REVIEW ARTICLE

The Diagnosis and Treatment of Behavioral Disorders in Dementia

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SUMMARY

Background: Behavioral disorders such as aggressiveness, agitation, delusions, disinhibition, affect lability, and apathy arise in more than 90% of patients with dementia. Behavioral disorders are a major challenge and the greatest stress factor in everyday life for nursing personnel and for family members caring for the patient.

Methods: This review is based on relevant publications retrieved by a selective literature search in the PubMed, Cochrane Library, and German S3 guideline databases with the search terms “behavioral disorders,” “non-cognitive disorders,” and “challenging behavior,” in conjunction with “dementia” and “behavioral and psychological symptoms of dementia.”

Results: Behavioral disorders regularly accompany dementing illness and have identifiable and treatable somatic and environment-related causes. They should be treated symptomatically, both with non-pharmacological measures and with drugs. Memory therapy ($d = 0.47$), ergotherapy ($d = 0.72$), music therapy ($d = 0.62$), and physical exercise ($d = 0.68$) are effective, as are anti-dementia drugs (galantamine: $p = 0.04$, donepezil: $p = 0.01$, rivastigmine: $p = 0.02$, memantine: $p = 0.004$). Risperidone is the drug of choice to combat agitation and aggressiveness ($d = 0.33$) as well as dementia and hallucinations ($d = 0.5$). Citalopram can be recommended for the treatment of depression in patients with dementia ($p = 0.05$).

Conclusion: Because of an improved evidence base, the latest version of the German S3 guideline on the diagnosis and treatment of dementia places greater emphasis on non-pharmacological treatments for behavioral disorders in dementia than it did in the past. The global efficacy of such treatments against behavioral disorders is well documented. Nonetheless, because of the heterogeneity of interventions and varying standards of assessment, the evidence for the utility of certain specific methods in the treatment of specific behavioral disorders is still limited. More research is needed in this area.

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Between 76% and 96% of all patients with dementia develop behavioral disorders such as aggressiveness, agitation, disinhibition, affect lability, or apathy in the course of their disease (1). These disorders, which arise alongside the cognitive deficits, have been variously called “behavioral disorders in dementia,” “non-cognitive manifestations,” and “challenging behavior” (2). They are not only accompaniments of the dementing illness but also have their own identifiable and often treatable causes.

Aggressiveness and disinhibition produce obvious behavioral disorders that rapidly bring the patient to medical attention, but these problems arise in no more than half of all patients with dementia. Apathy and depressed mood, though much more common (50–90%) (3), are often overlooked, as they are not dramatically evident in the clinical setting. The newly revised German S3 guideline on dementia (2) places more emphasis than before on non-pharmacological treatments of behavioral disorders in demented patients. The goals of this review are to present the current state of knowledge on the diagnosis and treatment of behavioral disorders and to promote interdisciplinary dialogue.

Method

A selective literature search was carried out in the PubMed, Cochrane Library, and German S3 guideline databases with the search terms “behavioral disorders,” “non-cognitive disorders,” and “challenging behavior” in conjunction with “dementia” and “behavioral and psychological symptoms of dementia (BPSD).” This review is based on selected evidence-based publications that, in the author’s view, provide an overview of the current state of knowledge and contribute to the interdisciplinary discussion of the subject.

Etiology and pathogenesis

The pathogenesis of disturbed behavior in demented patients is multifactorial. Among biological causes, wide currency is given to the metabolic hypothesis (4), according to which dysregulation of the hypothalamic-pituitary-adrenal “stress axis” leads to neurotransmitter imbalances producing delusions (dopamine) and depressive manifestations (serotonin). Atrophy of the nucleus raphe dorsalis leading to serotonin deficiency may be a further cause of affective manifestations. Early atrophy of the paralimbic system, as seen in Alzheimer dementia,

BOX

Approaches to patients with dementia

- **Deficit-oriented**
 - Caregivers display attitudes and behaviors oriented to what the patient cannot do, rather than to existing resources. Continual confrontation with deficits can lead to agitation, aggressiveness, and apathy.
- **Resource-oriented**
 - Only the capabilities that the patient still has should be reinforced by practice. The lost ones should be disregarded. In consequence of hippocampal atrophy, the patient will not be able to learn them anew.

can impair dopamine metabolism, leading to paranoid delusions (as of being the victim of poisoning or theft), and thereby to aggressiveness; in contrast, the aggressiveness seen in frontotemporal dementia is more the result of disinhibitory phenomena. Affect lability in vascular dementia can also cause aggressiveness. An etiological subclassification of aggressiveness, as suggested here, can be helpful for rational treatment planning.

