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ABSTRACT

Dementias are the most common type of neurodegenerative disorder. Behavioral disturbances are seen in more than 80% of patients suffering from these disorders. Although sexually inappropriate behaviors are not as common as some of the other behaviors seen in dementia, they can cause immense distress to all those who are affected. There are no randomized trials for the treatment of these behaviors, but the available data suggest efficacy for some commonly used treatment modalities. In this review, we systematically discuss various aspects of these behaviors and available treatments. (*J Geriatr Psychiatry Neurol* 2005;18:155-162)

Keywords: dementia; behavioral disturbance; inappropriate sexual behaviors; hypersexuality

Dementia is a syndrome characterized by concurrent impairments in cognition, behaviors, and activities of daily living. It is the most common type of degenerative neuropsychiatric disorder, affecting about 5% of people older than 65 years and 20% of people older than 85 years.[1] Alzheimer's-type dementia (AD) is the most common form, followed by the vascular dementia and Lewy body disease. Other less common causes of dementia are due to Parkinson's disease, alcohol abuse, normal pressure hydrocephalus, HIV infection, hypothyroidism, and deficiencies of Vitamin B12 and folic acid.

Behavioral disturbances are common in dementia. These can be defined as behaviors that are unsafe and disruptive and that interfere with the care of the patient in any given environment.[2] Lyketsos et al showed that two thirds of the patients with dementia will have behavioral disturbances at any one point in time. One third of outpatients with dementia and four fifths of the patients living in long-term care facilities have behavioral disturbance.[3,4] Behavioral disturbances can lead to increased morbidity, greater health care resource utilization, and premature institutionalization.[5-7]

Studies conducted over the past 3 decades have come to dispel the notion that the elderly are not sexually active. These studies have shown that 50% to 80% of people older than 60 years were sexually active at least once a month and that regular sexual activity continues through the seventh and the eighth decade.[8,9] Factors that influence sexual behaviors in the elderly are the availability of a willing and able partner, the physical and mental health of the individual and partner, the availability of privacy, and past sexual history and practices.[10,11]

Inappropriate sexual behaviors should be seen as a part of the symptom cluster of behavioral disturbances associated with dementia. Using the same construct of behavioral disturbance, they can be defined as sexual behaviors that are inappropriate, disruptive, and distressing and that impair the care of the patient in a given environment.

EPIDEMIOLOGY

The best estimate is that 7% to 25% of demented patients exhibit inappropriate sexual behaviors.[12,13] They are more commonly found in men, although the exact sex ratios are not clear.[14] These behaviors can be divided into 3 common types.[13]

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1. Sex talk: this is the most common form of inappropriate behavior and involves using foul language that is not in keeping with the patient's premorbid personality.
2. Sexual acts: these include acts of touching, grabbing, exposing, or masturbating. They can occur in private or in public areas.
3. Implied sexual acts: these include openly reading pornographic material or requesting unnecessary genital care.

NEUROBIOLOGY

Four brain systems have been implicated in the neurobiology of inappropriate sexual behaviors. These are the frontal lobes, the temporo-limbic system, the striatum, and the hypothalamus. Each system is thought to function differently from the other, and we may be able to predict the type of inappropriate behaviors associated with each system.

Frontal System

This is the most well-studied of all the brain systems, and it mediates the expression of sexual behaviors. Dysfunction of the frontal system typically involves disinhibition rather than hypersexuality. It is commonly seen in dementias, multiple sclerosis, and tumors.[15-17]

Temporo-Limbic System

Animal studies have shown that sexual behaviors are also mediated through the temporo-limbic system. In rats, chronic stimulation of limbic systems results in hypersexual behaviors.[18] In humans, bilateral lesions of the temporal lobes result in Kluver-Bucy syndrome, which includes autoerotic behaviors, hyperorality, and finger agnosia, as well as placidity, loss of fear, and memory impairments.[19] Hypersexual behaviors have also been reported after temporal lobe strokes, tumors, and epilepsy.[20-22] Right-side temporal lobe lesions can produce altered sexual behaviors more than the left, as it modulates emotions and the understanding of the affect associated with sexual arousal.[23,24]

