Cognitive impairment in depressed outpatients as measured with the Dementia Checklist: a simple method for primary care and in field research

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ABSTRACT *The Dementia Checklist is a 12-item dementia rating scale for physicians who, for whatever reason, cannot be specifically trained. It addresses symptoms of cognitive decline that can easily be identified, and that are typical for different stages of cognitive impairment. This allows an easy classification of the severity of dementia. In a first study, the dementia checklist was used in 937 geriatric outpatients who were treated by neuropsychiatrists for depression. All items contribute to the accuracy of measurement (Cronbach's $\alpha = 0.84$). Differences in cognitive impairment depending on age ($\chi^2 = 51.7$; $p \leq 0.001$) and depression ($\chi^2 = 47.6$; $p \leq 0.001$) indicate external validity of the dementia checklist and 5.7% of the outpatients were rated as demented. The Dementia Checklist provides a very economical and easy-to-use assessment of cognitive decline.*

Key words: dementia, cognitive impairment, staging methods, depression, elderly outpatients, fluoxetine

Introduction

Dementia is an organic syndrome characterized by a gradual decline in many mental activities within the domains of memory, language, concentration, and orientation. It also affects other cognitive abilities. Alzheimer's disease (AD) and vascular diseases (VaD) are the most common causes (Jenike, 1996). Dementia is one of the most common mental disorders in the elderly (Helmchen et al., 1999). Epidemiological studies have reported prevalence rates of moderate and severe dementia from 2.8% to 4.4% in the population over 60 years, from 2.0% to 7.8% in the population over 65 years, and up to 20% and more in the population over 85 (Jorm et al., 1987; Jenike, 1996). Prevalence rates of dementia vary as a function of different methods and criteria applied in different studies (Jorm et al., 1987; Mowry and Burvill, 1988; Johansson and Zarit, 1991). The relationship between

prevalence and age was found to be consistent across studies, with prevalence rates doubling about every five years (Jorm et al., 1987). As life expectancy rises and increasing age is associated with dementia (Helmchen et al., 1996; Henderson and Jorm, 1997), physicians will more often be confronted with this phenomenon in the future (Beard et al., 1995). Physicians therefore need reliable and valid instruments to ascertain and to quantify dementia.

Different instruments are available to assess dementia. The Mini-Mental State Examination (MMSE) as a functional test (Folstein et al., 1975) or interview-based staging systems like the Global Deterioration Scale (GDS) (Reisberg et al., 1982) are used to classify the progress of dementia in the context of medical care and research. The GDS is a rating instrument describing the progression of dementia in seven stages of cognitive and functional decline in a hierarchical

order. These clinically distinguishable stages are based on detailed phenomenological observations of cognitively inconspicuous individuals and patients with progressive AD (Reisberg et al., 1982). The Brief Cognitive Rating Scale (BCRS) (Reisberg et al., 1988) and the Functional Assessment Staging measure (FAST) (Reisberg, 1988) were developed from the GDS and are also common methods for assessing the severity of dementia. Their validity and reliability have been shown in many studies in recent years. For a detailed review see Reisberg et al. (1994). They were developed by dividing the symptoms described in the GDS according to their domain-specific nature, such as concentration, recent memory, remote memory, orientation, physical functioning, and self-care capabilities. In order to perform the GDS the rater needs knowledge of the full description of the different cognitive stages, and he needs to have a certain experience with dementia patients. More than 30 symptoms have to be taken into account, and the assessment takes at least 10–15 minutes.

Despite the existing dementia scales, there is still a need for a scale that can be used in large surveys by physicians who did not receive any formal training in the use of the scale, who may come from different professional backgrounds, and who may not have much time either. The test should be objective and reliable. For this purpose, we designed the Dementia Checklist in the context of a large drug utilization observation study (DUO) (Linden, 1997). It is based on 12 items describing everyday problems typical of the different stages of dementia.

The objective of this paper is to introduce the Dementia Checklist, its construction, possible uses and psychometric properties. Two different ways of determining outcome scores are also presented.