Psychological or environmental factors, such as a deficit-oriented approach to the patient (i.e., unintentional continuous confrontation with the deficits) and accompanying somatic illness, must be considered as well. A further contribution to the behavioral disorders comes from the patient's altered perception of the environment, caused by cognitive deficits such as disorientation, word-finding difficulty (aphasia), or difficulty recognizing faces (prosopagnosia) (*Box*).

Behavioral disorders can also arise as a consequence of concomitant somatic or psychiatric diseases that can be diagnosed and specifically treated. Purely symptomatic treatment (e.g., of aggressiveness), rather than treatment of detectable underlying causes, can lead to unnecessary long-term use of neuroleptic drugs, causing polypharmacy, adverse effects, and unnecessarily high costs for the health-care system (5).

Somatic causes of behavioral disorders in dementia

Clinical experience shows that these behavioral disorders sometimes have somatic causes:

Aggressiveness, agitation, and disinhibition: A major cause of these abnormalities is pain (6) due to falls, undiagnosed fractures, osteoporosis, or malpositioned dental prostheses (jaw atrophy). Cognitive deficits make it hard for patients with moderate or severe dementia to tell others that they have pain ("underreporting of pain") or to change their posture in such a way as to reduce pain. A nonspecific tormented state arises that can lead to aggressiveness.

A neuroleptic overdose (7) or an internal medical condition (hyperthyroidism, urinary tract infection) can

also induce aggressiveness. Moreover, if the principle "start low, go slow" is neglected, a rapidly escalating and excessively high dose of a neuroleptic drug can cause behavioral disorders. The right treatment in such cases is to stop the drug. Left-hemispheric cerebral ischemia can cause an organic affective disturbance (8) with affect lability and agitation, or else an organic delusional disorder (e.g., with delusions of being a victim of poisoning or theft) and aggressiveness.

Ostensible food refusal and apathy: The patient may stop eating and drinking because of a concomitant somatic or mental illness; colonization of the atrophic gastric mucosa with *Helicobacter pylori* is a common cause (9). The resulting chronic gastritis, cognitive deficits, and loss of appetite lead the patient to stop eating and drinking for fear of pain. The cognitive deficit makes it impossible for the patient to communicate this, and the carers may gain the impression of deliberate food refusal. Further causes include an overdose of digitalis, psychoactive drugs, or multiple agents at once (7). Left-hemispheric cerebral ischemia can lead to post-stroke depression with loss of drive and reduced appetite (8). These patients stand to benefit from antidepressive treatment.

Disturbances of the sleep-wake cycle: The affected patients are awake and agitated at night, and drowsy and apathetic in the daytime. The causes may include an inappropriate deficit-oriented approach to the patient from other persons, and/or accompanying somatic illnesses. Excessive doses of psychoactive drugs (7) and the uncritical long-term use of neuroleptic drugs or benzodiazepines make the sleep-wake cycle disturbances persist. Decompensated congestive heart failure with nocturia and frequent awakening is a common problem; the congestive heart failure should be treated and no neuroleptic drugs should be given, as these can worsen heart failure and thereby further disturb the sleep-wake cycle. The possibility of nocturnal hypoglycemia should also be considered (10).

Delusions and hallucinations: Visual hallucinations and delusions of being a victim of theft or poisoning arise in 30–50 % of cases (11). These may have somatic causes, including hyperthyroidism, disturbances of glucose metabolism, digitalis overdose, anticholinergic side effects, and psychoactive drug overdose (12). Visual and auditory impairment also promote delusions, as was already described by Kraepelin in 1915 ("*Verfolgungswahn der Schwerhörigen*," the persecution mania of the deaf). It is important to compensate for sensory deficits (13).

