze cum laude af in de klinische en gezondheidspsychologie. Haar afstudeerscriptie 'Hereditary melanoma and predictive genetic testing; Why not?', geschreven bij de afdeling klinische genetica van het Leids Universitair Medisch Centrum, verscheen in Psycho-Oncology in 2005. Sinds 2004 werkt ze als medisch psycholoog bij de afdeling klinische genetica van het Erasmus MC, met als takenpakket patiëntenzorg, onderwijs en wetenschappelijk onderzoek. Voor haar promotie onderzoek werkte ze nauw samen met de afdeling Medische Psychologie en Psychotherapie van het Erasmus MC. Sinds 2008 is ze lid geworden van de landelijke FTD expert groep. Tevens is ze sinds 2008 werkzaam als freelance trainer communicatievaardigheden in het bedrijfsleven.

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