**Dehydration in Seniors and Falls**

**Overview**

Dehydration occurs when you use or lose more fluid than you take in, and your body doesn't have enough water and other fluids to carry out its normal functions. If you don't replace lost fluids, you will get dehydrated.

Anyone may become dehydrated, but the condition is especially dangerous for young children and older adults.

The most common cause of dehydration in young children is severe diarrhea and vomiting. Older adults naturally have a lower volume of water in their bodies, and may have conditions or take medications that increase the risk of dehydration.

This means that even minor illnesses, such as infections affecting the lungs or bladder, can result in dehydration in older adults. ***\*First stage of dehydration: When you feel thirsty.***

Dehydration also can occur in any age group if you don't drink enough water during hot weather — especially if you are exercising vigorously.

You can usually reverse mild to moderate dehydration by drinking more fluids, but severe dehydration needs immediate medical treatment.

**Symptoms**

Thirst isn't always a reliable early indicator of the body's need for water. Many people, particularly older adults, don't feel thirsty until they're already dehydrated. That's why it's important to increase water intake during hot weather or when you're ill.

**The signs and symptoms of dehydration also may differ by age.**

Infant or young child

* Dry mouth and tongue
* No tears when crying
* No wet diapers for three hours
* Sunken eyes, cheeks
* Sunken soft spot on top of skull
* Listlessness or irritability

**Adult**

* Extreme thirst
* Less frequent urination
* Dark-colored urine
* Fatigue
* Dizziness
* Confusion

**When to see a doctor**

Call your family doctor if you or a loved one:

* Has had diarrhea for 24 hours or more
* Is irritable or disoriented and much sleepier or less active than usual
* Can't keep down fluids
* Has bloody or black stool

**Causes**

Sometimes dehydration occurs for simple reasons: You don't drink enough because you're sick or busy, or because you lack access to safe drinking water when you're traveling, hiking or camping.

Other dehydration causes include:

* Diarrhea, vomiting. Severe, acute diarrhea — that is, diarrhea that comes on suddenly and violently — can cause a tremendous loss of water and electrolytes in a short amount of time. If you have vomiting along with diarrhea, you lose even more fluids and minerals.
* Fever. In general, the higher your fever, the more dehydrated you may become. The problem worsens if you have a fever in addition to diarrhea and vomiting.
* Excessive sweating. You lose water when you sweat. If you do vigorous activity and don't replace fluids as you go along, you can become dehydrated. Hot, humid weather increases the amount you sweat and the amount of fluid you lose.
* Increased urination. This may be due to undiagnosed or uncontrolled diabetes. Certain medications, such as diuretics and some blood pressure medications, also can lead to dehydration, generally because they cause you to urinate more.

**Risk factors**

Anyone can become dehydrated, but certain people are at greater risk:

* Infants and children. The most likely group to experience severe diarrhea and vomiting, infants and children are especially vulnerable to dehydration. Having a higher surface area to volume area, they also lose a higher proportion of their fluids from a high fever or burns. Young children often can't tell you that they're thirsty, nor can they get a drink for themselves.
* Older adults. As you age, your body's fluid reserve becomes smaller, your ability to conserve water is reduced and your thirst sense becomes less acute. These problems are compounded by chronic illnesses such as diabetes and dementia, and by the use of certain medications. Older adults also may have mobility problems that limit their ability to obtain water for themselves.
* People with chronic illnesses. Having uncontrolled or untreated diabetes puts you at high risk of dehydration. Kidney disease also increases your risk, as do medications that increase urination. Even having a cold or sore throat makes you more susceptible to dehydration because you're less likely to feel like eating or drinking when you're sick.
* People who work or exercise outside. When it's hot and humid, your risk of dehydration and heat illness increases. That's because when the air is humid, sweat can't evaporate and cool you as quickly as it normally does, and this can lead to an increased body temperature and the need for more fluids.

**Complications**

Dehydration can lead to serious complications, including:

* Heat injury. If you don't drink enough fluids when you're exercising vigorously and perspiring heavily, you may end up with a heat injury, ranging in severity from mild heat cramps to heat exhaustion or potentially life-threatening heatstroke.
* Urinary and kidney problems. Prolonged or repeated bouts of dehydration can cause urinary tract infections, kidney stones and even kidney failure.
* Seizures. Electrolytes — such as potassium and sodium — help carry electrical signals from cell to cell. If your electrolytes are out of balance, the normal electrical messages can become mixed up, which can lead to involuntary muscle contractions and sometimes to a loss of consciousness.
* Low blood volume shock (hypovolemic shock). This is one of the most serious, and sometimes life-threatening, complications of dehydration. It occurs when low blood volume causes a drop in blood pressure and a drop in the amount of oxygen in your body.

**Prevention**

To prevent dehydration, drink plenty of fluids and eat foods high in water such as fruits and vegetables. Letting thirst be your guide is an adequate daily guideline for most healthy people.

