

## On Drug-Induced Memory Impairments

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### Abstract

Several factors affect memory, including prescribed and over-the-counter medications, which are known to affect short- and long-term memory as well as induce dementia-like symptoms. This article discusses at length these several medications including why they are prescribed, how they can affect memory, and what alternatives may be available. Three reasons are advanced for skipping sleeping aids, especially as one ages. A smart guide is also offered on how to keep the brain healthy and the memory sharp while aging.

**Keywords:** *Antianxiety drugs; anticholinergics; antihistamines; anti-nausea drugs; antiseizure drugs; brain messenger pathways; brain neurotransmitters; dementia; long-term memory; memory impairment; opiates; sedative-hypnotics; short-term memory; sleeping pills; sundowning; tricyclic antidepressants*

### Abbreviations

AD: Alzheimer's Disease; BDNF: Brain-Derived Neurotrophic Factor; CBT-I: Cognitive Behavioral Therapy for Insomnia; CDC&P: (U.S.) Centers for Disease Control & Prevention; CMR: Comprehensive Medication Review; DASH: Dietary Approaches to Stop Hypertension; GERD: Gastroesophageal Reflux Disease; GI: Gastrointestinal; HRT: Hormone Replacement Therapy; JAMA: Journal of the American Medical Association; MIND: Mediterranean-DASH Intervention for Neurodegenerative Delay; NHT: National Hearing Test; NSAID: Nonsteroidal Anti-Inflammatory Drug; OCD: Obsessive-Compulsive Disorder; OTC: Over-The-Counter; PD: Parkinson's Disease; PPI: Proton Pump Inhibitor; RLS: Restless Leg Syndrome; SSRI: Selective Serotonin Reuptake Inhibitor

### Introduction

Several factors are known to affect memory. I group them under the acronym **ADH(4S)VIM**, where **A** stands for **A**lcohol abuse; **D** for **D**rug abuse; **H** for **H**ead injuries; **4S** for heavy cigarette **S**moking, **S**leep deprivation, severe **S**tress, and **S**troke; **V** for **V**itamin B12 deficiency; **I** for **I**llness [such as Alzheimer's disease (AD) and depression]; and **M** for commonly prescribed or over-the-counter **M**edications. In my book titled "Memory: The enchanted loom's property in search of self", I discussed at great length memory and its multiple definitions. Suffice it to say here that 'short-term memory' (also known as 'working memory') refers to anything that happened within the last 30 seconds whereas 'long-term memory' involves anything beyond this brief window.

Now, medications are known to affect short- and long-term memory. In the former situation, they can interfere with a person's ability to focus and process information. They disrupt so-called "messenger pathways in the brain", changing the short-term memory processing. Thankfully, once the medication(s) are discontinued, short-term memory improves. In the latter situation, medications

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interfere with “neurotransmitters in the brain” (the body’s chemical messengers that help one to think, move, breathe, and function generally). When these neurotransmitters do not work as they should, a number of problems can occur, including issues with thinking and memory. The biggest concern with medications that affect neurotransmitter activity is when several of them are used concurrently, or/and when they are used at high doses, or/and when they are used for long periods of time. Certain medications can affect both short- and long-term memory, while others may affect only either one of these. Still others can induce dementia-like symptoms.

In this article, I propose to review the various known medications especially with regard to their effect on memory.

### Drugs that May Cause Short, Long-Term Memory Loss and Dementia-Like Symptoms

Table 1 below shows which drugs cause short-term memory loss, long-term memory loss, and dementia-like symptoms. Short-term memory loss has been associated with benzodiazepines, antihistamines, antiseizure drugs, narcotic painkillers, sleeping aids, and the older class of Tricyclic antidepressants. Long-term memory loss has been associated with benzodiazepines, antihistamines, incontinence drugs, narcotic painkillers, and the older class of tricyclic antidepressants. Dementia-like symptoms have been linked to antihistamines, certain incontinence drugs such as anti-nausea, muscle relaxers, and the older class of tricyclic antidepressants.

Drug Type	Short-term memory loss	Long-term memory loss	Dementia-like symptoms
1. Antianxiety (Benzodiazepines)	X	X	--
2. Antihistamines	X	X	X
3. Antiseizures	X	--	--
4. Incontinence, anti-nausea, and muscle relaxers (anticholinergics)	--	X	X
5. Narcotic pain killers (opiates)	X	X	--
6. Sleeping aids	X	--	--
7. Tricyclic antidepressants (older class) (*)	X	X	X
8. Other medications			

*Table 1: Synopsis of drugs and associated memory impairments*

(\*) **Vortioxetine**, a new generation tricyclic antidepressant, is not included in the U.S. pharmacopia.

