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Epidemiology

The course of neuropsychiatric symptoms in patients with dementia in primary care

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Abstract

Background. During the course of dementia, most people develop some type of neuropsychiatric symptoms (NPS), which result in lower quality of life, high caregiver burden, psychotropic drug use and a major risk of institutionalization. Studies on NPS in people with dementia have been mainly conducted in clinical centres or psychiatric services.

Objectives. To investigate the course of NPS in people with dementia in primary care.

Methods. Analysis of (cumulative) prevalence and incidence, persistence and resolution based on data collected during an assessment at home of a prospective naturalistic cohort study in primary care in a sample of 117 people with dementia and their informal caregivers. Subsyndromes of NPS were assessed with the Neuropsychiatric Inventory (NPI) and Cohen-Mansfield Agitation Inventory. Multivariate analyses were used to detect determinants for the course of NPS.

Results. The mean age of the people with dementia was 78.6 years, and 52% were female. Mean Mini-Mental State Examination total score was 19.5, mean NPI total score 15.7. The most prevalent clinically relevant subsyndromes of the NPI were hyperactivity and mood/apathy, and the most prevalent individual NPS were aberrant motor behaviour (28%), agitation/aggression (24%) and apathy/indifference (22%). Of the people with dementia, 72.3% had one or more symptoms of the mood/apathy and 75.3% of the hyperactivity subsyndrome.

Conclusions. GPs should be aware of NPS in people with dementia and should actively identify them when they visit these patients or when informal caregivers consult them. Timely diagnosing facilitates adequate professional care.

Key words: Caregivers, dementia, geriatrics, health risk behaviours, mental health, primary care.

Introduction

Dementia is a syndrome characterized by deterioration in memory, thinking, behaviour and everyday activities. Worldwide, around 47 million people, have dementia, and there are nearly 10 million new cases every year (1). In the Netherlands, >260 000 people have dementia of whom 70% are community-dwelling (2). Of these, 60% live with their informal caregiver and 40% alone (3). During the course of dementia, most people develop some type of challenging behaviour, also called neuropsychiatric symptoms (NPS) (4).

NPS can be categorized in behavioural subsyndromes: mood/apathy, hyperactivity and psychosis. Mood/apathy and hyperactivity are the most common subsyndromes with delusions, wandering/agitation, aberrant motor behaviour and apathy as the highest prevalent individual symptoms (4,5). Moreover, NPS are persistent although frequency parameters vary considerably across studies (4). For hallucinations, delusions, paranoia, aggression, wandering/agitation, aberrant motor behaviour, anxiety, irritability, disinhibition, apathy and sleep disturbance increasing trends in point prevalence rates at successive measurements have been found (4,6).

Almost all studies on the course of NPS in community-dwelling people with dementia were conducted in ambulatory patients visiting outpatient memory, (old-age) psychiatry, neurological or geriatric clinical centres or dementia services (4). In these studies, most participants were living at home. Some were living in long-term care facilities, and some studies did not specify whether or not the study population was institutionalized (4,7–9).

The only Dutch study on the course of NPS in community-dwelling people with dementia, the MAAstricht Study of BEhaviour in Dementia (MAASBED), was conducted in people with dementia enrolled from outpatient psychiatry-based clinics. This study found high incidence and prevalence rates and high persistence after 2 years (5).

In the Netherlands, basic medical care for community-dwelling older people is provided by GPs. In long-term care facilities, medical care is provided by specifically trained medical doctors called elderly care physicians (10). Only a small proportion of people in general practice are referred to outpatients' memory, (old-age) psychiatry, neurological and geriatric clinical centres, which is considered secondary care. Therefore, it is likely that a study population visiting outpatient clinical centres has more severe and frequent symptoms than the total group of people with dementia in primary care.