People may need to take in more fluids if they are experiencing conditions such as:

* Vomiting or diarrhea. If your child is vomiting or has diarrhea, start giving extra water or an oral rehydration solution at the first signs of illness. Don't wait until dehydration occurs.
* Strenuous exercise. In general, it's best to start hydrating the day before strenuous exercise. Producing lots of clear, dilute urine is a good indication that you're well-hydrated. During the activity, replenish fluids at regular intervals and continue drinking water or other fluids after you're finished.
* Hot or cold weather. You need to drink additional water in hot or humid weather to help lower your body temperature and to replace what you lose through sweating. You may also need extra water in cold weather to combat moisture loss from dry air, particularly at higher altitudes
* Illness. Older adults most commonly become dehydrated during minor illnesses — such as influenza, bronchitis or bladder infections. Make sure to drink extra fluids when you're not feeling well.

**SOURCE:** <https://www.mayoclinic.org/diseases-conditions/dehydration/symptoms-causes/syc-20354086>

**How Much Water Should a Senior Citizen Drink per Day?**

* *Article written by Rhianna DeVries - bio in*[*Editorial Team*](https://activeaging.com/meet-the-editorial-team/)*.*

We have all heard it… "drink eight glasses of water per day"! As it turns out, that that claim has no scientific evidence to back it up. Drinking fluids throughout the day keeps our bodies hydrated and running optimally, but how much water should a senior citizen drink every day? Below we detail the intricacies of daily water intake for senior citizens.

**Is 64 oz Of Water Per Day Enough?**

The daily amount of water a senior should drink daily depends on body weight, age, medication use, and [fitness](https://activeaging.com/activities/) and activity levels. ***In general, a good rule is to divide your weight in half to calculate daily water intake by ounces, according to***[***The Daily Meal***](https://www.thedailymeal.com/healthy-eating/we-asked-10-nutritionists-how-much-water-you-should-actually-drink-0/slide-7)***.*** For example, if you weigh 160 pounds, the appropriate amount of water is 80 ounces of water per day.  A cup holds 8oz, which equates to 10 cups of water per day. On average, [senior citizens need 7 hours of sleep](https://activeaging.com/blog/steps-for-better-sleep-as-we-age), which means you are awake 17 hours of the day.  That equates to about a cup of water every hour and a half of awake time.

**Daily Water Intake Chart by Weight**

|  |  |  |
| --- | --- | --- |
| **Pounds** | **Ounces of Water per Day** | **Number of Cups Daily** |
| 100lbs | 50oz | 6.25 Cups |
| 120lbs | 60oz  | 7.5 Cups |
| 140lbs | 70oz | 8.75 Cups |
| 160lbs | 80oz | 10 Cups |
| 180lbs | 90oz | 11.25 Cups |
| 200lbs | 100oz | 12.5 Cups |
| 220lbs | 110oz | 13.75 Cups |
| 240lbs | 120oz | 15 Cups |
| 260lbs | 130oz | 16.25 Cups |

It is important to consider another key factor when calculating a senior's daily water intake.  As we age, our water content decreases.  According to [Healthline](https://www.healthline.com/health/symptoms-of-dehydration-in-elderly), the amount of fluid in our body begins to decrease, meaning fewer water reserves are in our body.  The water reduction is caused by wear-and-tear on the kidneys, and as kidney function declines, so does our ability to retain water.

**How Often Should You Drink Water?**

Our bodies lose up to 2 or 3 quarts of water daily, and this amount must be restored to maintain the proper functioning of our bodily systems. Be sure to optimize consumption by drinking fluids at prime times of the day. Drinking a glass of water first thing in the morning helps flush out the waste your kidneys filtered overnight, according to [Drink Hydrant](https://www.drinkhydrant.com/blogs/news/drink-water-in-the-morning).  Having a glass of water before meals can assist with digestion and prep the mouth and stomach for foods by moistening the organs beforehand. And, of course, drinking water after exercise ensures that you replenish lost water through sweat.

**SOURCE:** <https://activeaging.com/blog/how-much-water-should-a-senior-citizen-drink-per-day>

**Dehydration in the Older Adult**

[Hayley J Miller](https://pubmed.ncbi.nlm.nih.gov/?term=Miller+HJ&cauthor_id=26375144)

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**Abstract**

Dehydration affects 20% to 30% of older adults. It has a greater negative outcome in this population than in younger adults and increases mortality, morbidity, and disability. Dehydration is often caused by water deprivation in older adults, although excess water loss may also be a cause. Traditional markers for dehydration do not take into consideration many of the physiological differences present in older adults. Clinical assessment of dehydration in older adults poses different findings, yet is not always diagnostic. Treatment of dehydration should focus on prevention and early diagnosis before it negatively effects health and gives rise to comorbidities. The current article discusses what has most thoroughly been studied; the best strategies and assessment tools for evaluation, diagnosis, and treatment of dehydration in older adults; and what needs to be researched further. [Journal of Gerontological Nursing, 41(9), 8-13.].