Psychological and environmental factors

An unintentionally deficit-oriented approach to the patient on the part of inadequately trained caregivers and family can lead to the patient's being continually confronted with the limitations caused by dementia. Hippocampal atrophy lessens learning ability; daily practice repetition of facts (e.g., dates and names) that are not essential in everyday life can lead, depending on the patient's premorbid personality, to aggression

TABLE 1a

Evidence-based pharmacotherapy for behavioral disorders in patients with dementia

Type of behavioral disturbance	Drug	Indication/effect strength [95% CI]	Risks and potential adverse effects	Recommendation grade ^{*1}	Evidence level ^{*2}	References
Agitation and aggressiveness	Risperidone (0.5–2 mg/d)	Agitation & aggressiveness d = 0.33 ^{*3} ; p = 0.002	– EPMD, QT _c interval prolongation – increased risk of falling, sedation – increased mortality – increased cerebrovascular risk – cognitive worsening	B	Ia	(2, 7, 22, 24, e7)
	Haloperidol (0.5–2 mg/d)	Aggressiveness d = 0.31; MD 0.31 [–0.49; –0.13], p = 0.0006	– EPMD (more than atypical agents) – QT _c interval prolongation – increased risk of falling, sedation – increased mortality (more than atypical agents) – increased cerebrovascular risk	A	Ia	(2, 22, e8)
	Aripiprazole (2.5–15 mg/d)	Agitation & aggressiveness MD –4.05 [–6.58; –1.52], p = 0.002	– off-label use – increased mortality, EPMD – increased cerebrovascular risk	0	Ia	(2, 22, 23)
Increased psychomotor activity	Risperidone (0.5–2 mg/d)	Severe agitation p = 0.011	see above for risperidone	0	II	(2, 24, e7)
Delusions and hallucinations	Risperidone (0.5–2 mg/d)	Delusions and hallucinations MD –0.14 [–0.25; –0.03], p = 0.01; d = 0.5	see above for risperidone	A	Ia	(2, e9)
	Haloperidol (0.5–2 mg/d)	Delusions and hallucinations p = 0.001	see above for haloperidol	none	none	(2, e10)
Depression	Citalopram (10–20 mg/d)	Depression and agitation p = 0.05	– hyponatremia, nausea – QT _c interval prolongation	B	Ib	(2, 32)

^{*1}Recommendation grades of the S3 guideline on dementia (2): A: “should” recommendation: at least one randomized, controlled trial of good overall quality and consistency directly related to the recommendation in question. B: “ought to” recommendation: well-conducted clinical trials, but no randomized and controlled trials with direct bearing on the recommendation.

0: “may” recommendation: reports of expert panels or expert opinion and/or clinical experience or recognized authorities.

^{*2}Evidence levels of the S3 guideline on dementia (2): Ia = consistent conclusion of high-quality trials, Ib = conclusion of a single high-quality trial, IIa = consistent conclusion of good trials, IIb = conclusion of a single good trial.

^{*3}Effect strengths: these are indicated in the guideline if they are given in, or can be calculated from, meta-analyses or original articles. They are expressed as Cohen's d, i.e., the difference between the mean values of the target variable in two groups that received a different treatment or intervention, normalized by the standard deviations within the two groups. Thus, Cohen's d expresses the standardized mean difference due to an intervention compared to a control condition. Conventionally, effect strengths in Cohen's d are described as follows: d = 0.2: small effect; d = 0.5: moderate effect; d = 0.8: large effect.

d, day; EPMD, extrapyramidal motor disorders; CI, confidence interval; MD, median.

or depression, and to low self-esteem. The patient suffering from dementia is in a difficult psychosocial situation (experience of loss, relocation to a nursing home) and lacks the cognitive resources to cope with it; the reinforcement of behavioral disorders is a common clinical observation.

Post-traumatic stress disorder (e.g., due to emotional trauma from wartime experiences) can lead, in patients with impaired cognitive function, to anxiety, sleep disturbances, insomnia, and aggressiveness (14). Affective and psychotic disorders or marked personality traits antedating the patient's dementia can also give rise to behavioral disorders or accentuate them and must be taken into consideration in the formulation of an overall treatment concept (15).