Material and methods

Patient sample

The original sample consisted of 977 individuals aged 60 years and older who were treated as outpatients by 151 psychiatrists and neurologists. Patients were recruited in the course of a drug utilization observation study on fluoxetine (Linden, 1997). The physicians were asked to document every patient they routinely treated with fluoxetine. The only criterion for inclusion in the study was the need for treatment irrespective of diagnostic divisions, including depressive illnesses as

well as dementia disorders with depressive symptoms. This generated a population of patients who could be normal in respect to cognitive decline, but in which it may be expected that cases with dementia may be over-represented in comparison to a sample of normals. This population therefore seems to be especially suited to test a scale that covers normal and subclinical states as well as states of greatest severity. In addition to a DUO report form physicians were provided with the dementia checklist without any further training. The dementia checklist contained the instruction to note the symptoms that the physicians see in their patients.

As data on the dementia checklist were missing in 40 subjects, 937 patients were included in the present analysis: 601 women and 336 men. Ages ranged from 60 to 90 years with a mean of 67 ± 6.18 (SD); 57% of the patients were pensioners, 24% housewives, 15% were still employed, 4% were unemployed or did not provide detailed information on their professional status, 57% of the sample were classified as unipolar endogenous depressive, 9% as neurotic depressive or reactive depressive, 4% as secondary depressive, and 2% as bipolar depressive, 25% of the patients were classified by their treating physicians as depressive disorder not otherwise specified (NOS) and 3% of the patients were not depressive but were suffering from other psychiatric disorders.

Construction of the scale

The dementia checklist consists of 12 items with yes/no ratings. The items describe characteristic symptoms of dementia and refer to cognitive abilities like recent and remote memory (items 1 to 5), orientation (items 6 and 9), concentration (item 8), self-care ability (items 7 and 11) and somatic functioning (items 10 and 12). We chose the most simple and clearest symptoms, which are easy to assess, even for raters without training.

The items were arranged in a hierarchical order, presenting the typical symptoms of very mild cognitive impairment first, and the typical symptoms of a very severe cognitive impairment in the end. With an increasing number of items, the symptoms are related to more severe stages of cognitive decline. See Table 1 for an overview of the items and the order of presentation.

Scoring of the scale

The presence of each symptom has to be rated independently of all others. It is possible to use two

Table 1. The Dementia Checklist

The Short Dementia Assessment	yes	no
(1) Subjective memory complaints	☐	☐
(2) Problems to remember familiar names	☐	☐
(3) The person misplaces or loses objects	☐	☐
(4) Malfunction in finding words	☐	☐
(5) Gap in one's memory for past events	☐	☐
(6) Difficulties to orientate at foreign places	☐	☐
(7) Partially in need of help in daily routine	☐	☐
(8) Difficulties counting backwards from 10 to 1	☐	☐
(9) Disorientation in time and/or place	☐	☐
(10) Lack of basic psychomotoric skills	☐	☐
(11) In need of permanent help in daily routine	☐	☐
(12) Loss of speech	☐	☐

different types of scoring, depending on the focus of the investigation. The cut-off score should be used if the clinical severity of the symptoms shown by an individual is of primary interest for the assessment. Using the cut-off score, scoring depends on the most severe clinical symptom from which a person suffers, regardless whether less serious symptoms occur or not. The sum score has to be used if the total number of positive symptoms is of interest. As a function of the scoring procedure, this second type of assessment is more conservative. In both scoring methods, higher scores indicate greater impairment.

Most of the symptoms of the dementia checklist are part of descriptions of different GDS stages (Reisber et al., 1982). This empirical assignment of the symptoms to different stages in the GDS makes it possible to use a corresponding classification system within the dementia checklist assigning the same or similar symptoms to the corresponding stages. Following that assignment, the cut-off score zero of the dementia checklist corresponds to stage I (normal) of the GDS, scores one and two to stage II (forgetful), three and four to stage III (early confused), five and six to stage IV (late confused), seven and eight to stage V (mild dementia), nine and 10 to stage VI (moderate dementia), and scores 11 and 12 correspond to stage VII (severe dementia).