The GP is most often the first physician consulted for dementia-related problems and has an important role in prescribing psychotropic drugs, such as antipsychotics, antidepressants, anxiolytics and hypnotics (11–13). The use of antipsychotics is associated with higher NPI scores (11). Greater cognitive impairment, higher baseline severity of NPS and increased functional impairment are associated with more NPS; the use of support services, like day and respite care and training courses for caregivers, is associated with less NPS over time (14–19). Higher frequency of NPS is associated with higher levels of psychological distress in informal caregivers of people with dementia. However, the evidence is not conclusive as to if some NPS are more stressful for informal caregivers than others (20–24).

To our knowledge, prospective studies on the course of NPS have not been conducted in patients exclusively from general practices. Such a study would help GPs and other professionals in primary care in the management of their patients with dementia, especially with respect to the planning of follow-up visits and the timing of psychoeducation, psychosocial interventions and the provision of care. Therefore, the aim of this study was to investigate the course of NPS and to detect determinants for the course of NPS in people with dementia in primary care.

Methods

This is a prospective naturalistic cohort study in primary care in the southern part of the Netherlands with a follow-up of 18 months. All participants were living at home and cared for by an informal caregiver at the start of this study. All 192 known GPs in 114 general practices were invited of whom 37 GPs in 18 general practices participated. Patients were assessed at baseline and after 9 and 18 months. Follow-up was continued after admission to a long-term care facility. Details of this study have been described previously (21,25,26). A trained research assistant collected data during an interview with patient and informal caregiver at home at baseline (T0), at 9 months (T1) and at 18 months (T2)

Patients and informal caregivers

The electronic medical files of the 18 participating practices were screened between January and July 2012. We identified and recruited dyads of patients with a diagnosis of dementia and their informal caregivers. Patients living in a long-term care facility or with an estimated life expectancy of <3 months were excluded. Patients, or their legal representatives, and caregivers gave written informed consent. The regional Committee on Research Involving Human Subjects in the Netherlands judged that this project could be carried out without formal approval.

Assessment instruments

Information about age and gender of the patient, about caregivers' age, gender and relation to the patient and about the use of health care services such as day care services, home and domestic care services and case management was collected (27).

NPS of the patient were assessed with the Neuropsychiatric Inventory (NPI) and the Cohen-Mansfield Agitation Inventory (CMAI). The NPI consists of 12 categories of NPS: delusions, hallucinations, agitation/aggression, depression, anxiety, euphoria, disinhibition, irritability/lability, apathy, aberrant motor activity, sleeping disorder and eating disorder. Based on previous studies, we categorized the NPI in three behavioural subsyndromes, relevant for the GP: mood/apathy (depression, apathy, nighttime behaviour disturbances, and appetite and eating abnormalities), psychosis (delusions and hallucinations), and hyperactivity (agitation, euphoria, irritability, disinhibition, and aberrant motor behaviour). Anxiety is regarded as a separate symptom (28). For each individual symptom, the severity and frequency are scored with structured questions administered to the patients' caregiver. The final score for each symptom is obtained by multiplying severity (score: 1–3) with frequency (score: 1–4). Symptom scores are combined to an overall score with a range of 0–144 with higher scores indicating a more severe symptom burden. In line with previous studies, a score >3 for an individual symptom was defined as clinically relevant (5,29–31).

The CMAI was developed to assess the frequency of agitated behaviours. It has 29 items scored on a 7-point frequency scale (1 = never, 2 = <once a week, 3 = 1–2 times per week, 4 = several times per week, 5 = 1–2 times per day, 6 = several times per day and 7 = several times per hour). Symptom scores are combined to an overall score with a range of 29–203 with higher scores indicating a more severe symptom burden (32–34). In line with a previous study, we categorized the items in three subsyndromes: physically aggressive (spitting, cursing/verbal aggression, hitting, grabbing, pushing, strange noises, screaming and scratching), physically non-aggressive (pace/aimless wandering, inappropriate dressing/disrobing, trying to get to a different place, handling things inappropriately, hiding things, hoarding things and general restlessness) and verbally agitated behaviour (constant unwarranted request for attention/help, repetitive sentences/questions, complaining and negativism) (34). A score ≥3 was defined as clinically relevant (34).