Diagnostic evaluation and differential diagnosis

The behavioral disturbance should first be identified as such, and then classified. The type of dementia from which the patient is suffering is important as

well. Patients with Alzheimer's disease have delusions or hallucinations because of limbic and paralimbic atrophy and depression owing to early involvement of the posterior raphe nuclei. Patients with frontotemporal dementia have early manifestations of disinhibition and emotional indifference. Patients with vascular dementia may have pronounced affect lability, and those with Lewy body dementia may have marked scenic hallucinations with little or no affective component (16).

It is important to distinguish the behavioral disorders that may accompany dementia from delirium, i.e., a confusional state with an organic cause, consisting of altered consciousness, impaired attentiveness, vegetative manifestations, and other cognitive deficits. One criterion that helps differentiate delirium from behavioral disorders is the patient's inability to direct, redirect, or maintain attention to any particular object (17).

The somatic comorbidities mentioned above as potential causes of behavioral disorders should be

TABLE 1b

Anti-dementia drugs in the treatment of behavioral disorders in patients with dementia

Drug	Trials	Indications	Effects and effect strengths* ¹ [95% CI]	References
Donepezil	15 RCTs	Mild to moderate dementia of Alzheimer type (DAT)	MD -4.42 [7.93; -0.91], p = 0.01 d = 0.07* ²	(2, e11)
Galatamine	10 RCTs	Mild to moderate DAT	MD -0.7 [-1.2; -0.2], p = 0.04 d = 0.14	(2, e12)
Rivastigmine	1 RCT	Parkinson dementia	p = 0.02	(e13)
	1 RCT	Lewy-body dementia	MD 1.7 [-1.1; 4.6], p = 0.088	(e14)
Memantine	3 RCTs	Severe DAT	MD 2.76 [0.88; 4.63], p = 0.004	(e15)
	1 RCT	Lewy-body dementia	MD -5.9 [-11.6; -0.2], p = 0.041	(e16)

*¹Effect strengths are indicated in the guideline if they are given in, or can be calculated from, meta-analyses or original articles. They are expressed as Cohen's d, i.e., the difference between the mean values of the target variable in two groups that received a different treatment or intervention, normalized by the standard deviations within the two groups. Thus, Cohen's d expresses the standardized mean difference due to an intervention compared to a control condition. Conventionally, effect strengths in Cohen's d are described as follows: d = 0.2: small effect; d = 0.5: moderate effect; d = 0.8: large effect..

*²The effect strengths refer to the overall efficacy of the drug in question against behavioral disorders in patients with dementia.
CI, confidence interval; MD, median; RCT, randomized and controlled trial.

recognized and treated. Precipitating factors and situations should be determined concretely on the basis of a history taken from someone who has been able to observe the patient closely. A patient with advanced dementia who keeps looking for his deceased wife and continually hears "But she's dead!" from those around him can hardly escape developing a behavioral disorder. A psychiatric evaluation is helpful; attention should be paid to delusions, mood swings, loss of appetite, and sleep disturbances. Specific scales can be used to assess the potential causes (e.g., pain, depression) and the severity of the behavioral disorders (eTable).

Treatment

Therapeutic fundamentals

Behavioral disorders are an integral part of the dementia syndrome and can be treated (2). There are ways of caring for demented patients that help prevent delirium (18).

Behavioral disorders should be treated in the setting of an integrated overall treatment concept consisting of both drugs and non-pharmacological methods. The first step should be the psychoeducation of all persons involved so that they can approach the patient in a validating, resource-oriented way (19). Next, the precipitating factors and situations should be determined and avoided.

Psychoactive drugs should be used if non-pharmacological methods have been tried without success (2), but only after a thorough somatic evaluation. The main question must not be "What drug should we give this patient?" but rather, "What is this patient's real problem?"

Drug treatment

Anti-dementia drugs are effective (galantamine d = 0.14, p = 0.004; donepezil d = 0.07, p = 0.001;

rivastigmine p = 0.002; memantine p = 0.004), and psychoactive drugs are effective against behavioral disorders (2, e11–e16) (Tables 1a and 1b).