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**SOURCE:** <https://www.mayoclinic.org/diseases-conditions/dehydration/symptoms-causes/syc-20354086>

**18 Symptoms of Dehydration**

1. Constipation
2. Yellow Urine
3. Chronic Fatigue Syndrome (CFS)
4. Headache
5. Brain Fog
6. Irritability
7. Insomnia
8. Thirst
9. Lack of Urination
10. Cracking Lips and Hands
11. Dry Eyes
12. Dry Mouth
13. Bad Breath
14. Indigestion
15. Cramp
16. Elevated Heart Rate
17. UTI’s
18. Difficulty Losing Weight

**SOURCE:** <https://veryhealthy.life/18-symptoms-of-dehydration/18/>

**Association Between Dehydration and Falls**

**Objective**

To determine whether there is an association between dehydration and falls in adults 65 years and older.

**Patients and Methods**

We used University of Wisconsin Health electronic health records from October 1, 2011 to September 30, 2015 to conduct a retrospective cohort study of Midwestern patients 65 years and older and examined the association between dehydration at baseline (defined as serum urea nitrogen to creatinine ratio > 20, sodium level > 145 mg/dL, urine specific gravity > 1.030, or serum osmolality > 295 mOsm/kg) and falls within 3 years after baseline while accounting for prescriptions of loop diuretic, antidepression, anticholinergic, antipsychotic, and benzodiazepine/hypnotic medications and demographic characteristics, using logistic regression.

**Results**

Of 30,634 patients, 37.9% (n=11,622) were dehydrated, 11.4% (n=3483) had a fall during follow-up, and 11.7% (n=3572) died during the follow-up period. We found a positive association of dehydration with falls alone (odds ratio [OR], 1.13; *P*=.002). For the outcome of falls or death, dehydration was positively associated (OR, 1.13; *P*=.001), along with loop diuretics (OR, 1.26; *P*<.001) and antipsychotic medications (OR, 1.52; *P*<.001).

**Conclusion**

More than one-third of older adults in this cohort were dehydrated, with a strong association between dehydration and falls. Understanding and addressing the risks associated with dehydration, including falls, has potential for improving quality of life for patients as they age.

Unintentional falls are a common occurrence among older adults, affecting approximately 30% of persons older than 65 years and 50% of those older than 80 years annually.[1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib1) Falls are the leading cause of injury-related death in adults older than 65 years and the most common cause of nonfatal injuries and hospital admissions for trauma.[2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib2) Each year 3 million nonfatal fall injuries among older adults are treated in emergency departments and more than 800,000 of these patients are hospitalized. In 2015, the direct medical costs of falls, were $50.0 billion. As the demographic characteristics of the US population shift to an increased number of elders, this problem is likely to get bigger and more expensive. Several factors contribute to falls: medications, infection, pain, muscle weakness, dehydration, etc.

Dehydration can lead to impaired brain perfusion, with subsequent dizziness and orthostasis.[3](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib3) Orthostatic hypotension has been associated with falls.[4](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib4) Decreased elasticity of aging tissues leads to decreased venous blood return when we arise and lowers diastolic blood pressure.[5](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib5) Add to this antihypertensive or diuretic medications or diseases that decrease compensatory mechanisms and falls can occur.[6](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib6) Although recent randomized controlled trials showed that antihypertensives do not increase fall risk, studies looking at the time of initiation or increase in antihypertensive medications have shown increased risk for falls, especially with diuretics, which deplete fluids.[6](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib6), [7](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib7), [8](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib8), [9](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib9), [10](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib10) Although there is a theoretical association between dehydration and falls, little is known about the prevalence of dehydration in older adults or the actual association between dehydration and falls.

We studied the associations between falls, dehydration, and medication use, as well as for falls or death.

**Patients and Methods**

This retrospective cohort study was based on the University of Wisconsin Health Enterprise Clarity Database in the Epic electronic health record (EHR) system and includes 600,000 patients seen each year in the Upper Midwest with approximately 1500 physicians and 16,500 staff at 6 hospitals and more than 80 outpatient sites. Data were cleaned of unreasonable covariate and laboratory values. Patient data were considered exempt by the University of Wisconsin Institutional Review Board policy.

On September 30, 2012 (baseline date), we identified 54,095 patients with 1 or more encounter within the previous year and 1 or more encounter within the 3 years after September 30, 2012 (October 1, 2012, through September 30, 2015). We chose to collect dehydration laboratory values before the time of falls reporting because many falls were reported after the occurrence and many patients did not have laboratory tests collected at the time and it provides a uniform time of dehydration assessment between those who did and did not fall. We chose a 1-year interval for laboratory result reporting because most individuals had some laboratory tests drawn within a year before baseline. Individuals were excluded if they did not have valid dehydration laboratory values or died before or on September 30, 2012, our baseline date ([Figure 1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/figure/fig1/)). Other exclusion criteria were end-stage renal failure or liver disease (*International Classification of Diseases, Ninth Revision* [*ICD-9*] codes 585.6 and 570.0-573.3) at any point on or before baseline or during follow-up. In addition, patients were excluded if they reported a motor vehicle accident (codes E800-E879) or seizure (*ICD-9* codes 345.8, 345.9, and 780.39) if it occurred on or before the first fall during follow-up due to potential rhabdomyolysis affecting renal function. Laboratory values of the final cohort of 30,634 patients were positive for dehydration if any one of the following were true in the year before baseline (October 1, 2011, through September 30, 2012): serum urea nitrogen to creatinine ratio > 20, sodium level > 145 mg/dL, urine specific gravity > 1.030, or serum osmolality > 295 mOsm/kg. If multiple values were available for a particular laboratory test, the value closest in time to baseline was used.