Cognition of the patient was assessed with the Mini-Mental State Examination (MMSE) ranging from 0 to 30 (35).

Psychotropic drug use of the patient was classified according to the Anatomical Therapeutic Chemical classification system: antipsychotics (N05A), antiepileptic medication (N03A), antidepressants (N06A), anxiolytics (N05B), hypnotics (N05C) and anti-dementia medication (N06D) (36).

For the assessment of psychological distress of the informal caregivers, the Sense of Competence Questionnaire (SCQ) was used (range 27–135), a 27-item questionnaire of which higher scores indicate lower feelings of burden (37,38).

Fourteen of the 18 general practices participated in a special care program called CONCERN (Care Optimization for Non-professional Caregivers of Elderly with dementia and Reduction of Neuropsychiatric symptoms) after baseline measurements. In CONCERN a GP, case manager and an elderly care physician systematically collaborate to improve dementia care in order to reduce NPS (25). Other participants received care as usual.

Data analysis

Data were analysed using the Statistical Package for Social Science 23.0. We used descriptive statistics for data at T0, T1 and T2. Analysis of variance, chi-square tests and *t*-tests were used to analyse differences between patient and caregiver dyads who completed the study and those who were lost to follow-up, and between patients with and without admission to a long-term care facility during follow-up.

We made three categories for cognition of the patient: 0–9, 10–19 and 20–30. Six patients had no MMSE in all three assessments because assessment was too stressful or because of absence due to stay at day care centres. It was assumed for these patients to have a low MMSE score 0–9 because they visited day care centres and used home care services and four of these patients were admitted to a long-term care facility after baseline and before T1 measurements. Eight patients were lost to follow-up. Therefore, at baseline, the numbers of patients in the different subgroups were MMSE score 0–9; *n* = 15 (13.8%); score 10–19; *n* = 31 (28.4%); score 20+; *n* = 63 (57.8%).

The prevalence (point and cumulative), cumulative incidence and persistence of each NPS at each assessment were expressed as the percentage of patients with scores >3 on any item of the NPI or subsyndrome. 'Point prevalence' was defined as the proportion of patients with a specific NPS at each assessment, 'cumulative prevalence' as the proportion of patients developing a specific NPS on at least one assessment, 'cumulative incidence' as the proportion of patients who were symptom-free at baseline but developed the specific NPS at subsequent assessments, 'persistence' as a NPS present on at least two or during all three subsequent assessments, regardless of time of first manifestation of the NPS and 'resolution' as the proportion of patients who showed a specific symptom at baseline but not at the next assessments (5).

We used a random intercept mixed model in the multivariate analysis which took into account the clustering of measurements within patients and the clustering of patients within a general practice. Dependent variables were NPI total score and the NPI and CMAI subsyndromes. Independent variables were patients' age and gender, cognition of the patient, psychotropic drug use, patient–caregiver relationship, psychological distress of informal caregiver, use of respite care or personal health care at baseline and participation in CONCERN, all at baseline.

To investigate the course of NPS over time, a model with time as a discrete independent variable was used. We compared a model with interaction terms of the independent variables with time (model 2) with a restricted model without those interaction terms (model 1) using a likelihood ratio test (39).

Results

In the 18 participating general practices, 243 patients with dementia were identified of whom 117 (48%) were included (Figure 1). In total, 32 dyads (27.4%) were lost to follow-up during the study: 19 dyads (16.2%) between T0 and T1 and 13 dyads (11.1%) between T1 and T2. Twenty-one patients were admitted to a LTCF between T0 and T1 and four patients between T1 and T2. Of these 25 admitted patients, 15 completed the study.