More details are provided below regarding these several types of medications and their effects on memory.

#### 1. Antianxiety Drugs (Benzodiazepines)

- **Why they are prescribed:** Benzodiazepines are used to treat a variety of anxiety disorders, agitation, seizures, delirium, and muscle spasms. Because benzodiazepines have a sedative effect, they are sometimes used to treat insomnia and the anxiety that can accompany depression.

**Examples:**

- Alprazolam (Xanax),
- Chlordiazepoxide,
- Clonazepam (Klonopin),
- Diazepam (Valium),
- Flurazepam,
- Lorazepam (Ativan),
- Midazolam,
- Quazepam (Doral),

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- Temazepam (Restoril), and
- Triazolam (Halcion)

- **How they can affect memory:** Benzodiazepines dampen activity in key parts of the brain, including those involved in the transfer of events from short-term to long-term memory. In fact, they are used in anesthesia for this very reason.
- **Alternatives:** Benzodiazepines should be prescribed only rarely in older adults and, then, only for short periods of time. It takes older people much longer than younger people to flush these drugs out of their bodies, and the ensuing build-up puts older adults at higher risk for not just memory loss but also delirium, falls, fractures, and motor vehicle accidents. Another drawback is that they are addicting. The condition may perhaps be treated with other types of drugs or non-drug treatments. For instance, if taking these medications for insomnia, the first line of treatment would be cognitive behavioral therapy for insomnia (CBT-I). An antidepressant might also be able to treat anxiety.

**Note:** Before stopping or reducing the dosage of any benzodiazepine, it is important to note that sudden withdrawal can trigger serious side effects, so a health professional should always monitor the process.

## 2. Antihistamines

- **Why they are prescribed:** These medications are used to relieve or prevent allergy symptoms or symptoms of the common cold. Some antihistamines are also used to prevent dizziness, motion sickness, nausea, and vomiting. They are also employed to treat anxiety or insomnia.

### Examples:

- Brompheniramine (Dimetane),
- Chlorpheniramine (Chlor-Trimeton),
- Clemastine (Tavist),
- Diphenhydramine (Benadryl),
- Hydroxyzine (Vistaril). and
- Promethazine (Phenergan).
- **How they can affect memory:** These medications - prescription and over-the-counter (OTC) - inhibit the action of acetylcholine, a chemical messenger that mediates a wide range of functions in the body. In the brain, they inhibit activity in the memory and learning centers.
- **Alternatives:** Newer-generation antihistamines such as loratadine (Claritin) and cetirizine (Zyrtec) are better tolerated by older patients and do not present the same risks to memory and cognition.

## 3. Antiseizure Drugs

- **Why they are prescribed:** Long used to treat seizures, these medications can also be prescribed for nerve pain, bipolar disorder, mood disorders, and mania.

### Examples:

- Carbamazepine (Tegretol),
- Gabapentin (Neurontin),
- Lamotrigine (Lamictal),
- Levetiracetam (Keppra),
- Oxcarbazepine (Trileptal),
- Phenobarbital (Luminal),
- Phenytoin (Dilantin),
- Pregabalin (Lyrica),
- Primidone (Mysoline),
- Rufinamide (Banzel),

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- Topiramate (Topamax),
- Valproic acid (Depakote), and
- Zonisamide (Zonegran).
- **How they can affect memory:** Anti-seizure medications are believed to limit seizures by dampening the flow of signals within the central nervous system. Basically these medications are slowing the brain down. As a consequence, attention, memory and sleepiness are common side effects of these medications.
- **Alternatives:** It is also possible that other potentially treatable health issues not related to the medication may be messing with memory, such as anxiety and poor sleep. If uncontrolled, seizures themselves can affect memory as well.

### 4. Incontinence Drugs (Anticholinergics)

- **Why they are Prescribed:** These medications are used to relieve symptoms of overactive bladder and reduce episodes of urge incontinence or an urge to urinate so sudden and strong that one often cannot get to a bathroom in time.