[](https://www.ncbi.nlm.nih.gov/core/lw/2.0/html/tileshop_pmc/tileshop_pmc_inline.html?title=Click%20on%20image%20to%20zoom&p=PMC3&id=7283563_gr1.jpg" \t "tileshopwindow)

Flow diagram of selection process for cohort group.

**Outcome**

The main outcome measure was diagnosis of a fall during the follow-up period. Falls diagnoses were identified by *ICD-9* codes E880 to E888. The secondary outcome was the composite of fall or death during the follow-up period as determined by a death date in the EHR during follow-up. Outcome variables were assessed in the follow-up period within the 3-year period after baseline. The follow-up period ended on September 30, 2015, shortly before the transition from *ICD-9* to *International Classification of Diseases, Tenth Revision* occurred.

Use of loop diuretics, anticholinergics, antidepressants, antipsychotics, and benzodiazepines/hypnotics was identified if such medications appeared in the drug list for any of the individual’s records in the year before baseline. Other covariates included baseline age, sex, race/ethnicity (white non-Hispanic, black non-Hispanic, other non-Hispanic, and Hispanic), orthostatic hypotension (by most recent orthostatic blood pressure values in the year before baseline), congestive heart failure (*ICD-9* codes 398.91 and 428.0-428.9 in the diagnosis list or problem list in the year before baseline), and insurance. Baseline insurance was categorized as Hospice if paid toward hospice care regardless of insurance source, Standard for insurance paid toward any other goal regardless of insurance source, or None for those with no insurance. Thus, regardless of insurance type (ie, Medicare, Medicaid, or private), if they had insurance and it was being paid toward hospice care at baseline, insurance was categorized as Hospice; if any insurance was paid toward nonhospice care, insurance was categorized as Standard; those without insurance were categorized as None. Although insurance is typically categorized as, for example, Medicaid, Medicare, and private, the above categorization was chosen because it more directly reflects the goal of care and thus risk for the outcomes in our study. We also report percentages of individuals who have Medicaid or Medicare in the results and in the footnote of [Table 1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/table/tbl1/).

bIn the whole sample, 24,450 (79.8%) had Medicare and 86 (0.3%) had Medicaid. For those not dehydrated, 15,354 (80.8%) had Medicare and 43 (0.2%) had Medicaid. For those dehydrated, 9096 (78.3%) had Medicare and 43 (0.4%) had Medicaid.

**Statistical Methods**

The association between dehydration and falls was examined using logistic regression, while including various medications of interest (loop diuretics, anticholinergics, antidepressants, antipsychotics, and benzodiazepines/hypnotics) known to affect falls risk as covariates in addition to the baseline subject covariates described. A similar model using the composite outcomes of falls or death was used to examine how the associations might be affected when considering death. Model diagnostics indicated no major concerns for overdispersion or poor fit. Unadjusted covariate distributions were compared between those who did and did not fall; continuous items were compared using Mann-Whitney tests; categorical items were compared using χ2 or Fisher exact tests. Statistical significance was assessed at the α=.05 level for all tests. All analyses were performed using R, version 3.4.4 (R Foundation for Statistical Computing).[11](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib11)

**Results**

Within the EHR, 54,095 individuals were identified with the appropriate baseline age and inclusion criteria for prebaseline and follow-up encounter occurrence. Of these, 20,737 patients were excluded due to no valid laboratory value for dehydration; 36 were excluded who died on or before September 30, 2012; and 2,688 were excluded with end-stage renal failure or seizure diagnoses during or before the study period or motor vehicle accident before the first reported fall in the follow-up period. The resulting sample for analysis contained a total of 30,634 individuals ([Figure 1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/figure/fig1/)).

**Patient Characteristics**

Mean ± SD baseline age of the study population (N=30,634) was 74.37±7.58 years and 17,060 (55.7%) were women. The population was predominantly white non-Hispanic (94.6%; n=28,972) with 507 (1.7%) black non-Hispanic, 354 (1.2%) Hispanic, and 801 (2.6%) other non-Hispanic ([Table 1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/table/tbl1/)). Most, 24,450 (79.8%), had Medicare at baseline, and 25,750 (84.1%) had their insurance pay toward standard care (nonhospice care). Relatively few individuals, 86 (0.3%), were receiving Medicaid, and 417 (1.4%) had their insurance pay toward hospice care.