Characteristics of study population

Characteristics of patients and informal caregivers at baseline and separately for the patients who were lost to follow-up or institutionalized during follow-up are presented in Table 1 according as the patients who refused to participate or were withdrawn. Only 4% of the patients were younger than 65 years. Mean MMSE total score: at baseline 19.5 (SD 5.6; *n* = 97), after 9 months 19.6 (SD 6.9; *n* = 70) and after 18 months 15.1 (SD 9.4; *n* = 63). Mean NPI total score: at baseline 15.7 (SD 15.4; *n* = 116), after 9 months 17.8 (SD 16.7; *n* = 97) and after 18 months 20.3 (SD 15.6; *n* = 85).

Course of NPS

At baseline, aberrant motor behaviour (28.4%), agitation/aggression (23.9%) and apathy/indifference (22.4%) were the most prevalent clinically relevant symptoms, and their prevalence continued to be high or increased throughout the study (Table 2). Irritability/lability
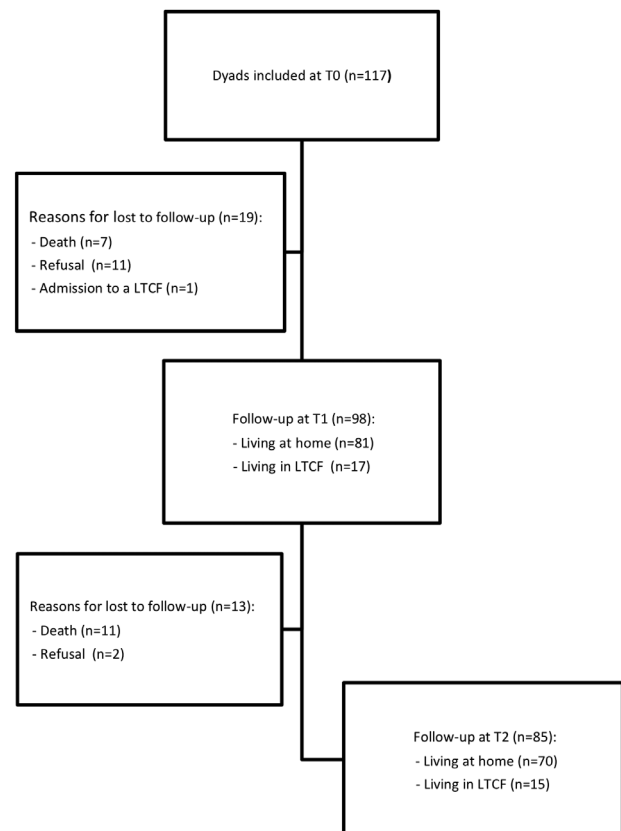
Figure 1. Recruitment of patients with dementia in primary care and follow-up (2012 and 2013). Dyads = patient and caregiver; LTCF = long-term care facility; *n* = number of participants; T0 = baseline, T1 = after 9 months; T2 = after 18 months

Table 1. Characteristics of patients with dementia and informal caregivers (*n* = 117) in primary care (2012)