**Examples:**

- Darifenacin (Enablex),
  - Oxybutynin (Ditropan XL) - Another oxybutynin product, 'Oxytrol for Women', is sold over the counter,
  - Solifenacin (Vesicare),
  - Tolterodine (Detrol), and
  - Trospium (Sanctura).
  - **How they can Affect Memory:** Individuals using anticholinergics may experience issues with their long-term memory. These drugs are linked to a higher risk of dementia, and this increased risk may continue even after the medication is stopped. That is because these drugs block the action of acetylcholine, a neurotransmitter that mediates all sorts of functions in the body. In the bladder, anticholinergics prevent involuntary contractions of the muscles that control urine flow. In the brain, they inhibit activity in the memory and learning centers. The risk of memory loss is heightened when the drugs are taken for more than a short period of time or used with other anticholinergic drugs.
- Note:** Older adults are particularly vulnerable to the other adverse effects of anticholinergic drugs, including constipation (which, in turn, can cause urinary incontinence), blurred vision, dizziness, anxiety, depression and hallucinations.
- **Alternatives:** As a first step, it is important to make sure of the appropriate diagnosis. For example, urinary incontinence symptoms might stem from another condition (such as a bladder infection or another form of incontinence) or a medication (such as a blood pressure drug, diuretic or muscle relaxant). Once these other possible causes are ruled out, some simple lifestyle changes, such as cutting back on caffeinated and alcoholic beverages, drinking less before bedtime and doing exercises to strengthen the pelvic muscles may help control urination.
- Note:** Some urologists are treating overactive bladder with Botox injections to help the muscle relax.

### 5. Narcotic Painkillers (Opioids)

- **Why they are Prescribed:** These medications are occasionally utilized to alleviate moderate to intense pain resulting from surgical procedures or injuries. In certain cases, they may also be utilized to address chronic pain.

**Examples:**

- Fentanyl (available as a patch),
  - Hydrocodone (Vicodin),
  - Hydromorphone (Dilaudid, Exalgo),
  - Morphine, and
  - Oxycodone (Oxycontin).
  - These drugs come in many different forms, including tablets, solutions for injection, transdermal patches and suppositories.
  - **How they can Affect Memory:** These medications function by interrupting the transmission of pain signals in the central nervous system and by dulling emotional responses to pain. Both these actions are mediated by chemical messengers that are
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also involved in many aspects of cognition, so use of these drugs can interfere with long- and short-term memory, especially when used for extended periods of time. Researchers have also found a link between opioid use and dementia in older adults.

- **Alternatives:** In patients under the age of 50 years, nonsteroidal anti-inflammatory drugs (NSAIDs) are the frontline therapy for pain. Unfortunately, NSAID therapy is less appropriate for older patients who have a much higher risk of gastrointestinal (GI) bleeding. Research shows the risk goes up with the dosage and duration of treatment. Acetaminophen (Tylenol) may be another option.

### 6. Sleeping Aids (Nonbenzodiazepine Sedative-Hypnotics)

- **Why they are Prescribed:** Sometimes called the “Z” drugs, these medications can be used to treat insomnia and other sleep problems. They are also prescribed for mild anxiety.

**Examples:**

- Eszopiclone (Lunesta): belongs to a class of drugs called sedative-hypnotics. It acts on the brain to produce a calming effect. Use of this medication is usually limited to short treatment periods of 1 to 2 weeks or less.
- Sleep Eze 3 (Chlorhydrate diphenhydramine), also prescribed for allergy, hay fever, and common cold.
- Zaleplon (Sonata): A hypnotic.
- Zolpidem (Ambien): A sedative hypnotic.
- **How they can Affect Memory:** Even though these are chemically different from benzodiazepines (refer to No. 1 mentioned above), they target many of the same neurological pathways and neurotransmitters, resulting in comparable side effects and issues with dependency and withdrawal. The “Z” medications may lead to amnesia and occasionally provoke risky or unusual actions, like preparing food or operating a vehicle without any memory of the occurrence upon awakening.
- **Alternatives:** There are alternative drug and non-drug treatments for insomnia and anxiety, so talk with your health care professional about options. Cognitive behavioral therapy for insomnia (CBT-I) is the first-line treatment for the sleep disorder. Melatonin, for instance, can help to reestablish healthy sleep patterns.
- **Reasons to Skip Sleeping Pills as one Gets Older:** (see section below)

### 7. Tricyclic Antidepressants

- **Why they are Prescribed:** This older class of antidepressant drugs is prescribed less often these days, but some people still use tricyclics for depression, anxiety disorders, obsessive-compulsive disorder (OCD) and nerve-related pain.

**Examples:**

- Amitriptyline (Elavil),
- Clomipramine (Anafranil),
- Desipramine (Norpramin),
- Doxepin (Silenor),
- Imipramine (Tofranil),
- Nortriptyline (Pamelor),
- Protriptyline (Vivactil), and
- Trimipramine (Surmontil).
- **How they can Affect Memory:** Tricyclic antidepressants block the action of serotonin, norepinephrine and other chemical messengers in the brain, which can lead to a number of side effects, including lapses in memory.
- **Alternatives:** Newer antidepressants like fluoxetine (Prozac), sertraline (Zoloft) and other selective serotonin reuptake inhibitors (SSRIs) do not have the same anticholinergic effects as tricyclic antidepressants and therefore do not interfere with cognition. Non-drug therapies might work just as well or better than a drug.