Any underlying physical illness should first be treated with the appropriate drug(s), e.g., a urinary tract infection should be treated with an antibiotic. Psychoactive medication for the behavioral disturbance resulting from the somatic condition (e.g., aggressiveness) should be given, if at all, in a symptomatically oriented way, and only for a limited time. Drugs with anticholinergic (side) effects, sedatives, and muscle relaxants should be avoided (20), as should drugs with a high potential for interactions with other drugs (those that appear on the PRISCUS list) (21) (Table 2).

Treatment of psychotic manifestations, psychomotor agitation, and aggressiveness: High-potency atypical neuroleptic drugs are given in acutely dangerous situations, or when severe psychotic manifestations are present. Attention should be paid to gradual introduction of the drug ("start low, go slow") over 1–2 weeks and to short-term use, in view of the cerebro- and cardiovascular risks (22) and elevated mortality (23). The drug of choice is risperidone (from 0.25 to a maximum of 2 mg/day; p = 0.002) (24). Olanzapine, quetiapine, and aripiprazole are effective against aggressiveness, but not delusional symptoms (e17, e18). Olanzapine has anticholinergic side effects (15).

Caution should be exercised in the use of classic neuroleptic drugs, such as haloperidol (elevated risk of extrapyramidal motor side effects) (25), or of low-potency neuroleptic drugs, such as melperone (sedation, risk of falls).

The neuroleptic drugs clozapine and quetiapine are suitable for use in patients with Lewy body dementia, as they do not worsen parkinsonian manifestations (26). Benzodiazepines should be used for no more than a short time, as they can cause dependence, falls, and

TABLE 2

Problematic psychoactive drugs in the treatment of behavioral disorders in demented patients*¹

Drug class	Substances (selected)	Problems (selected)	Alternative drugs (selected)
Neuroleptic drugs	Classic neuroleptic drugs – haloperidol (> 2 mg/d) – fluphenazine – levopromazine	– EPMD, including tardive dyskinesia and parkinsonism – sedation, falls – anticholinergic side effects, delirium – increased mortality	– atypical neuroleptic drugs (e.g., risperidone)
	Atypical neuroleptic drugs – olanzapine – clozapine	– sedation, falls – anticholinergic side effects, delirium – increased mortality	– other atypical neuroleptic drugs (e.g., risperidone)
Antidepressants	Tricyclic antidepressants – amitriptyline – doxepine – imipramine – trimipramine	– anticholinergic side effects with cognitive impairment and delirium – increased risk of falling – orthostatic dysregulation – cardiac arrhythmia	– SSRI, e.g., citalopram, sertraline – mirtazapine, venlafaxine
	SSRI – fluoxetine – paroxetine	– hyponatremia – drug interaction (Cyp2D6)* ² – nausea and dizziness	– other SSRI, e.g., citalopram, sertraline – mirtazapine, venlafaxine
	MAO inhibitors – tranylcypromine	– hypertensive crisis with brain hemorrhage – malignant hyperthermia	– SSRI, e.g., citalopram, sertraline – mirtazapine, venlafaxine
Sedatives, hypnotic drugs	Long-acting benzodiazepines – diazepam – bromazepam – nitrazepam	– muscle relaxation with danger of falling – cumulation of effect* ³ – cognitive impairment – depression	– short-acting benzodiazepines, such as oxazepam or lorazepam
	Z substances – zolpidem (> 5 mg/d) – zopiclone (> 3.75 mg/d)	– muscle relaxation with danger of falling – cognitive impairment	– other short-acting benzodiazepines, such as oxazepam or lorazepam

*¹These recommendations are based on the PRISCUS list of potentially inappropriate drugs for elderly patients ([21] and on the following website: www.aok-gesundheitspartner.de/imperia/md/gpp/bund/arztundpraxis/prodiolog/2012/priscusliste_gpp.pdf).

*²Fluoxetine and paroxetine strongly inhibit the isoenzyme 2D6 of cytochrome P450 (Cyp) and thereby inhibit the effect of other drugs that share this catabolic pathway.

*³Diazepam has a markedly increased half-life in elderly patients, with the danger of cumulative effect.

d, day; EPMD, extrapyramidal motor disorders; SSRI, selective serotonin reuptake inhibitor

depression (27); oxazepam or lorazepam can be used if necessary, as their half-lives are not prolonged in elderly patients. Carbamazepine is effective against agitation and aggressiveness (28) but has a high potential for drug interactions. Valproic acid is ineffective against agitation or aggressiveness (29).