	Baseline (*n* = 117)	Lost to follow-up[a]	LTCF[b]	Refusal + withdrawn[c]
		Baseline (*n* =32)	Baseline (*n* = 25)	(*n* = 126)
Patient characteristics				
Age, years (SD) [range]	78.6 (7.1) [57–91]	80.8 (6.9) [65–91]*	80.9 (6.9) [68–91]	79.2 (6.8) [63–92]
Age subgroup [*n* (%)]				
<70 years	15 (12.8%)			
70–80 years	55 (47.0%)			
>80 years	47 (40.2%)			
Sex (*n* (%))				
Male	56 (47.9%)	11 (34.4%)	13 (52.0%)	42 (33.3%)
Female	61 (52.1%)	21 (65.6%)	12 (48.0%)	84 (66.7%)
MMSE total score, mean (SD) [range]	19.5 (5.6) [0–27] [*n* = 97]	18.4 (6.6) [*n* = 24]	17.81 (4.2) [*n* = 16]	
MMSE score [*n* (%)]	[*n* = 109]			
0–9	15 (13.8%)			
10–19	31 (28.4%)			
20–30	63 (57.8%)			
NPI total score, mean (SD)	15.7 (15.4) [*n* = 116]	18.8 (18.9) [*n* = 31]	24.2 (21.0)*	
Psychotropic drug use [*n* (%)][d]				
None	54 (47.0%) [*n* = 115]			
At least one	61 (53.0%)			
At least 2 different	16 (13.9%)			
At least 3 different	4 (3.5%)			
Psychotropic medication	[*n* = 114]			
No psychotropic medication	54 (47.0%)			
Antipsychotics	11 (9.6%)			
Antiepileptics	6 (5.2%)			
Antidepressants	20 (17.4%)			
Anxiolytics	3 (2.6%)			
Hypnotics	3 (2.6%)			
Anti-dementia	39 (33.6%)			
Caregiver characteristics				
Age, years (SD) [range]	67.3 (13.3) [32–92]	64.9 (16.7) [32–92]	63.3 (12.1) [46–87]	66.0 (14.0)[28–92] [*n* = 95]
Sex [*n* (%)]				
Male	37 (31.6%)	11 (34.4%)	4 (16.0%)	41 (33.1%) [*n* = 124]
Female	80 (68.4%)	21 (65.6%)	21 (84.0%)	84 (66.9%) [*n* = 124]
Relationship [*n* (%)]			*	
Spouse	76 (65.0%)	18 (56.2%)	11 (44.0%)	60 (49.2%) [*n* = 122]
Child	34 (29.1%)	11 (34.4%)	13 (52.0%)	55 (45.1%) [*n* = 122]
Other	7 (5.9%)	3 (9.4%)	1 (4.0%)	7 (5.7%) [*n* = 122]
SCQ total score, mean (SD) [range]	98.7 (15.9) [40–128] [*n* = 115]	98.5 (17.0) [32–92]	92.0 (17.0) [58–128]*	
Use of care services [*n* (%)]				
CONCERN	59 (50.4%)	14 (43.8%)	9 (36.0%)	
Case management	34 (29.3%) [*n* = 116]	9 (29.0%) [*n* = 31]	3 (12.0%)*	
Respite care	40 (34.2%)	10 (31.2%)	12 (48.0%)	
Home care services, including domestic care	69 (59.0%)	23 (71.9%)	22 (88.0%)*	

LTCF, long-term care facility; *n*, number of subjects.

[a]Lost to follow-up: baseline characteristics of dyads who were lost to follow-up during the study (*n* = 32).

[b]LTCF: baseline characteristics of patients who were admitted to a LTCF during the study (*n* = 25).

[c]Refusal + withdrawn: baseline characteristics of dyads who refused (*n* = 121) or withdrew their consent (*n* = 5) before start of the study.

[d]Psychotropic drug use: antipsychotics, antiepileptic medication, antidepressants, anxiolytics, hypnotics or anti-dementia medication.

*$P < 0.05$.

prevalence increased throughout the study. Delusions, disinhibition, euphoria/elation and hallucinations were infrequent.

Mood/apathy subsyndrome

The prevalence of the mood/apathy subsyndrome was stable throughout the study. Of the participants with dementia, 72.3% had one or more symptom. The high cumulative prevalence could be largely attributed to the symptom apathy/indifference (51.2%). The cumulative incidence was 47.7% for the mood/apathy subsyndrome and 38.8% for the symptom apathy/indifference.