### 8. Other Medications

Other medications worth considering include:

- **Beta-Blockers:** While there is no evidence that beta-blockers (prescribed for heart failure, angina, certain heart rhythm

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disorders, and high blood pressure) contribute to long-term cognitive decline or dementia, they can make some people feel “fatigued,” “foggy” and “not their sharpest”. Fortunately, there are different beta-blockers with slightly different chemical composition.

- **Cannabinoids:** Access to cannabis and use of the drug have grown in recent years. Mounting research shows that cannabis may have an effect on cognition. In a study involving approximately 1,000 individuals, it was found that long-term cannabis users showed cognitive deficits as well as memory and attention problems.
- **Corticosteroids:** These anti-inflammatory medications, utilized for the treatment of rheumatoid arthritis, lupus, and various other ailments, can lead to confusion and memory impairment in individuals taking high doses. They can also induce depression.
- **Heartburn Medications:** Some recent studies have found a link between medications commonly used to treat gastroesophageal reflux disease (GERD), heartburn, and peptic ulcers with an increased risk of dementia. If taking an over-the-counter proton-pump inhibitor (PPI), it is important to use the medication in moderation and for short amounts of time (not for more than two weeks at a time).
- **Statins:** Very large studies performed in hundreds of thousands of individuals monitored very carefully did not show any increase in memory problems or anything else related to brain function. There is no convincing evidence for a causal relationship between statins and cognitive dysfunction. Actually, data suggest that statins may be protective against cognitive decline, since they are effective at preventing strokes (see Fymat, 2024i).

The above considerations are summarized in Table 2 below:

Drug Category	Examples	Why prescribed?	How they affect memory?	Alternatives	Notes
Anti-anxiety (Benzodiazepines)	<ul style="list-style-type: none"> <li>o Alprazolam (Xanax)</li> <li>o Chlordiazep oxide (Librium)</li> <li>o Clonazepam (Klonopin)</li> <li>o Diazepam (Valium)</li> <li>o Flurazepam</li> <li>o Lorazepam (Ativan)</li> <li>o Midazolam</li> <li>o Quazepam (Doral)</li> <li>o Temazepam (Restoril)</li> <li>o Triazolam (Halcion)</li> </ul>	<ul style="list-style-type: none"> <li>o Anxiety disorders + anxiety accompanying depression</li> <li>o Agitation</li> <li>o Delirium</li> <li>o Insomnia</li> <li>o Muscle spasms</li> <li>o Seizures</li> </ul>	<ul style="list-style-type: none"> <li>o Dampen activity in key parts of the brain, including those involved in the transfer of events from short-term to long-term memory</li> </ul>	<ul style="list-style-type: none"> <li>o Anti-depressants</li> <li>o Cognitive behavioral therapy for insomnia (CBT-I)</li> </ul>	<ul style="list-style-type: none"> <li>o Also used in anesthesia</li> <li>o To be rarely prescribed in older adults and only for short periods of time</li> <li>o Confusion</li> <li>o Higher risk - not just memory loss but also delirium, falls, fractures, and motor vehicle accidents</li> <li>o Addicting</li> <li>o Sudden withdrawal can trigger serious side effects</li> </ul>
Antihistamines	<ul style="list-style-type: none"> <li>o Brompheniramine (Dimetane)</li> <li>o Chlorpheniramine (Chlor-Trimeton)</li> <li>o Clemastine (Tavist)</li> <li>o Diphenhydramine (Benadryl)</li> <li>o Hydroxyzine (Vistaril)</li> <li>o Promethazine (Phenergan)</li> </ul>	<ul style="list-style-type: none"> <li>o Allergy symptoms</li> <li>o Anxiety</li> <li>o Common cold symptoms</li> <li>o Dizziness</li> <li>o Insomnia</li> <li>o Motion sickness</li> <li>o Nausea</li> <li>o Vomiting</li> </ul>	<ul style="list-style-type: none"> <li>o Inhibit action of acetylcholine</li> <li>o Inhibit activity in the memory and learning centers</li> </ul>		<ul style="list-style-type: none"> <li>o Other treatable health issues may be messing with memory, such as anxiety and poor sleep</li> <li>o Uncontrolled, seizures can affect memory</li> </ul>
Incontinence (anticholinergics)	<ul style="list-style-type: none"> <li>o Darifenacin (Enablex),</li> <li>o Oxybutynin (Ditropan XL)</li> <li>o Oxytrol for women</li> <li>o Solifenacin (Vesicare)</li> <li>o Tolterodine (Detrol)</li> <li>o Trospium (Sanctura)</li> </ul>	<ul style="list-style-type: none"> <li>o Incontinence</li> <li>o Overactive bladder</li> <li>o Urge for sudden urination</li> </ul>	<ul style="list-style-type: none"> <li>o Long-term memory</li> <li>o Dementia</li> </ul>	<ul style="list-style-type: none"> <li>o Lifestyle changes</li> <li>o Exercises to strengthen the pelvic muscles</li> </ul>	<ul style="list-style-type: none"> <li>o Block the action of acetylcholine</li> <li>o Can cause confusion, dry mouth, and blurry vision, especially in older adults.</li> <li>o In bladder: prevent involuntary contractions of the muscles controlling urine flow</li> <li>o In brain: inhibit activity in memory and learning centers</li> <li>o Memory loss heightened when drugs are taken for long time or used with other anticholinergics</li> <li>o Botox injections</li> </ul>