Treatment of affective abnormalities and apathy: Serotonin reuptake inhibitors are the best-studied drugs for the treatment of affective manifestations (30). Occasionally, hyponatremia can arise, leading to worsening of cognitive deficits or delirium. Fluoxetine and paroxetine should be avoided because of their high potential for drug interactions, and tricyclic antidepressants because of their anticholinergic side effects (31). Citalopram is effective (32). There have not been any randomized, controlled trials of mirtazapine, escitalopram, venlafaxine (e19), reboxetine, or duloxetine; these drugs can be given on an individual trial basis. Trazodone (33) and MAO inhibitors (34) have been found effective in a small number of studies. Trazodone improves anxiety (33); its risks are sedation, hypertensive crisis, and priapism. The treatment of apathy has not been adequately studied, but there is evidence that the use of anti-dementia drugs on an individual trial basis may be helpful (e20).

Non-pharmacological treatments

Evidence is available on the efficacy of psychosocial interventions (2). Effect strengths have been published for memory therapy (d = 0.47; [2, e21]), ergotherapy (d = 0.72; [2, e22]), physical exercise (d = 0.68; [2, e23]), and active music therapy (d = 0.62; [e24]).

All persons involved in the care of the patient must first receive psychoeducation and training so that they will not approach the patient in a deficit-oriented way. In general, any potential precipitation of behavioral disorders by the behavior of the caregivers and family should be avoided. It is helpful for anyone speaking with the patient to employ short, informative sentences, a flexible choice of words, and a sonorous and pleasant tone of voice (e25). The integration of care-giving members is necessary.

The following specific techniques can be used to help strengthen the patient's resources:

Memory therapy: In weekly group sessions, a world of pleasant feelings is activated – for example, by looking at old holiday photographs and by talking about the good times gone by – with the effect of reinforcing the emotional component of old memories and reducing agitation or aggressiveness (e21).

Self-maintenance therapy: This form of therapy (19) promotes the recovery of self-esteem through

TABLE 3

Evidence-based non-pharmacological interventions for the treatment of behavioral disorders in patients with dementia

	Technique	Effect strengths ^{*1} and possible indications ^{*2}	Recommendation grade ^{*3}	Evidence level ^{*4}	References
Memory therapy	Activation of pleasant remote memories in groups, e.g., by looking at old pictures and talking about them	d = 0.47 fear, unrest, depression, and aggressiveness	B	Ib	(2, e21, e33)
Ergotherapy	Practicing of retained capabilities that are relevant to everyday life and of emotionally positive activities (e.g., cooking, gardening), with reference to the patient's life history	d = 0.72 apathy, unrest, and agitation	B	Ib	(2, e22)
Music therapy	a) group singing; b) music listening, with reference to the patient's life history (e.g., folk songs from childhood)	d = 0.62 agitation and irritability	0	a) IIa / b) III	(2, e24)
Physical activity	Activation by (e.g.) taking the patient for a walk or simple movement and balance exercises	d = 0.68 depression	B	Ib	(2, e23)
Aroma therapy	Use of pleasant aromatic substances (e.g., melissa oil) for their calming effect	unrest, fear, agitation, aggressiveness	0	Ib	(e29)
Snoezel therapy	Application of various calming stimuli (light, sound, aroma, touch) in a special relaxation room	unrest, fear, agitation, aggressiveness	0	Ib	(2, e28)
Work with family members	Orientation about the disease, behavior management, and coping with stress	depression (inconsistent trials)	B	Ia	(2, e34)

^{*1}Effect strengths: these are indicated in the guideline if they are given in, or can be calculated from, meta-analyses or original articles. They are expressed as Cohen's d, i.e., the difference between the mean values of the target variable in two groups that received a different treatment or intervention, normalized by the standard deviations within the two groups. Thus, Cohen's d expresses the standardized mean difference due to an intervention compared to a control condition. Conventionally, effect strengths in Cohen's d are described as follows: d = 0.2: small effect; d = 0.5: moderate effect; d = 0.8: large effect.