Hyperactivity subsyndrome

Hyperactivity was the most prevalent subsyndrome at each measurement and increased throughout the study. Of the participants

Table 2. Frequencies of clinically relevant NPI symptoms and subsyndromes (NPS ≥4) and CMAI subsyndromes (score ≥3) of patients with dementia in primary care (2012)

	Point prevalence			Cumulative prevalence (n = 85)	Cumulative incidence	Persistence (n = 85)		Resolution
	Baseline (n = 117)	9 months (n = 97)	18 months (n = 85)			2 times	3 times	
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
NPI								
Mood/apathy	55 (47.4) (n = 116)	49 (51.0) (n = 96)	41 (50.0) (n = 82)	60 (72.3) (n = 83)	21 (47.7) (n = 44)	35 (41.7) (n = 84)	17 (20.0)	6 (15.4) (n = 39)
Dysphoria/depression	19 (16.2)	16 (16.7) (n = 96)	9 (10.8) (n = 83)	25 (30.1) (n = 83)	11 (15.9) (n = 69)	8 (9.5) (n = 84)	0 (0.0) (n = 84)	6 (42.9) (n = 14)
Apathy/indifference	26 (22.4) (n = 116)	33 (34.0)	25 (29.8) (n = 84)	43 (51.2) (n = 84)	26 (38.8) (n = 67)	18 (21.2)	8 (9.4)	7 (41.2) (n = 17)
Nighttime behaviour disturbance	22 (19.0) (n = 116)	14 (15.1) (n = 93)	13 (17.1) (n = 76)	25 (32.1) (n = 78)	12 (18.5) (n = 65)	6 (7.2) (n = 83)	2 (2.4) (n = 84)	3 (27.3) (n = 11)
Appetite/eating abnormalities	22 (18.8)	19 (19.6)	19 (22.6) (n = 84)	34 (40.5) (n = 84)	19 (27.5) (n = 69)	8 (9.4)	2 (2.4)	5 (33.3) (n = 15)
Hyperactivity	57 (48.7)	50 (51.5)	50 (58.8)	64 (75.3)	26 (55.3) (n = 47)	37 (43.5)	21 (24.7)	4 (10.5) (n = 38)
Agitation/aggression	28 (23.9)	23 (23.7)	27 (31.8)	39 (45.9)	22 (32.4) (n = 68)	12 (14.1)	8 (9.4)	5 (29.4) (n = 17)
Euphoria/elation	7 (6.0) (n = 116)	1 (1.0)	2 (2.4)	6 (7.1)	1 (1.3) (n = 80)	0 (0.0)	0 (0.0)	4 (80.0) (n = 5)
Irritability/lability	19 (16.2)	27 (28.1) (n = 96)	23 (27.1)	36 (42.4)	22 (31.0) (n = 71)	17 (20.0)	7 (8.2)	3 (21.4) (n = 14)
Disinhibition	11 (9.4)	10 (10.3)	6 (7.1)	14 (16.5)	8 (10.1) (n = 79)	4 (4.7)	1 (1.2)	4 (66.7) (n = 6)
Aberrant motor behaviour	33 (28.4) (n = 116)	32 (33.0)	36 (42.4)	50 (58.8)	31 (47.0) (n = 66)	19 (22.4)	7 (8.2)	3 (15.8) (n = 19)
Psychosis	12 (10.3)	18 (18.6)	10 (11.8)	20 (23.5)	13 (16.7) (n = 78)	8 (9.4)	3 (3.5)	2 (28.6) (n = 7)
Delusions	12 (10.3)	14 (14.4)	9 (10.6)	18 (21.2)	11 (14.1) (n = 78)	7 (8.2)	3 (3.5)	3 (42.9) (n = 7)
Hallucinations	3 (2.6)	6 (6.2)	4 (4.7)	6 (7.1)	5 (6.0) (n = 84)	1 (1.2)	1 (1.2)	0 (0.0) (n = 1)
Anxiety	20 (17.1)	18 (18.8) (n = 96)	13 (15.3)	28 (33.3) (n = 84)	13 (18.8) (n = 69)	12 (14.1)	5 (5.9)	6 (40.0) (n = 15)
CMAI subsyndromes								
Physically aggressive	28 (23.9)	23 (23.7)	35 (41.2)	58 (49.6)	30 (40.0)	13 (15.3)	33 (38.8)	6 (31.6)
Physically non-aggressive	72 (61.5)	56 (57.7)	60 (70.6)	97 (82.9)	25 (58.1)	8 (9.4)	59 (69.4)	4 (8.5)
Verbally agitated	82 (70.1)	70 (72.2)	60 (70.6)	103 (88.0)	21 (63.6)	48 (56.5)	41 (48.2)	5 (9.3)

n, number of subjects.