Analysis of psychometric properties of the dementia checklist

All items were included in this first analysis. The percentage of positive answers per item (item difficulty; p), the corrected item-total correlations (r_c) and internal

consistency of the items (α_d) were calculated for every item, in order to ascertain the contribution of a single item to the assessment of cognitive impairment and to the reliability of the dementia assessment.

The reliability analysis of the dementia checklist included Cronbach's alpha (α) for internal consistency and split-half reliability (r_s) to specify the degree of accuracy in measurement. To test the validity of the scale, differences in the degree of cognitive decline in dependence of age, gender, and severity of depression were calculated using chi-square tests. The association between cognitive impairment and age was calculated using Pearson's correlation.

Results

Test and item analysis

Table 2 shows the frequency of positive items: 66.1% of all patients complain about their memory, 48.3% have difficulty remembering familiar names, 31.9% misplace or lose objects, 30.6% have difficulty in finding words, 25.0% exhibit gaps in memory of past events, 17.2% have difficulty with orientation in unfamiliar places, 9.5% need some help in daily routine, 6.9% have difficulties in counting backwards from 10 to 1, 4.4% are disoriented in time and/or place, 2.5% lack basic psychomotoric skills, 2.2% need permanent help with their daily routine, and 1.1% of all patients have loss of speech.

Rank correlation between the frequency of positive answered items and the order presented was $\tau = -1$ ($p < 0.01$). The frequency of symptoms in the

Table 2. Distribution and characteristics of single items of the dementia checklist (N = 937, % = percentage of positive answers, r_c = corrected item-total-correlation, α_d = internal consistency)

Items	%	r_c	α_d	n
1. Subjective memory complaints	66	0.45	0.78	619
2. Problems to remember familiar names	48	0.52	0.77	453
3. Misplaces or loses objects	32	0.53	0.77	299
4. Malfunction in finding words	31	0.50	0.77	287
5. Gap in one's memory for past events	25	0.51	0.77	234
6. Difficulties with orientation in nonfamiliar places	17	0.51	0.77	161
7. Partially in need of help in daily routine	9	0.54	0.77	89
8. Difficulties counting backwards from 10 to 1	7	0.46	0.78	65
9. Disorientation in time and/or place	4	0.46	0.78	41
10. Lack of basic psychomotoric skills	3	0.29	0.79	23
11. Permanent in need of help in daily routine	2	0.42	0.79	21
12. Loss of speech	0.01	0.31	0.79	10

Table 3. Cognitive impairment in reference to the GDS staging (11) (N = 937, ≥ 60 years of age) (percentages)

Stages		Score %	Sum %	Cut-off %
I	No cognitive decline (normal)	0	23.5	23.5
II	Very mild cognitive decline (forgetfulness)	1–2	35.0	21.1
III	Mild cognitive decline (early confusion)	3–4	25.4	20.6
IV	Moderate cognitive decline (late confusion)	5–6	10.4	20.8
V	Moderately severe cog. decline (early dementia)	7–8	2.8	4.3
VI	Severe cognitive decline (moderate dementia)	9–10	2.3	6.3
VII	Very severe cognitive decline (late dementia)	11–12	0.6	3.4

sample decreases strictly as the postulated severity of symptoms increases. Of 937 patients, 630 followed the hierarchical order: if they showed a more severe symptom then they also showed all less severe symptoms.

All items contribute to the accuracy of measurement. No item had to be dropped or changed. Corrected total correlations ranged from $r_c = 0.29$ to $r_c = 0.54$. Internal consistency (if item excluded) was from $\alpha_d = 0.77$ to $\alpha_d = 0.79$ (see Table 2). The standardized reliability coefficient (Cronbach's alpha) was $\alpha = 0.82$. Split-half-reliability was $r = 0.85$.