^{*2}Indications: In view of the heterogeneity of non-pharmacological treatments, it is difficult to draw conclusions about the effect of specific interventions on concrete behavioral disorders. The effect strengths describe the general efficacy of the treatment in question against behavioral disorders in patients with dementia. The indications are based on the S3-guideline on dementia (2) and the cited references.

^{*3}Recommendation grades of the S3 guideline on dementia (2): A: "should" recommendation: at least one randomized, controlled trial of good overall quality and consistency, with direct relevance to the recommendation in question. B: "ought to" recommendation: well-conducted clinical trials, but no randomized trials with direct relevance to the recommendation. 0: "may" recommendation: reports of expert panels or expert opinion and/or clinical experience of recognized authorities.

^{*4}Evidence levels of the S3 guideline on dementia (2): Ia = unanimous conclusion of high-quality trials, Ib = conclusion of a single high-quality trial, IIa = unanimous conclusion of good trials, IIb = conclusion of a single good trial, III = conclusion from well-designed, non-experimental observational studies (e.g., case studies).

activities for which the patient still has the requisite competence. The patient feels noticed and needed once again. The activity must be chosen individually in the light of the patient's life history. The remaining capabilities are practiced and the already lost ones are avoided, as the hippocampal atrophy of Alzheimer's disease prevents the learning of new material. The benefits of self-maintenance therapy are improved autoperpersonal orientation and reduced behavioral disorders such as anxiety or aggressiveness (e26).

Ergotherapy (e22) and active music therapy: Activities such as group singing (p = 0.002; [e24]) improve behavioral disorders such as agitation (d = 0.75; [2, e22]) and irritability (d = 0.77; [2, e22]), as long as the choice of the activity (or of the music) is based on the patient's life history and needs. The evidence on the putative benefits of painting and dancing is mixed; nonetheless, in everyday practice, these nonverbal modes of expression often seem to be useful in reducing agitation (e27). The same can be

said for the use of a trained animal (e.g., dog-assisted therapy) to activate the patient.

Physical exercise: Physical activity (going for a walk) and mild physical training (exercises) can reduce depression (e23).

Snoezel therapy (e28): This relaxation technique involving the stimulation of multiple senses in a room with pleasant light and sound effects (aromatic oils for the sense of smell [e29], massage for the sense of touch [e30]) can counteract feelings of anxiety and insecurity and lessen agitation and aggressiveness (e28, e31).

Work with family members: This involves education and practice in avoiding a deficit-oriented approach and promoting the patient's existing resources, as well as measures to lessen the workload of nursing caregivers. The family is also helped to stabilize the care situation at home (35). Family members can, in turn, supply relevant biographical information for therapy and often already have experience with concrete behavioral disorders.

Psychotherapeutic interventions: these can be useful for patients with mild to moderately severe dementia (e32) but must be adapted to the patient's cognitive level and conducted in shorter, more frequent sessions. For example, patients who cry out frequently because of insecurity and disorientation can be helped with frequent and brief anxiety-reducing conversations that make them feel more secure, so that they no longer feel the need to cry out.

Validation (36): This is a basic aspect of the approach to demented patients. Validation is resource-oriented and excludes all that is deficit-oriented. At the outset, one confirms the patient's inner emotional world, even if it seems cut off from reality (e.g., an 83-year-old woman's fear of having given birth to a child that she cannot care for). This instills confidence and a sense of security over the short term, which can then be used to redirect the patient's thoughts from stress-inducing concerns to other, more pleasant subjects, mobilizing additional aid from the patient's short-term memory deficit. In consequence, the inner emotional world is reinforced and behavioral disorders such as agitation, anxiety, and aggressiveness are reduced or prevented (37) (*Table 3*).

Overview

Behavioral disorders often arise in demented patients over the course of their disease. Particularly in advanced dementia, they are a cause of nursing home transfers, hospitalizations, and the administration of psychoactive drugs, and they are associated with markedly increased use of nursing resources. They are the most important stress factor for care-giving family members and nursing staff. The behavioral disorders accompanying dementing disease often have identifiable somatic and environmental causes that are amenable to specific treatment. Their diagnosis and differential diagnosis require appropriate somatic evaluation, differentiation from delirium, and classification of the type of dementia that is present. Psychopathological examination and the use of specific scales are essential.