Point prevalence: the proportion of patients with specific symptoms at each assessment; Cumulative prevalence: the proportion of patients developing a symptom on at least one assessment over the 18-month study period; Cumulative incidence: the proportion of patients who were symptom-free at baseline but developed the symptom at subsequent assessments; Persistence: symptom was present on at least two subsequent assessments, regardless of time of the first manifestation and persistence of NPS during all three assessments; Resolution: the proportion of patients who showed a specific symptom at baseline but not at the next assessments.

with dementia, 75.3% had one or more symptom. The high cumulative prevalence could be largely attributed to the symptom aberrant motor behaviour (58.8%). The cumulative incidence was highest for the subsyndrome hyperactivity (55.3%), and in particular for aberrant motor behaviour (47.0%).

Psychosis subsyndrome

Of the psychosis subsyndrome, 23.5% of the participants with dementia had one or more symptoms throughout the study.

Persistence and resolution of NPI subsyndromes

Participants with dementia who had one or more symptoms of the hyperactivity or mood/apathy subsyndrome on one assessment were highly likely to still have symptoms at the next assessment. Of the 85 participants with a complete follow-up, 24.7% demonstrated at least one or more clinically relevant symptom of the hyperactivity subsyndrome and 20.0% of the mood/apathy subsyndrome at all assessments. Aberrant motor behaviour (22.4%) and apathy/indifference (21.2%) showed the highest persistence for two consecutive measurements.

Euphoria/elation (80.0%) and disinhibition (66.7%) are the clinically relevant symptoms of the hyperactivity subsyndrome which are most likely to be present at baseline but not at the next two assessments. For the mood/apathy subsyndrome, these symptoms are dysphoria/depression (42.9%) and apathy/indifference (41.2%), and for the psychosis subsyndrome, it is delusions (42.9%). The symptom anxiety (40.0%) is also likely to be present at one measurement but not at the next two assessments.

CMAI subsyndromes

Verbally agitated subsyndrome was the most prevalent subsyndrome of the CMAI at each measurement and remained stable throughout the study. The prevalence rates of symptoms of the physically aggressive and non-aggressive subsyndromes of the CMAI increased between 9 and 18 months of follow-up. Throughout the study, 88.0% of the participants with dementia had one or more verbally agitated symptoms, 82.9% had one or more symptoms of the physically non-aggressive subsyndrome compared with 49.6% of the physically aggressive subsyndrome. For the CMAI, the cumulative incidence was highest for the verbally agitated subsyndrome (63.3%), but the cumulative incidence for the physically non-aggressive subsyndrome was almost as high (58.1%). Participants with dementia who had one or more symptoms of the physically non-aggressive subsyndrome of the CMAI at baseline were highly likely to have symptoms again at the next two assessments (69.4%). This was also high for the verbally agitated subsyndrome (48.2%) and the physically aggressive subsyndrome (38.8%). The symptoms of the physically aggressive subsyndrome of the CMAI were most likely to be present at baseline but not at the next two assessments.

Multivariate analysis of determinants

The majority of the multivariate analysis of determinants did not show statistically significant results. For the NPI subsyndrome mood/apathy, we found a significant different course in time for cognition of the patient ($P = 0.02$), participation in CONCERN ($P = 0.005$) and for respite care ($P = 0.002$) and for the CMAI subsyndrome physically aggressive behaviour for relationship of the informal caregiver to the patient ($P = 0.000$). All results are shown in Supplementary Table S1 and Supplementary Figure S1, available as supplementary material.