Striatum

Some sexual behaviors are associated with lesions of the corticostriatal circuits, and they can be theorized as being obsessive-compulsive in nature. They are internally generated and dysfunctional. These types of behaviors can be seen in Huntington's disease, Wilson's disease, and Tourette's syndrome.[25-27] In patients with Parkinson's disease, increased sexual behaviors have been reported after L-dopa therapy.[28,29]

Hypothalamus

Lesions to the hypothalamus can lead to an increase in sexual behaviors.[30] Kleine-Levin syndrome, characterized by hypersomnolence and increased sexual drive, is thought to be due to hypothalamic dysfunction. Lesions to the right hypothalamus and periventricular area can cause manic symptoms including increased sexual drive.[23]

CONSEQUENCES

These behaviors can be very embarrassing for the relatives and caregivers.[31] They may also lead to the confinement of the individual to his residence or placement into a skilled nursing facility. Such behaviors may create problems for other residents, staff members, and families at these places. Repeated masturbation can cause genital trauma. Sexual abuse can cause trauma as well, and it is a risk factor for sexually transmitted diseases.[32] False allegations may cause the unnecessary dismissal of an accused staff member.[31] Sexualized behaviors may also cause a conflict between ethical and legal responsibilities, since hindering sexual expression can be seen to violate the patient's autonomy, whereas failure to prevent inappropriate behaviors can place the patient and others at risk for mental and physical trauma.[33]

ASSESSMENT

The first part of the assessment is to obtain a comprehensive history, including a thorough sexual history.[33] If the patient is severely impaired, then a history should be obtained from the caregivers or family members. It must be ensured that these behaviors are truly sexual and inappropriate in nature and do not represent a desire for closeness or comfort.[34] It is also common for caregivers and the staff at nursing homes to misinterpret some of these behaviors as being sexually disinhibited.[35] History-taking should be followed by a good mental status and physical examination. Laboratory data, including neuroimaging studies to rule out delirium, should also be obtained. Neuropsychological testing may help in evaluating the patient's level of cognitive functioning and in understanding his or her deficits. It is important to have an open discussion about these behaviors, and the distress they cause and how it should be handled. A thorough assessment, open communication, and prompt intervention are the keys to success.

DIFFERENTIAL DIAGNOSIS

Central nervous system diseases. Strokes, tumors, surgeries, and trauma to the brain can result in inappropriate sexual behaviors. They often occur in people with no prior history of such behaviors or in people who have successfully managed to repress their sexual urges most of their lives.[23,31]

Delirium. This is a common complication seen in patients with dementia and other medical disorders. These

behaviors often occur acutely and resolve once the underlying condition is treated.[32]

Medications. Different classes of medications can cause or worsen these behaviors. Some of the more common drugs that are implicated are as follows:

- Levodopa can cause sexualized behaviors in patients with Parkinson's disease.[28]
- Alcohol and benzodiazepines impair cognition and cause disinhibition.
- Stimulant drugs, including cocaine, can cause an increase in libido.

Psychotic disorders. Inappropriate behaviors may be seen in these disorders. They are usually bizarre and related to the underlying psychopathology. The behavior may be due to the delusional misidentification of someone else as their spouse. Delusions and hallucinations may lead to false sexual allegations.

Mood disorders. Inappropriate behaviors can occur in patients with hypomania or mania. These behaviors may be due to an increase in libido, impaired judgment, or a combination of both these conditions. Depressive disorders often produce sexual dysfunction and not inappropriate behaviors.

Social factors. Lack of privacy, restrictive attitudes, and social cues may result in inappropriate behaviors.[31] These behaviors may be due to a lack of avenues for expression of normal sexual drive. In cognitively impaired elderly people, the viewing of sexually explicit television shows and/or physical care by a staff member of the opposite sex may result in inappropriate behaviors.

TREATMENTS

There are very few studies that have systematically reviewed the treatment of these behaviors. Most of the data available to us are from case reports or case series. The choice of treatment depends upon the urgency of the situation, the types of behaviors, and the underlying medical conditions of the patient. Both nonpharmacological and pharmacological treatments have been found to be effective.

Nonpharmacological Treatments

If these behaviors are due to certain social cues which are misinterpreted, then modification of these cues usually leads to a reduction in these inappropriate behaviors. Other nonpharmacological treatments that have been found to be useful in reducing and/or eliminating these behaviors include the following.