Behavioral disorders can be treated. An overall plan for treatment with drugs and non-pharmacological interventions should be devised. Drug treatment should not be oriented solely to the particular abnormal behavioral manifestation that is present (e.g., aggressiveness), but should rather be directed against the underlying cause, if possible. Any accompanying somatic illnesses should be treated before psychoactive drugs are initiated. The short-term use of psychoactive drugs is reasonable if psychosocial interventions have been ineffective, if the patient is suffering from intense delusions, or if a dangerous situation has arisen. The available evidence supports the use of anti-dementia drugs.

Non-pharmacological treatments have assumed greater importance now that their efficacy has been

demonstrated in multiple clinical trials. Memory therapy, ergotherapy, music therapy, and physical activities have all been found beneficial. The avoidance of a deficit-oriented approach to the patient, the reinforcement of the patient's still existing resources, and work with the patient's family are helpful. Psychotherapeutic measures are useful to a limited extent. It is essential that validation, with strict orientation to the patient's existing resources, should be the basic attitude informing treatment.

The global efficacy of non-pharmacological treatments against behavioral disorders is well documented. Nonetheless, because of the heterogeneity of interventions and the varying standards of assessment, the evidence for the utility of certain specific methods in the treatment of specific behavioral disorders remains limited. More research is needed in this area. It would be desirable for non-pharmacological techniques to be used more intensively in the everyday practice of nursing homes and hospitals. The patients' quality of life would improve, as would that of the persons caring for them, and polypharmacy would be avoided.

KEY MESSAGES

- Behavioral disorders are an integral part of the dementia syndrome and the most important stress factors for caregivers and family members.
- They often have treatable somatic, psychological, or environmental causes—for example, a deficit-oriented approach from the persons caring for them.
- The causally directed treatment of behavioral disorders should precede the symptom-oriented administration of psychoactive drugs.
- The pharmacotherapy of behavioral disorders should not be primarily directed against the manifest disorder (e.g., aggressiveness), but rather against the underlying cause, which may also be somatic.
- Non-pharmacological treatments are effective and are being increasingly implemented in clinical practice.

Dedication

This article is dedicated in gratitude to my teachers, Prof. Dr. Claus-Werner Wallesch of Elzach (neurology) and Prof. Dr. Albert Diefenbacher of Berlin (psychiatry and psychotherapy).

Conflict of interest statement

Prof. Kratz has received lecture honoraria from the Lilly and Janssen-Cilag companies.

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eTABLE

Diagnostic scales for the assessment of behavioral disorders in demented patients

Scale	Focus	Scoring	References
Montgomery-Asberg Depression Rating Scale (MADRS)	Scale for the assessment of depressive manifestations (by someone other than the patient)	The individual scores on 10 items are added for a maximum of 60 points. > 28 = severe depression	(e1)
Pain Assessment in Advanced Dementia Scale (PAINAD)	Scale for the assessment of pain in a patient with dementia (by someone other than the patient)	> 2 points: the patient is probably in pain	(e2)
Nurses Observation Scale of Geriatric Patients (NOSGER)	Scale for assessing the functional condition of elderly patients	Overall mean value: the higher the score, the more severe the functional impairment	(e3)
Cohen-Mansfield Agitation Inventory (CMAI)	Scale for the quantitative and qualitative assessment of behavioral disorders in demented patients	29 types of agitated behavior, each one longitudinally assessed on a scale of 1 (never) to 7 (several times per hour)	(e4)
Neuropsychiatric Inventory (NPI)	Assessment of behavioral disorders in persons with dementia & burden on caregiving family members	12 areas of behavior longitudinally assessed with respect to frequency, severity, and burden	(e5)
Empirical Pathology in Alzheimer's Disease Rating Scale (E-BEHAVE-AD)	Longitudinal assessment and grading of severity of behavioral disorders in Alzheimer's disease, as well as assessment of the burden on family members	25 behavioral manifestations and global assessment of the burden on family members; four-point scale for longitudinal assessment, from 0 (not present) to 3 (present, with physical component)	(e6)