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Narcotic painkillers (opioids)	o Surgery pain or injury	o Fentanyl o Hydrocodone (Vicodin) o Hydro-morphone (Dilaudid, Exalgo) o Morphine and oxycodone (Oxycontin)	o Involved in many aspects of cognition o Interfere with long- and short-term memory o Link between opioid use and dementia	o In patients under 50: NDAIDs are the front-line therapy for pain o Acetamino-phen (Tylenol)	o NSAID therapy is less appropriate for patients older than 50 o For older patients: risk of gastro-intestinal (GI) bleeding, which increases with age o Not a good combination not a good combo with blood thinners, diabetes drugs, diuretics, or blood pressure drugs o Rough on major organs (kidneys, liver, heart, digestive system)
Sleep aids (non-benzodiazepine sedative-hypnotics) ("Z" drugs)	o Insomnia o Mild anxiety o Other sleep problems	o Diphenhydramine o Eszopiclone (Lunesta) o Zaleplon (Sonata) o Zolpidem (Ambien)	o Act on many of the same brain pathways and chemical messengers as benzodiazepine	o CBT-I o Melatonin	o Problems with addiction and withdrawal o Can cause amnesia o Can trigger dangerous or strange behaviors o Dry mouth o Blurred vision o Bladder problems
Tricyclic antidepressants	o Anxiety disorders o Depression o Nerve-related pain o Obsessive-compulsive disorder	o Amitriptyline (Elavil): old o Clomipramine (Anafranil) o Desipramine (Norpramin) o Doxepin (Silenor) o Imipramine: old o Nortriptyline (Pamelor) o Protriptyline (Vivactil) o Simipramine (Tofranil) o Trimipramine (Surmontil)	o Block the action of serotonin, norepinephrine and other chemical messengers in the brain o Lead to memory lapses and other side effects	Newer anti-depressants: o Fluoxetine (Prozac) o Sertraline (Zoloft) o selective serotonin reuptake inhibitors (SSRIs) o Non-drug therapies	o Older anti-depressants less prescribed o Interfere with cognition o Memory trouble o Constipation o Irregular heartbeat o Blurry vision o Confusion o Dry mouth
Other # 1	o Beta-blockers	o Do not contribute to long-term cognitive decline or dementia	o Heart failure o Angina o Heart rhythm disorders o High blood pressure	Different formulations	o Some people feel "fatigued," "foggy" and "not their sharpest"
Other # 2	o Cannabinoids		o Cognitive deficits o Memory o Attention problems		o Anti-inflammatory drugs
Other # 3	o Cortico-steroids	o Lupus o Rheumatoid arthritis o Other conditions	o Confusion o Memory loss o Depression		o Effects noted at high doses
Other # 4	o Heartburn meds	o Gastro-esophageal reflux disease (GERD) o Heartburn o Peptic ulcers	o Increased risk of dementia		
Other # 5	o Statins	o Strokes	o No increase in memory problems o No effect on brain function		o May be protective against cognitive decline

**Table 2: Medications and their effects on memory**

The type and number of drugs taken may be affecting memory as well. Taking multiple medications (so-called 'polypharmacy') has been linked to lower memory function in older adults, as well as an increased risk for delirium. Through the process known as 'deprescribing', some medications taken may no longer be necessary or effective and may consequently be reduced in dose, gradually

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tapered off, or eliminated if they contribute to memory loss. Another approach is switching to a different class of medication with fewer potential complications.

### Medications, Dementia, and Sundowning

Sundowning syndrome is a state of confusion or agitation that occurs late in the afternoon and stretches into evening. Although it is typically linked to Alzheimer's disease (AD), it can occur with any type of dementia. Medications like anticholinergics, antihistamines, and anti-Parkinson's disease (PD) drugs, and tricyclic antidepressants can trigger or worsen its symptoms. Other substances – alcohol and nicotine, for example – can also cause sundowning.