Cognitive impairment in the sample

The distribution of cognitive impairment in this sample is presented in Figure 1. The sum score ranged from 0 to 12, with a mean of $2.46 (\pm 2.33)$. The cutoff for dementia is stage V in terms of the GDS staging (10, 12, 13, 14). A subject needs at least a score of seven points out of 12 to be classified as demented.

According to this criterion 5.7% of the sample was classified as demented. Prevalence of early, moderate and late dementia in the sample was 2.8%, 2.3% and 0.6%. Prevalence of dementia of patients aged 65 and older (N = 539) was 8.0%. Of these patients, 3.3% suffered from early dementia, 3.9% from moderate dementia, and 0.8% from late dementia.

Table 3 shows the distribution of cognitive impairment with reference to the GDS staging (Reisberg et al., 1982). The cutoff score results in a more equal distribution of patients over the different stages: stage I: 23.5%, stage II: 21.1%, stage III: 20.6%, stage IV: 20.8%, stage V: 4.3%, stage VI: 6.3%, stage VII: 3.4%, whereas the sum score is more conservative as less patients were classified as demented (stages V to VII, 5.7%) or as late confused (stage IV, 10.4%).

For an overview of cognitive impairment in the different age groups see Figure 2. Cognitive impairment in these groups shows a bimodal distribution for patients older than 75 years of age. For the patients

Figure 1. Cognitive impairment in the total sample (N = 937, ≥ 60 years of age).

aged 65 to 69 years the distribution suggests a second peak. The first peak is in stage II (forgetfulness) for the patients younger than 75, and the second peak is in stage VI (moderate dementia) for patients aged 65 to 69. The bimodal distribution is very clear in the group of patients aged 75 and more, with the first peak in stage III (early confusion) and the second peak in stage VI (moderate dementia).

The cognitive impairment of mildly, moderately and severely depressed patients is presented in Figure 3. Cognitive impairment of the severely depressed patients forms a bimodal distribution with a second peak in stage six (moderate dementia). The treating physician rated the degree of depression.

External validity of scores

As expected, significant correlations were found between cognitive impairment and age ($r = 0.27$; $p < 0.01$). As can be seen in Table 4, patients showed significant differences in the distribution of cognitive impairment in different age groups ($\chi^2 = 51.7$; $df = 6$; $p < 0.001$). There were also differences in the degree of depression between age groups ($\chi^2 = 47.6$; $df = 4$; $p < 0.001$).

With increasing age, there was a continuous reduction in patients assessed as normal to forgetful (from

69.6% to 38.5%), and a distinct continuous increase of patients staged as early to late confused (from 27.6% to 49.7%), and mildly to severely demented (from 2.8% to 11.8%), with small differences in frequency of cognitive impairment between patients aged 65 to 69 years (55.6%, 38.3%, 6.1%) and patients aged 70 to 74 years (52.9%, 39.9%, 7.2%).

With increasing depression, there was a continuous decrease in the group assessed as normal to forgetful (from 64.8% to 50.0%), an increase in the group assessed as early to late confused and a continuous increase in the group staged mildly to severely demented (from 3.4% to 17.3%). In the present study, no significant gender differences in the distribution of cognitive impairment were found ($\chi^2 = 2.11$; $df = 2$; $p < 0.35$). These results support the external validity of the dementia checklist.

Discussion

The Dementia Checklist is a new tool for the quantification of dementia stages. Every physician who treats elderly patients can provide the necessary information without much additional examination or interviewing of the patient. It needs only minutes to be filled in by the physician. The items do not describe complex psychopathological constructs; rather, they represent simple and obvious symptoms and daily behaviours.

Figure 2. Distribution of cognitive impairment in different age groups.

Figure 3. Cognitive impairment of mildly, moderately and severely depressed patients.