Supportive psychotherapy. This modality of treatment is especially useful for spouses of patients who have inappropriate behaviors. They often need reassurance that these behaviors are secondary to the illness and not a reflection of their relationship. It may also be useful to reframe their partner's sexual requests as calls for closeness and reassurance.[31]

Behavior modification. When inappropriate behaviors occur, sensitively explain to the patient why such behaviors are unacceptable. It is helpful to avoid confrontation, as it may cause excessive guilt or shame. Do not ignore these behaviors, as this may unwittingly reinforce them. Distraction may be a very useful technique for some of the patients.[36] In nursing homes, single rooms and provision for conjugal or home visits may help reduce the frequency of such behaviors by satisfying the patient's normal sexual drive. For those patients who are already exhibiting inappropriate behaviors, avoidance of external cues such as overstimulating television or radio programs is helpful. In the patients with a tendency to expose themselves or masturbate in public, trousers that open in the back or that are without zippers may be helpful. For those patients in understimulating environments, provision for adequate social activity is helpful. For sexual misinterpretations, provide simple and repeated explanations of why such behaviors are unacceptable.

Changing the attitudes of the family, caregivers, and staff in the nursing homes. The care of patients with dementia at home or at a nursing home demands a high degree of technical and interpersonal skills. Caregivers are often caught between moral norms, a person's rights, and providing appropriate care for their patients.[33] This can lead to confusion, anger, denial, helplessness, and sometimes ambivalence and apathy. Suitable sex-education programs for the family, the caregivers, and the staff at the nursing homes can add to the quality of life of a demented person. The need for normal sexua l expression while preventing inappropriate sexual behaviors should be emphasized. Three separate studies have demonstrated that greater knowledge of sexuality and aging is associated with a more permissive attitude.[37-39]

Pharmacological Treatments

There are no double-blind placebo controlled trials for any of the drugs that are used to treat these behaviors. Medications should only be used when all other treatment methods have failed. Follow the general rule in the elderly of starting the medications at a low dose and titrating slowly. It is important to be vigilant for side effects from these drugs. It is prudent to discontinue medications that can precipitate or worsen these behaviors. Avoid medications like benzodiazepines, as they can cause disinhibition. The classes of medications that have been found to be useful in the treatment of these behaviors include selective serotonin reuptake inhibitor (SSRI) antidepressants, antipsychotics, and hormonal agents, along with cimetidine and pindolol.

Table 1. Medications Used for Treating Inappropriate Sexual Behaviors

Medication	*Dose of Drug*	*No. of Patients*	*Behaviors to be Treated*	*Common Side Effects*
Paroxetine	20 mg/day	1	Disinhibition	Gastrointestinal disturbance, asthenia, sweating, tremors, dizziness, anxiety, headache, sedation
Citalopram	20 mg/day	1	Inappropriate disrobing	Gastrointestinal disturbance, sweating, dizziness, somnolence, tremors, headache, anxiety
Clomipramine	150-200 mg/day	2	Exposing, public masturbation, repeated touching	Sedation, gastrointestinal disturbance, weight changes, anxiety, tremors, sweating
Quetiapine	25 mg/day	1	Repeated masturbation	Sedation, orthostatic hypotension, headache, dizziness, constipation
Trazodone	100-500 mg/day	4	Hypersexuality	Sedation, orthostatic hypotension, dizziness, headache, gastrointestinal disturbance, priapism
MPA	100-300 mg/wk every 2 weeks (IM)	6	Masturbation, exposure, fondling, attempting to have sex with others	Weight changes, abdominal pain, dizziness, nausea, depression, insomnia, pelvic pain, breast pain, edema
Diethylstilbestrol	1 mg/day	1	Forcing penis into the mouth of another resident	As in MPA
Estrogen	0.625 mg/day; 0.5-0.10 mg/day (patch)	39	Hypersexuality	As in MPA
Leuprolide acetate	7.5 mg/month (IM)	2	Hypersexuality, exhibitionism	As in MPA
Cimetidine	600-1600 mg/day	20	Masturbation, fondling, exposing, sexual hallucination	Gastrointestinal disturbance, confusion, increased serum transaminases, rash, blood dyscrasias
Pindolol	40 mg/day	1	Verbal comments, hugging, kissing	Bradycardia, congestive heart failure, hypotension, lightheadedness, depression, nausea, vomiting

Note: MPA, medroxyprogesterone acetate; IM, intramuscular.