### Three Reasons to Skip Sleeping Pills as One Gets Older

The share of adults who use medication to help them sleep is on the rise. More adults 65 and older are taking pills at bedtime than those 64 and younger. A new report from the (U.S.) Centers for Disease Control & Prevention (CDC&P) found that, in 2020, 12% of those aged 65 or older and 8.4% of all adults regularly took prescription or over-the-counter sleep medication, up from 4% about a decade ago.

Studies show about 1 in 3 adults do not get enough sleep (about 7 hours a night for adults 50 and older) on a regular basis, and an estimated 50 to 70 million Americans have chronic sleep disorders. Sleep quality tends to decline with age. It is no surprise, then, that older adults are more likely to turn to medications for an assist. But there are a few things one needs to know before doing so.

#### 1. Medications Can Come With Dangerous Side Effects

Recent sleep medications such as zolpidem (Ambien) and eszopiclone (Lunesta) possess a 'relatively safer' profile compared to older medications used for sleep issues. Still, anything that is going to be sedating or make one sleepy is going to put one at risk for dizziness, falls, and the like.

Studies indicate that both the newer medications and the traditional benzodiazepines can hinder mental and physical abilities in elderly individuals, resulting in a heightened risk of falls and confusion. And, combined with other medications — especially anything for pain, mood, anxiety — could possibly put one at a higher risk of suppressing breathing and respiratory depression.

Caution is required not only with prescription medications. Non-prescription options also have a range of undesirable and possibly harmful side effects. For example, diphenhydramine, the active ingredient in many over-the-counter sleep aids like Advil PM, Tylenol PM, and ZZZQuil, has been linked to an increased risk for cognitive decline and confusion in older adults, as well as urinary retention, constipation, and next-day grogginess, which can interfere with driving ability.

**Melatonin's Popularity:** A 2022 study published in the Journal of the American Medical Association (JAMA) tracked a fivefold increase in melatonin use among U.S. adults over the past few decades. An increasing number of Americans are also taking more than the recommended amount of the supplement. Supplements deserve a similar level of scrutiny. For example, valerian root, an herbal supplement often marketed to improve sleep, can cause dizziness, dry mouth, and mental dullness.

#### 2. Medications May Be Masking Underlying Health Issues

Taking something to help sleep may be a quick fix, but it could be causing one to overlook an underlying health condition that is behind insomnia such as, for example, anxiety. It is not uncommon for a condition known as restless leg syndrome (RLS) to keep older adults up at night, yet this is a treatable condition. An overactive thyroid, sleep apnea, diabetes, and chronic pain have also been linked to sleep problems.

#### 3. There Are Better Treatments than Pills

It is important to talk to a medical professional, especially given the links between poor sleep and other health problems like heart disease, diabetes, and depression. A sleep specialist or therapist trained in cognitive behavioral therapy for insomnia (CBT-I) may be the first line of treatment for sleep problems. This type of therapy assists patients in recognizing and tackling the habits and actions that



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prevent them from obtaining the sleep they require. It also provides them with techniques for stress relief and relaxation. CBT-I is effective in the general population and in older adults with chronic insomnia disorder. And unlike medication, CBT-I is likely to have fewer harms.

Additionally, lifestyle tweaks, including regular exercise, can lead to improved sleep by allowing a quicker and longer sleep when compared to sedentary lifestyles. Current guidelines recommend that older adults aim for about 30 minutes a day of moderate-intensity activity, like brisk walking. Caffeine intake and late meals can also affect slumber.

## Smart Guide to Keeping the Brain Healthy and the Memory Sharp While Aging

Just like the rest of the body, the brain changes as one ages, and memory loss can become an issue. Although there is no guaranteed solution to memory loss, one can modify the risk and adapt certain lifestyle changes to help keep the brain as healthy and sharp as possible. There are the following 22 tips to help improve memory and maintain overall brain wellness.

### 1. Review Medications' Purposes and Side Effects

Benzodiazepines, which treat anxiety and seizures; tricyclic antidepressants (older class); narcotic painkillers (opioids); sleeping aids; incontinence drugs; and even some antihistamines can cause brain fog.

### 2. Review Medications' Dosages and Frequency

Changes in the body due to normal aging affect how medications are metabolized and cleared, and certain medications — if they are not dosed appropriately — can be potentially harmful, affect memory and cause brain fog. It may be advisable to review one's entire medication list. In the U.S., Medicare Part D covers this service - called a 'comprehensive medication review' (CMR).

### 3. Take the Cognitive Assessment on Staying Sharp

"Staying Sharp" is an online program that shows how to build habits that support brain health. It is a free cognitive assessment to see how one performs that day on certain aspects of cognition, including reasoning, memory, and attention. The assessment can be taken every 30 days.