**Falls and Dehydration**

A total of 11,622 (37.9%) of the 30,634 patients studied were identified as dehydrated; 3483 (11.4%) were diagnosed with at least 1 fall during the follow-up period and 3572 (11.7%) died during follow-up, with 6463 (21.1%) having either a fall or death ([Table 1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/table/tbl1/)). In the regression model for falls alone, dehydration was positively associated with falls (odds ratio [OR], 1.13; *P*=.002). For the same model structure with the outcome of falls or death, dehydration was also positively associated with the composite (OR, 1.13; *P*=.001; [Table 2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/table/tbl2/); [Figure 2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/figure/fig2/)).

Logistic Regression Results: Falls or Falls or Death Adjusted Models

|  | **Falls** | **Falls or Death** |
| --- | --- | --- |
| ***P*** | **OR Estimate** | **OR 95% CI** | ***P*** | **OR Estimate** | **OR 95% CI** |
| Dehydrated | .002 | 1.13 | 1.05-1.22 | .001 | 1.13 | 1.05-1.22 |
| Depression meds | <.001 | 1.58 | 1.46-1.72 | <.001 | 1.61 | 1.49-1.76 |
| Anticholinergic meds | <.001 | 1.24 | 1.15-1.34 | <.001 | 1.28 | 1.18-1.38 |
| Antipsychotic meds | .862 | 1.01 | 0.87-1.18 | <.001 | 1.52 | 1.32-1.76 |
| Hypnotic meds | <.001 | 1.31 | 1.21-1.41 | <.001 | 1.37 | 1.27-1.48 |
| Loop meds | .286 | 1.06 | 0.96-1.17 | <.001 | 1.26 | 1.15-1.39 |
| Age (y) | <.001 | 1.07 | 1.07-1.08 | <.001 | 1.07 | 1.07-1.08 |
| Male | <.001 | 0.73 | 0.67-0.79 | <.001 | 0.79 | 0.73-0.85 |
| Congestive heart failure | .268 | 1.08 | 0.94-1.25 | .002 | 1.25 | 1.09-1.44 |
| Orthostatic blood pressure | .001 | 1.69 | 1.24-2.31 | .005 | 1.63 | 1.16-2.28 |
| Insurance: hospice | <.001 | 2.33 | 1.86-2.91 | <.001 | 2.93 | 2.36-3.63 |
| Insurance: none | .270 | 1.06 | 0.96-1.17 | <.001 | 23.50 | 21.51-25.67 |

[Open in a separate window](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/table/tbl2/?report=objectonly)

Meds = medications; OR = odds ratio.

[](https://www.ncbi.nlm.nih.gov/core/lw/2.0/html/tileshop_pmc/tileshop_pmc_inline.html?title=Click%20on%20image%20to%20zoom&p=PMC3&id=7283563_gr2.jpg" \t "tileshopwindow)

[Figure 2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/figure/fig2/)

Falls and falls or death outcomes logistic regression results: estimated odds ratios with 95% CIs. CHF = congestive heart failure; hypo = hypotension; med = medication.

**Falls and Medication Use**

Of the 30,634 patients in the data set, at baseline, 6525 (21.3%) used antidepressants, 10,172 (33.2%) used anticholinergics, 1605 (5.2%) used antipsychotics, 11,337 (37.0%) used hypnotics, and 5377 (17.6%) used loop diuretics. The statistically significant medications associated with an increased risk for falls alone included antidepressants (OR, 1.58; *P*<.001), anticholinergics (OR, 1.24; *P*<.001), and hypnotics (OR, 1.31; *P*<.001). When the outcome is the composite of falls or death, all the medications were statistically significant and positively associated with falls or death: antidepressants, OR, 1.61 (*P*<.001); anticholinergics, OR, 1.28 (*P*<.001); hypnotics, OR, 1.37 (*P*<.001); antipsychotics, OR, 1.52 (*P*<.001); and loop diuretics, OR, 1.26 (*P*<.001).

**Discussion**

This study showed strong evidence of an unadjusted association between falls and dehydration, with 13.3% (1547 of 11,622) falling for baseline dehydrated vs 10.2% (1936 of 19,012) if not dehydrated (*P*<.001). In logistic regression, this positive association remained after adjusting for medications and other subject characteristics associated with dehydration and/or falls risk. Sensitivity analyses assessing falls risk only for those who did not die in follow-up were also performed and resulted in no meaningful change in the association between dehydration and falls risk.

Interestingly, the covariate with the strongest association with the falls or death outcome was “no insurance” (OR, 23.50; 95% CI, 21.51-25.67). Those 65 years and older without insurance and ineligible for Medicare could be at greater risk for death due to less health care support, fewer resources, or other factors that make them ineligible for Medicare, such as immigration status.