SSRI Antidepressants

The SSRIs are thought to decrease inappropriate behaviors by their antiobsessional and antilibidinal effects.[40,41] They also tend to decrease sex hormone–induced aggressive behaviors.[42] These medications are found to be safe in overdoses and to have the added benefit of treating comorbid depression and anxiety disorders. The common side effects of these medications are gastrointestinal disturbances, headache, insomnia, and sexual dysfunction.

There is 1 case report on the use of paroxetine in a 69-year-old man with disinhibition and dementia.[43] This patient had failed treatments with haloperidol, chlorpromazine, lorazepam, lithium, and nortriptyline. The dose was 20 mg daily and the effects were seen within 1 week. The improvement was sustained at 3-month follow-up.

There is 1 case report on the use of citalopram in a 90-year-old woman residing in a nursing home who had a 2-year history of physical aggression and inappropriate disrobing at the pelvic area of male residents.[44] This patient had failed a trial of paroxetine at 20 mg once daily. Risperidone at 0.5 mg twice a day orally was effective in decreasing the physical aggression but not the sexually inappropriate behaviors. It had to be discontinued because of extrapyramidal side effects. Trials of valproic acid and gabapentin were also ineffective. A trial of citalopram at 20 mg orally once daily was very effective in decreasing the aggressive and inappropriate behaviors within 1 week. These symptoms remained in remission at 9-month follow-up. The authors of the report postulated that the effectiveness of citalopram compared to paroxetine was probably because of its higher selectivity on serotonin reuptake inhibition.

There are 2 case reports on the use of clomipramine, a nonspecific norepinephrine and serotonin reuptake inhibitor, in the treatment of inappropriate sexual behaviors in dementia.[45] The first patient (repeatedly exposing himself), had failed medroxyprogesterone acetate and thioridazine trials. Clomipramine was started and titrated to 150 mg daily. After 4 weeks, there was a significant decrease in his behaviors. In a second case (public masturbation, repeated touching), the patient had failed trials of thioridazine and buspirone. Clomipramine was started and titrated to 200 mg daily. The behaviors ceased but he developed orthostatic hypotension. The clomipramine was discontinued and thioridazine was restarted. As the behaviors reappeared, thioridazine was discontinued and clomipramine was reinitiated again. It was titrated to 175 mg daily without any adverse events. With the reintroduction of clomipramine, the behaviors ceased.

Antipsychotics

There are no known clinical trials in the elderly on the use of antipsychotic medications in the treatment of these behaviors, but the available evidence points to their efficacy.[46] These drugs are thought to decrease sexually inappropriate behaviors by their dopamine-blocking effects. Although all antipsychotics are thought to be equally effective in treating these behaviors, atypicals are better tolerated in the elderly.[47]

There is 1 case report on the use of quetiapine in an 85-year-old man with dementia and parkinsonism who presented with inappropriate sexual behaviors, that is, masturbating for several hours a day to the point of self-injury.[48]

The patient had failed a 2-week trial of cyproterone acetate at 100 mg orally twice daily. He also developed diarrhea from paroxetine at 5 mg orally once daily after only 2 doses. He responded well to quetiapine at 25 mg orally once daily. The sexual behaviors stopped within 2 days and did not recur in the 2-month follow-up period. There was no worsening of his parkinsonism or blood pressure during the 2-month period.

Trazodone

Trazodone is a presynaptic reuptake inhibitor and a mild postreceptor agonist of serotonin with a half-life of 5 to 9 hours. Simpson et al reported a case series of 4 patients with dementia and inappropriate sexual behaviors who had failed to respond to antipsychotics (thioridazine, haloperidol, mesoridazine, and thiothixene) and benzodiazepines but responded to trazodone.[49] They were men between the ages of 62 and 72 years. The dose range for trazodone was between 100 and 500 mg a day in divided doses. The response was thought to be due to the calming effect of the drug and not its antidepressant effect. The main side effects of trazodone are headache, dry mouth, sedation, orthostatic hypotension, and weight gain. Priapism (painful erection) occurs in 1 in 6000 patients and is due to the a-2 blocking effect of the drug. In cases of priapism, emergency treatment is needed with an intracavernal injection of epinephrine.