### 4. Schedule a Memory Screening

A memory screening, covered yearly by Medicare Part B for those who are 65 or older, should be part of one's annual wellness visit. The screening can check for conditions including dementia, depression, anxiety or delirium.

### 5. Check Hormone Levels

In women, changes in hormone levels during perimenopause (typically from the late 30s to mid-50s) and menopause (on average around age 51) can affect memory. Although one might not feel so sharp when hormone production first drops, once the body recalibrates to the new hormone levels, the fog should clear. In this regard, hormone replacement therapy (HRT) may play a beneficial role.

### 6. Check Blood Pressure Levels

Untreated high blood pressure — 130/80 or higher — in midlife can affect dementia risk later in life. Normal blood pressure is 120/80 or less, and maintaining this is critically important to reduce the risk of developing dementia. High blood pressure hardens arteries, including brain arteries, which will eventually impede the flow of blood and oxygen into the brain and debris out of it.

### 7. Have Cholesterol Levels Checked

Having high cholesterol — a total of 240 mg/dl or more — is a risk factor for several different types of dementia. Most healthy adults should have their cholesterol checked during a routine physical every four to six years, though some individuals should have their cholesterol checked more frequently. As with blood pressure, it is important to manage cholesterol levels through diet and lifestyle changes (low in saturated fat and high in fiber). It helps to maintain a healthy weight, exercise most days, quit smoking, and limit drinks

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to one per day for women and two for men. If lifestyle changes are not sufficient, cholesterol-lowering medications could be prescribed.

### 8. Be on the Alert for Sleep Apnea

If your partner says you snore, gasp or sometimes stop breathing when you are asleep, you might have sleep apnea — a potentially serious disorder. Waking with dry mouth or a headache and feeling sleepy throughout the day are other signs. Sleep apnea is a major, but treatable, risk factor for dementia. To get treatment and lower the risk, one needs to do a sleep study to get a diagnosis, but that no longer means having to sleep in a lab while hooked up to machines as a home breathing monitor could instead be employed. Medicare covers sleep studies for people suspected to have sleep apnea.

### 9. Get your Hearing Checked

Research shows that hearing loss increases the risk for dementia. Mental stimulation is key to brain health, and if one cannot hear, one loses the stimulation from conversations, music, movies and all the other surrounding sounds. Using a hearing aid restores that vital stimulation, and for individuals at risk for cognitive decline, hearing aids may help lower that risk. People are encouraged to take the National Hearing Test (NHT).

### 10. Check Vitamin and Nutritional Deficiencies

If the body is not getting the proper nutrients, brain performance can suffer. Deficiencies in vitamin B12, thiamine and possibly folate, for example, can play a role in memory problems. Most doctors will check for nutritional deficiencies when their patients complain of memory problems. Low vitamin levels are often easily addressed via supplements. Additionally, certain medications, such as statins, can prevent the gut from taking up all the nutrients from the foods eaten.

### 11. Rest the Brain

The brain needs sleep to function. During sleep, it consolidates memories and clears out unnecessary information as well as some of the toxins that accumulate during the day. Even one night of poor sleep can have a negative impact on how the brain functions for the next day or so, and a lifetime of poor sleep can raise the risk for dementia. Aim to get at least 7 hours of sleep every night, as there is an increased risk associated with getting fewer than 6 hours per night. ‘Sleep hygiene includes going to bed and getting up at the same time every day; keeping the bedroom cool and dark; keeping screens (TVs, smartphones, and tablets) out of the bedroom; and following a relaxing bedtime routine every night.

### 12. Exercise the Body

A daily dose of physical activity (30 minutes a day, not strenuous) helps chip away at obesity, diabetes, and heart disease — all risk factors for developing dementia down the road. It can also help relieve stress that may keep the brain from performing at its best. Exercise has direct effects on brain health, too. It stimulates production of a substance in the brain called brain-derived neurotrophic factor (BDNF), which helps with nerve cell repair and the formation of connections between brain cells. It makes it a little easier to remember information when it is easier to make connections between those brain cells.

### 13. Exercise the Brain

Just as one must keep the body active to stay in good health, one has to keep the mind active, too. There should always be some kind of successive challenge that keeps one engaged and forces one to form new brain connections. Examples include: a card game, a hobby, playing a musical instrument, learning a new language etc. These will challenge the mind and help boost brain activity.

### 14. Nourish the Brain

A healthy diet is not only important for heart health. The brain also needs healthy food, vitamins, and nutrients. Put simply, “*what’s good for the heart is good for the brain*”. That means a diet: low in saturated fat and added sugars and high in fiber; a variety of fruits (including blueberries or other fruit of blue to red hues); vegetables (leafy greens such as kale, collards, spinach, and broccoli) and complex carbohydrates; consuming fish rich in anti-oxidants, astaxanthin, calcitonin, DHA, fatty acids, minerals, omega-3, proteins,

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selenium, vitamins A and D, and other essential nutrients such as are found particularly in salmon; and avoiding highly processed 'junk' food.