We may have underestimated the prevalence of dehydration with stringent criteria. For example, older adults rarely concentrate their urine to greater than 1.030 because of atrophy of the long nephrons that are best at concentrating urine. As dehydration worsens, creatinine level increases, potentially narrowing the serum urea nitrogen to creatinine ratio to less than 20. Our study confirmed the association of death with antipsychotics, which led to the black box warning for this class of drugs.[12](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib12)

Older adults are at greater risk for dehydration because of several normal aging changes that occur throughout our lifespan. As we age, we feel less thirsty because of apoptosis of the hypothalamus, the thirst center location.[13](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib13),[14](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib14) Apoptosis of neurons in the pituitary result in decreased antidiuretic hormone production. The aging kidney is less responsive to antidiuretic hormone and less able to concentrate urine with increasing age.[15](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib15),[16](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib16) Our body water content also decreases from 70% at birth to 40% in older women and 45% in older men, leading to decreased fluid reserve.[17](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib17) In addition, many older adults limit their fluid intake in an attempt to prevent urinary and fecal incontinence.

Greater fluid losses in urine and less reserve increase adverse effects of dehydration. The Institute of Medicine recommends 2.7 L (91 ounces) of total water for women and 3.7 L (125 ounces daily) for men, with about 80% of it coming from beverages.[18](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib18) They also state that most healthy people adequately meet their daily hydration needs by letting thirst be their guide. As we age, apoptosis of the hypothalamus decreases thirst and the risk for dehydration increases.[14](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib14)

The ultimate goal is adequate hydration of our patients for optimal outcomes. As physicians we are responsible for identifying these aging changes and encouraging oral hydration, which improves blood osmolality better than intravenous fluids.[19](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7283563/#bib19) Many simple and cost-effective tools to help patients keep track of fluid intake exist: arranging 8 toothpicks near the sink and moving 1 toothpick with each glass of water to the other side of the sink, filling a half gallon pitcher of water that needs to be drunk by the end of the day; associating drinking with a common activity such as seeing a television commercial or answering an e-mail, or using a smartphone app that has an alarm reminder feature. The efficacy of these interventions to decrease patient-oriented outcomes needs to be tested in future studies.

Several limitations should be considered, including potential underreporting of falls by patients who may fear institutionalization. In addition, providers may not have listed falls because other diagnoses were perceived as more important or because the *ICD-9* code required the date of the fall, which may not be remembered by patients. The observational nature of these data prevents us from controlling for confounder through study design, necessitating control by statistical analysis. This study sample is a set of individuals self-selecting to interact with a single health care system. Therefore, risk estimates may not reflect what might be found in a statewide or nationwide representative sample. The laboratory values we used for dehydration are affected by medications, such as diuretics, and diseases, such as kidney failure. We excluded patients with a diagnosis of kidney failure, but there may have been an overlap of patients with kidney failure having been dehydrated that we excluded, and those with abnormal laboratory test results for dehydration having kidney failure.

Finally, we used a large observation window to capture exposures and outcomes. Using a snapshot of 1 year for laboratory identification of dehydration and the later (up to 3 years) identification of a fall could lead to missing or overidentifying associations. Obtaining laboratory results and medications in closer proximity to the time of the fall may be more accurate but may also miss many cases that did not have laboratory tests done upon presenting for a fall or did not fall. Being able to more regularly assess a cohort for dehydration would give a better estimate of association between dehydration and falls risk.

**Conclusion**

There is strong observational evidence that supports an association between falls and dehydration and falls and the use of loop diuretics in the 65 year and older population. A future pragmatic trial of nursing homes that implement a hydration program, looking at patient-oriented outcomes of function, cognition, falls, and death, is warranted.

**Dehydration in Elderly People: Risks, Warning Signs, and Prevention Tips**

By Publisher | Last updated June 7, 2021

Did you know that the consequences of dehydration in elderly adults are often serious—more so than in younger people? Seniors also have more risk factors for becoming dehydrated. But here's the good news: Dehydration can be easily prevented. Awareness is the first step in avoiding the health problems that can be caused by a lack of fluids.

But many people don't realize just how problematic dehydration can be for older adults—and how common it really is. Take a look at these facts:

* According to a review article in [*e-SPEN, the European e-Journal of Clinical Nutrition and Metabolism*](https://clinicalnutritionespen.com/article/S1751-4991%2809%2900093-6/pdf), one study showed that about 31 percent of long-term care patients were found to be dehydrated.
* Treating elderly people who are hospitalized for dehydration costs the medical system about $1.36 billion annually, according to an article in [*Nutrition and Healthy Aging*](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5734130/).
* Dehydrated patients are six times more likely to die in the hospital than patients who are not dehydrated, according to a study in [*Age and Ageing*](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4621229/).

This article explains why older people are at greater risk for becoming dehydrated. It also lists the consequences of dehydration in the elderly. As well, you'll learn how to spot the warning signs of dehydration and discover what to do if you or a loved one experiences symptoms.

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* [Why dehydration is more common among seniors](https://www.greatseniorliving.com/articles/dehydration-in-elderly#common-among-seniors)
* [Signs of dehydration in elderly people](https://www.greatseniorliving.com/articles/dehydration-in-elderly#signs)
* [Treating dehydration: What to do and when to seek help](https://www.greatseniorliving.com/articles/dehydration-in-elderly#treating-dehydration)
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**What Is Dehydration?**

Water is the source of life. That may sound like an exaggeration, but it's true. Throughout your life, water is essential for many of your body's functions, including:

* Temperature regulation
* Waste elimination
* Joint lubrication
* Delivery of nutrients to cells
* Blood oxygen circulation
* Skin hydration
* Cognitive function

You become dehydrated when your body doesn't have enough water to sustain these vital processes.