Discussion

In this prospective naturalistic cohort study in primary care, we found that 72.3% of the participants with dementia had one or more symptoms of the NPI mood/apathy subsyndrome and 75.3% of the hyperactivity subsyndrome. Almost 50% of the participants with dementia without one or more symptoms of the mood/apathy and hyperactivity subsyndrome at baseline measurements developed these at subsequent measurements. The symptoms aberrant motor behaviour, apathy/indifference and in a slightly lesser degree agitation/aggression occurred frequently and were persistent. Most participants with dementia remained free of symptoms of the psychosis subsyndrome. Euphoria/elation, disinhibition, dysphoria/depression, apathy/indifference, delusions and anxiety are the symptoms that are most likely to resolve. The verbally agitated subsyndrome was the most prevalent subsyndrome of the CMAI, 88.0% of the people with dementia had one or more verbally agitated symptoms and 82.9% had one or more physically non-aggressive symptoms. We found a different course in time for participation in CONCERN for the NPI subsyndrome mood/apathy specifically between baseline and after 9 months of follow-up, but in our opinion, it is not possible to differentiate the relevance of this in clinical practice.

Comparison with the literature

Except for delusions, the most prevalent individual symptoms in our study were aberrant motor behaviour, apathy/indifference and agitation/aggression with increasing point prevalence rates, which is in accordance with former studies (4).

This study confirms our hypothesis that a study population visiting outpatient clinical centres in the Netherlands have more severe and frequent symptoms than the total group of people with dementia in primary care. In the Dutch MAASBED study, there was a higher occurrence of all subsyndromes, but the most prevalent and incident symptoms were similar (5).

Individual clinically relevant NPS in community-dwelling people with dementia in Australian Memory Clinics and in the DelpHi-Study (Dementia: life- and person-centred help) were less prevalent than among people with dementia in primary care in our study. This is probably a selection issue as the Australian study population partly consisted of people with mild cognitive impairment (6) and in the DelpHi-Study after screening only 46% of the people with dementia had a diagnosis of dementia before the start of the study (40).

Strengths and limitations

In this study, patients and informal caregivers were included from general practices. The sample was heterogeneous with patients in all stages of dementia. Dyads were followed beyond admission to a long-term care facility. The lost to follow-up rate during 18 months was low.

Limitations of our study are the rather low participation of general practices (114 invited, 18 participated) and the difference between the participants and non-participants which indicates selection bias. Moreover, general practices and dyads who participated in CONCERN are different from those who did not, and this also might result in selection bias. This might affect the prevalence, incidence and persistence of symptoms. Another limitation is that there are three assessments during the follow-up period of 18 months. Variations in NPS between two successive assessments are unknown. Finally, there were missing data for the MMSE at baseline. We assumed that six patients without MMSE scores in all three measurements have low MMSE scores (0–9) because they visited day care centres and used home care services, and four of these patients were admitted to a LTCF after baseline and before T1 measurements. This may have led to misclassification bias.

For the CMAI, we categorized the items in three subsyndromes in line with a previous study in Dutch nursing homes because our study population was too small to perform a factor analysis. We assumed that the factor structure would be the same for our Dutch primary care population.

Implications

The results of this study showed that NPS of the subsyndromes hyperactivity and mood/apathy, and specifically aberrant motor behaviour, apathy/indifference and agitation/aggression, are highly prevalent, incident and persistent in Dutch people with dementia in primary care. NPS are associated with psychological distress in informal caregivers of people with dementia in primary care.

Consequently, GPs should be aware of this and should actively identify these symptoms when they visit these patients or when informal caregivers consult them about these patients or for themselves. Timely diagnosing NPS facilitates adequate professional care that might either train caregivers to prevent those symptoms to deal with them in an effective way or to look for additional assistance. This probably enables people with dementia to remain longer in their own environment and reduce their informal caregivers' psychological distress.

Supplementary material

Supplementary material is available at *Family Practice* online.

Declaration

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