Hormonal Agents

Antiandrogens. The commonly used antiandrogens are medroxyprogesterone acetate (MPA) and cyproterone acetate (CPA). The rationale behind their use is that the reduction in serum testosterone level will impair sexual functioning, and this in turn will eliminate the inappropriate behaviors.

Medroxyprogesterone acetate. MPA is a progesterone that decreases the level of testosterone by inhibiting the levels of pituitary luteinizing hormone (LH) and follicle stimulating hormone (FSH). Though it is called an antiandrogen, it does not possess antiandrogen effects at the receptor levels. The major side effects are sedation, increased appetite, weight gain, fatigue, loss of body hair, hot and cold flashes, mild diabetes, decreased ejaculatory volume, and symptoms of depression. Cooper reported the cases of 4 male nursing home patients with dementia and inappropriate behaviors (masturbation, exposure, fondling, and attempting to have sex with other patients).[17] They were between the ages of 75 and 84 years and had failed behavioral management and treatment with thioridazine or chlorpromazine. They were administered MPA at 300 mg intramuscularly per week for 1 year. Sexual activity of these patients was recorded 6 months before the trial, during the trial, and 1 year after the trial. These undesirable sexual activities were reduced within 10 to 14 days. The mean serum levels of testosterone and LH were reduced by 90% and 60%, respectively, after 28 days. The levels of testosterone and LH returned to pretreatment levels within 4 weeks after the end of the trial. At 1-year follow-up, 3 of the 4 patients were free of the inappropriate behaviors. The fourth patient had a return of some of the inappropriate behaviors but not to the same degree as before. The investigators concluded that the effect of the drug was not only due to the reduction of the testosterone but also due to its inhibitory effect on the hypothalamic neurons.

Weiner et al[50] reported 2 cases of sexually inappropriate behaviors (molestation, exposure, masturbation, and fondling) in demented men aged 72 years and 84 years, who failed a trial of thioridazine. The first patient was treated with intramuscular MPA at 100 mg every 2 weeks. At the end of 2 weeks, the testosterone level was reduced from 2.9 ng/mL to 1.7 ng/mL, with an accompanying reduction in these behaviors. The dose was increased to 150 mg as the behaviors returned. The behaviors were completely eliminated within the next 2 weeks. In the second case, the patient responded to 200 mg of intramuscular MPA within 2 weeks

There are no case reports on the use of CPA in older men. There are 2 case reports of women with inappropriate behaviors.[51,52] The first patient was a woman with treatment-resistant schizophrenia and compulsive masturbation who responded well to CPA. The second case was of a 40-year-old woman with hypersexual behavior who responded to treatment with CPA.

Estrogens. These medications act by reducing LH and FSH secretion and thereby reducing testosterone production. The common estrogens are diethylstilbestrol (DES) and conjugated estrogen. Common side effects include fluid retention, nausea, vomiting, impotence, and gynecomastia. There are reports of increased cardiovascular and thromboembolic episodes in patients with prostate cancer who are treated with DES. Kyomen et al reported the use of DES in a 94-year-old man with dementia and sexualized aggression, including forcing his penis into the mouth of another patient and thrashing his body against her.[53] The patient responded to 1 mg of DES within 3 weeks. Lothstein et al reported marked improvement in symptoms in 38 out of 39 patients with dementia who were treated with oral estrogen (0.625 mg daily) or with transdermal estrogen patches (0.5-0.10 mg).[54]

Gonadotrophin-releasing hormone analogs. These medications suppress the testosterone production by stimulating the secretion of pituitary LH and FSH. This results in an increase in estrogen production, thereby decreasing the level of testosterone. Leuprolide acetate is the common gonadotrophin-releasing hormone (GnRH) analog used in clinical practice. These drugs must be used continuously to maintain their effectiveness. Common

side effects include hot flashes, erectile dysfunction, decreased libido, and irritation at the injection sites. There are 2 case reports on their use in inappropriate behaviors. The first report is by Ott, in which he described the use of leuprolide acetate in a 43-year-old man with dementia and Kluver-Bucy syndrome with good effect.[55] This patient had not responded to pindolol at 360 mg daily. The dose of leuprolide was 7.5 mg intramuscularly every month. The second report was by Rich et al in a 39-year-old man with Huntington's disease and exhibitionism who responded well to leuprolide acetate.[56]

A discussion on the use of hormonal agents for the treatment of inappropriate sexual behaviors in the elderly is a very sensitive one. The issues raised include the inability of the subject to give informed consent, the side-effect profile of these drugs and the social stigma associated with using these drugs, which are seen as "chemical castration." Though there is no literature on how to handle these issues, a pragmatic approach to resolve the ethical conflict is to have discussions with the caregivers and the family about the risk and benefits of these drugs. Finally, using these medications as agents of last resort with adequate documentation of failed trials may also help with decreasing the anxiety about their use.