Fortunately, your body is designed to constantly adjust its fluid levels. Thirst is one way this happens. When your body's fluid levels drop, your hypothalamus sends signals that create the sensation of being thirsty. As well, your kidneys preserve water by making your urine more concentrated when you don't have enough fluids in your body.

However, maintaining the right amount of water to avoid the consequences of dehydration can be a little tricky. That's partly because you lose water through sweat and urination, and also through normal bodily functions. For example, you exhale water vapor when you breathe.

And when you lose water, you also lose salt and electrolytes. Electrolytes are electrically charged nutrients that are essential for regular heartbeats, muscle contractions, and more. So losing electrolytes can have serious [health consequences](https://www.greatseniorliving.com/articles/dehydration-in-elderly#consequences).

**Why Dehydration Is More Common Among Seniors**

Maintaining a healthy balance of water and electrolytes can be an even more complex process for seniors than it is for younger people. As a result, older people are more likely to get dehydrated. And the complications of dehydration in the elderly can be more serious.

According to an article in [*Frontiers in Molecular Biosciences*](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4860410/), dehydration is one of the top 10 reasons for seniors to be hospitalized. And for hospitalized seniors, dehydration can lead to longer stays in intensive care units, increased hospital readmissions, and more placements in long-term care facilities.

Why does the risk of dehydration increase with age? Older adults are prone to dehydration because they can experience several health or lifestyle conditions that lead to low fluid levels. Many seniors experience at least one of the following risk factors:

**1. Age-related physical changes**

As we age, our bodies contain less water, partly because our kidneys become less efficient. (At birth, we are about 75 percent water, but an elderly body is about 50 percent water, according to an [NPR science article](https://www.npr.org/sections/krulwich/2013/11/25/247212488/born-wet-human-babies-are-75-percent-water-then-comes-drying).)

However, according to the *Nutrition and Healthy Aging* article, studies have found that although seniors are at greater risk for dehydration, they drink less water, on average, than younger people. That's often because seniors experience a weakened sense of thirst, so they don't always realize when they need to drink something.

Scientists aren't sure why this happens. But what makes this lack of thirst in elderly people particularly troublesome is that we're generally dehydrated *before* we feel thirsty. So the elderly get dehydrated quickly because they can't always recognize the signs of needing to take a drink until it's too late.

This reduced sense of thirst is often more pronounced in seniors with [Alzheimer's disease or other forms of dementia](https://www.greatseniorliving.com/health-wellness/dementia) or in those who have had a stroke. Such seniors may also have difficulties swallowing or asking their caregivers for a drink. As a result, seniors with dementia often need their fluid intake to be carefully monitored.

**2. Medication side effects**

Many medications that are commonly prescribed to seniors can act as diuretics (i.e., they can increase the production of urine) and contribute to dehydration. Side effects of any medications—particularly blood pressure medications, antihistamines, antacids, and heart medications—should be discussed with a physician.

**3. Incontinence issues**

The risk for dehydration associated with incontinence isn't necessarily caused by the fluid lost through involuntary urination. Rather, it's related to the fact that many elderly people restrict their fluid intake because they don't want any awkward accidents.

However, it's important to note that reducing fluid intake doesn't necessarily prevent incontinence. According to the [National Association for Continence](https://www.nafc.org/bhealth-blog/how-much-water-should-you-drink-when-you-have-incontinence), drinking *more* water may actually help some seniors deal with incontinence.

As well, when you're dehydrated, your bladder can become more irritable and vulnerable to bacterial infection. So staying hydrated can reduce the [risk of UTIs](https://www.greatseniorliving.com/articles/urinary-tract-infections).

If you restrict your fluid intake because you're worried about incontinence, talk to your doctor. He or she can help you to determine how much water you should be drinking.

**4. Fear of falling**

Some seniors resist drinking a lot of water because they worry about [falling](https://www.greatseniorliving.com/articles/elderly-falls) if they have to get up at night to pee. But being dehydrated is also a risk factor for falling.

However, it's often a good idea to restrict fluids for a couple of hours before bedtime. Again, talk to your healthcare provider in order to figure out what works for you.

**5. Living conditions**

Seniors in [nursing homes](https://www.greatseniorliving.com/living-options/nursing-home) are more likely to become dehydrated because they are often dependent on staff members to help them with their fluid intake. The article in *Nutrition and Healthy Aging* noted that the highest risk for dehydration is among seniors who seem to be physically capable of getting a drink but have cognitive issues that cause them to forget to drink. So nursing homes and [memory care facilities](https://www.greatseniorliving.com/living-options/memory-care) need to have policies in place for monitoring fluid intake.

**6. Medical issues**

Many seniors have [medical conditions](https://www.greatseniorliving.com/health-wellness/physical-health#physical-health-issues) that can lead to dehydration. Examples of health problems than can result in fluid loss include diarrhea, fever, and diabetes.