Table 4. Distribution of cognitive impairment in relation to age, depression and gender

	Cognitive impairment							
	normal – forgetfulness (stage I – II)		early – late confusion (stage III – IV)		early – late dementia (stage V – VII)		total	
	n	(%)	n	(%)	n	(%)	n	(%)
age ¹								
60–64	277	(69.6)	110	(27.6)	11	(2.8)	398	(100)
65–69	135	(55.6)	93	(38.3)	15	(6.1)	243	(100)
70–74	81	(52.9)	61	(39.9)	11	(7.2)	153	(100)
75–90	55	(38.5)	71	(49.7)	17	(11.8)	143	(100)
depression ²								
mild/moderate	173	(64.8)	85	(31.8)	9	(3.4)	267	(100)
distinct	289	(57.0)	199	(39.3)	19	(3.7)	507	(100)
severe/extreme	75	(50.0)	49	(32.7)	26	(17.3)	150	(100)
gender ³								
male	190	(56.5)	122	(36.3)	24	(7.2)	336	(100)
female	358	(59.6)	213	(35.4)	30	(5.0)	601	(100)

The checklist has been used in a large drug utilization observation study in which depressed and not demented patients were the target (Linden, 1997). This approach allows one to test whether the scale covers the full spectrum from no cognitive impairment to severe cases of dementia. The distribution of symptoms, as found in this sample, showed several important results:

Firstly, the overall prevalence of mild to severe dementia was found to be 5.7% for all patients included – all patients with an age of 60 years and older – or 8.0% for those patients 65 years of age and older. These rates are in the expected range if one considers the known association between depression and at least initial phases of dementia (Helmchen and Linden, 1995; Buntix et al., 1996).

Secondly, there is a clear increase in the rate of cognitive impairment with age. The distribution of cognitive decline of the patients older than 75 years of age is bimodal, with one peak below the cutoff for dementia (stage three; early confusion) and the other peak above the cutoff for dementia (at stage six; moderate dementia). This indicates that the dementia checklist differentiates clearly between demented and non-demented patients. Reischies et al. (1996) described the bimodal distribution of cognitive decline and suggested distinguishing between a ‘normal’ population with a gradual continuous cognitive impairment and a population with senile dementia characterized by

a discontinuous cognitive decline. This hypothesis possibly explains why the bimodality of distribution occurs only in the oldest age group. These data give external validity to the scale, in addition to the face validity of the items per se.

Thirdly, the occurrence of symptoms among the patients obviously follows the presented hierarchical order. Items of higher order almost always include all items of lower order – for example, patients who had problems counting backwards also showed gaps in their memory of past events, but not vice versa. The comparison of the classification of the patients by ‘cut-off score’ or ‘sum score’ yield very similar results. In two thirds of the ratings, there was no deviation from the theoretical rank order, although it may well be that in different forms of dementia processes – for example AD versus VaD – different symptom patterns may be seen. This is the reason why the ‘sum score’ is recommended as the routine way of scoring.

So far, there are no data on the use of the dementia checklist in longitudinal assessments. The kinds of symptoms considered do not suggest that the scale could be sensitive enough to reflect subtle changes over time and the scale can probably not be used to reflect subtle short-term changes, as would be necessary in drug trials. This lack of sensitivity to small changes is an advantage if a robust overall staging is needed – for example, for the description of an elderly population. This is what the scale has been designed

for. It allows population estimates of dementia cases, and it also provides a symptom profile of cognitive impairment that can be used to describe demented as well as non-demented populations.

Finally, limitations of the study must be discussed. First, it has to be pointed out that the dementia checklist is only a syndromal measure that does not allow differential diagnostic conclusions. The discrimination between different types of dementia disorders would require additional longitudinal, etiological, and psychopathological information. Nevertheless, for clinical practice or epidemiological purposes it often is sufficient to refer to the dementia syndrome (see also DSM-IV) without further differentiation. Secondly, we have no data on direct comparisons with other established measures of dementia to test external validity. In this first evaluation of the scale data we are restricted to the analysis of the internal structure of the scale and a content comparison with other respective scales such as the Reisberg staging. Empirical data and clinical considerations support good face validity of the scale and suggest that it would be promising to test it in further studies in comparison to other more comprehensive instruments.

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