### 15. Adopt a Mediterranean Diet

The Mediterranean and MIND diets support brain health. Mediterranean diet emphasizes eating plant-based foods and healthy fats found in nuts, olive oil, avocados, and some fish, a moderate amount of cheese and yogurt, favoring poultry over red meat, and eating little or no sweets and no butter. The MIND (Mediterranean-DASH Intervention for Neurodegenerative Delay) diet incorporates aspects of the Mediterranean and DASH (Dietary Approaches to Stop Hypertension) diets. It is also primarily plant-based, with an added emphasis on leafy greens and berries, draws on healthy fats (see also the Sidebar), and includes little to no meat.

### 16. Limit Alcohol

Alcohol can have negative effects on brain function in both the long and short term — and not just during the time that one drinks. Alcohol is a sedative. It lingers in the bloodstream and affects the brain for a day or more.

### 17. Manage Stress Levels

Stress can impact brain function today and in the long run. When one is stressed out, the brain does not have the bandwidth to remember the simple things that might usually be taken for granted. Living in a constant state of stress can lead to chronic inflammation that takes a toll on the body. Lifelong stress can raise the risk for health conditions including Alzheimer's disease (AD), as well as hypertension or high blood pressure. If stress is a regular feature in day-to-day life, it is time to get it under control. First, look for stressors that can be eliminated. Second, explore enjoyable stress management techniques (meditation, deep breathing, yoga, a daily walk, socializing with friends, practicing a hobby or taking a daily break to read a novel, etc). Avoid medications (prescription and otherwise such as anti-anxiety medications), alcohol, and recreational drugs as they lower alertness and attention.

### 18. Stay Social

Loneliness and social isolation are risk factors for dementia. Like physical exercise, socializing stimulates the brain and may reduce the risk for dementia. Part of that is that socializing engages the mind.

### 19. Combine Healthy Habits

Many of these healthy habits could be combined into a single activity with multiple benefits. For example, volunteering might provide physical activity along with the opportunity to socialize, learn a skill and engage the mind; a dance class could challenge physically while offering social interaction; a cooking club with friends could help adopt a healthier diet while socializing and learning to prepare new dishes. There is no limit to the ways in which one can combine healthy habits into enjoyable activities.

### 20. Chunk Information

Divide larger amounts of information into bite-size pieces, making associations, reducing the amount of information to remember, and relying on longer-term stored information.

### 21. Avoid Multitasking

When attention is split between multiple things, one is less likely to put that brain spotlight on the information to be recorded because it was never committed to memory in the first place.

### 22. Establish a Daily Routine

When having a daily routine, and going through the same steps every day throughout the day, one is more likely to realize if something was missed. Getting into a routine reduces the demands on active decision-making, which can free up cognitive processing for other activities. For instance, when making coffee every morning, consider taking medications then as well, thus avoiding to work as hard to remember the medications.

## Conclusions and Take-A ways

- Several factors are known to affect memory (acronym ADH(4S)VIM where A stands for Alcohol abuse; D for Drug abuse; H for Head injuries; 4S for heavy cigarette Smoking, Sleep deprivation, severe Stress, and Stroke; V for Vitamin B12 deficiency; I for Illness (such as Alzheimer’s disease and depression); and M for Medications.
- Medications are known to affect short-term memory by interfering with a person’s ability to focus and process information. They disrupt “messenger pathways in the brain”, changing the short-term memory processing.
- Medications also affect long-term memory by interfering with “neurotransmitters in the brain” (the body’s chemical messengers). Problems can occur, including issues with thinking and memory.
- The biggest concern with medications that affect neurotransmitter activity is when several are used concurrently, or/and when they are used at high doses, or/and when they are used for long periods of time. Certain medications can affect both short- and long-term memory, while others may affect only either one of these.
- Drugs that cause short-term memory loss, long-term memory loss, and induce dementia-like symptoms have been tabulated and elaborated at length in terms of why they are prescribed, how they can affect memory, and available alternatives.
- Sundowning syndrome is a state of confusion or agitation that occurs late in the afternoon and stretches into evening. Although it is typically linked to Alzheimer’s disease, it can occur with any type of dementia. Medications like anticholinergics, tricyclic antidepressants, antihistamines, and anti-Parkinson’s drugs can trigger or worsen its symptoms. Other substances – alcohol and nicotine, for example – can also cause sundowning.
- A smart guide to keeping the brain healthy and the memory sharp while aging has been offered in the form of 22 tips to help improve memory and maintain overall brain wellness.

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