Cimetidine

Cimetidine is an H-2 receptor antagonist with antiandrogen effects. Wiseman et al completed a retrospective chart review of 17 men and 3 women with various inappropriate behaviors (masturbation, fondling, and preoccupation with sex, exposing self, and sexual hallucinations and delusions about their spouse's fidelity).[57] Of the 20 patients in the review, 14 had responded to cimetidine at dose ranges from 600 to 1600 mg/day, spironolactone 75 mg daily, ketoconazole, or to all 3 medications combined together. Response time ranged from 1 to 8 weeks. Common side effects were nausea, arthralgia, and headaches. Some of these patients also received clozapine, carbamazepine, perphenazine, venlafaxine, and loxapine for delusions, hallucinations, and irritability. Recall bias and subjective nature of the responses were the major limitations of this study.

Pindolol

There is a case report of a 75-year-old demented man with aggressive and hypersexual behaviors (verbal comments, hugging, kissing, self exposure, and attempted fondling) who had failed treatment with haloperidol (1-3 mg daily) and hydroxyzine (50-150 mg). Both agitation and hypersexual behaviors diminished in response to pindolol at 40 mg daily along with haloperidol 3 mg daily and hydroxyzine 100 mg daily. Time to response was 2 weeks. Common side effects of pindolol are fatigue and hypotension. This drug is thought to reduce inappropriate behaviors by decreasing adrenergic drive and thus decreasing agitation, aggression, and inappropriate behaviors.[58]

Mood Stabilizers

There are no reports on the use of mood stabilizers in the treatment of inappropriate sexual behaviors, though these medications are commonly used to treat bipolar disorder in the elderly and behavioral disturbances associated with dementia.[59,60] Common side effects of these medications are tremors, sedation, falls, and weight gain.

Cholinesterase Inhibitors and N-methyl D-aspartate Receptor Antagonist

Cholinesterase inhibitors such as donepezil, rivastigmine, and galantamine have been found to be effective in treating cognitive dysfunction and behavioral disturbances associated with dementia.[61] However, there are no reports on the use of these medications in the treatment of inappropriate sexual behaviors associated with dementia.

The N-methyl D-aspartate (NMDA) receptor antagonist memantine has been approved for the use in moderate to severe AD. This medication has been found to be effective in treating cognitive and behavioral disturbance associated with AD.[62] There are no current reports on their use in elderly patients with inappropriate sexual behaviors.

ETHICAL ISSUES

The question that gets asked frequently is, Should 2 demented persons or 1 demented and 1 nondemented person be allowed to participate in a sexual relationship? The answer remains poorly defined, but use the safety-first rule. If the persons are competent to understand, they consent to form a relationship, there is no coercion by one or other party, and they can express joy in such a relationship, then it is ethically acceptable to let them form such a relationship. Lichtenberg and Strzepek in their review discussed several questions that can help determine the individual's capacity to consent to a sexual relationship.[63] These questions test the individual's awareness about the relationship, the presence or absence of coercion, moral values, ability to prevent abuse, and psychological aspects of entering and terminating relationships. In many cases, a psychiatric or neuropsychological consultation will help in clarifying the issue of informed consent. Try to involve families in the decision-making process, though dealing with their anxiety about this issue can be difficult.

CONCLUSION

Dementia is a growing public health problem. Behavioral problems associated with dementia are very common and are a major source of distress. These behaviors are also the most common reason for the placement of a demented individual into a skilled nursing facility. Inappropriate sexual behaviors are a less common but an extremely distressing symptom seen in patients with dementia. There are limited data on the various aspects of these behaviors

including definition, neurobiology, and treatments. Future research should not only focus on effective treatments but also on early detection and prevention of such behaviors. This will reduce undue suffering to both the patients and their caregivers, as well as improve the quality of life for all those affected.

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