**Signs of Dehydration in Elderly People**

It's important to be aware of the signs and symptoms of dehydration. In elderly people, the effects of being dehydrated can progress quickly, so you must act fast if you suspect dehydration.

As well, symptoms of dehydration in the elderly are often progressive. In the initial stages, you can tell if an elderly person is dehydrated by checking for the following signs of mild dehydration:

* Cracked lips
* Dry mouth
* Dry skin, particularly in the armpits
* Less frequent urination than normal

More severe effects of dehydration in the elderly are:

* Dark-colored urine (instead of what it should be: the color of pale straw)
* Strong-smelling urine
* Dizziness
* Increased heart rate
* Muscle cramps
* Crying without tears
* Confusion
* Irritability
* Fatigue
* Headaches
* Fainting

However, it's important to keep this in mind: Dehydration symptoms in adults who are in their senior years aren't always clear-cut. For example, some medications can affect the color of urine. As well, although dehydration can cause hallucinations in the elderly, cognitive changes from dementia or even side effects from certain medications are also sometimes responsible for the experience of perceiving things that aren't there.

So how can you identify potential dehydration?

Here's one good strategy: If you experience any of the symptoms above, simply drink some water, then see if the symptoms improve in 10 to 15 minutes. (Or if you suspect that a loved one is dehydrated, make sure that he or she gets some water, then wait and look for improvement.)

**You should go to the ER for dehydration when you or the elderly person in question is experiencing any confusion, unexplained irritability, or sleepiness.**

Always remember that getting prompt medical care is the most reliable way to know whether a senior is dehydrated. That's because dehydration is diagnosed in the elderly through blood tests that check their electrolyte levels and kidney functions. ([Urine tests](https://academic.oup.com/ajcn/article/104/1/121/4569661) aren't always reliable for seniors.)

**Treating Dehydration: What to Do and When to Seek Help**

If an elderly person is dehydrated, you should give him or her a glass of water right away. **But if his or her symptoms don't improve, it's best to head to the emergency room or call 911.**

In the emergency room, dehydration treatment usually starts with an assessment to determine the degree of the problem. For mild cases, carefully observing patients and ensuring that they drink plenty of electrolyte-containing fluids may be all that's needed.

But for moderate dehydration, intravenous (IV) treatment is often necessary. And in severe cases, further intervention may be required. For example, if a person's kidneys are affected, he or she may require dialysis. And an older person who is experiencing confusion or other more serious signs of dehydration may need to be admitted to the hospital.

So the treatment and time required for recovery from dehydration, in elderly people especially, depends a lot on the degree of the problem, as well as on the person's overall health. But taking fast action can help reduce the recovery time. That's why it's important not to ignore the symptoms of dehydration in elderly people.

**How to Prevent Dehydration in Elderly Adults**

With a few proactive strategies, preventing dehydration in the elderly is possible. Being aware of the risks is a good first step. So is remembering this simple fact: Elderly people can stay hydrated by drinking enough water.

But many seniors wonder exactly how much water is enough. After all, you may have heard or read that everyone should drink eight cups of water each day. Recently, however, many experts have backed away from the eight-cups-a-day rule.

Here's what's best: Consider all of the factors that can influence how much water you need to drink, including any medications you take, your body weight, and your activity level. Discuss all of it with your physician.

In other words, an elderly person should drink an amount of water in a day that is based on the personalized advice of his or her doctor. There's no universal rule for the amount you should drink.

It's also important to remember that you can drink beverages other than water to reach your daily fluid requirements. Even though water is a great beverage, a study in [*The American Journal of Clinical Nutrition*](https://academic.oup.com/ajcn/article/103/3/717/4564598) found that other drinks may be more effective because they don't lead to as much urine production. The study determined that milk, orange juice, and commercially prepared electrolyte replacement drinks were better at preventing dehydration.

When choosing an electrolyte replacement drink, be mindful of the sugar content. Although it was created as a children's drink, [Pedialyte](https://www.amazon.com/s?k=Pedialyte&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=78ed95e027483fdddf872679246419b6&camp=1789&creative=9325) is suitable for elderly people because it has many important electrolytes. It also contains less sugar than many other similar options. For instance, a sports drink like Gatorade is good for dehydration, but the sugar level is often high.

In part because of their reduced sense of thirst, many older people find it difficult to get enough fluid in a day. Here are some tips that can make beverages more appealing:

**1. Keep in mind that not all fluids come in a glass.**

Many foods contain a lot of water. Vegetables, most fruits, and soups can all contribute to your daily fluid intake. (In fact, when elderly people stop eating, they increase their risk for dehydration because they are no longer getting any fluids from food.) Try using a little creativity by [making popsicles](https://www.amazon.com/Ozera-Reusable-Popsicle-Molds-Maker/dp/B01GDXHSZ2/?&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=13a723940ebccbd52c1f7048e2e83e7c&camp=1789&creative=9325) with fruit juice or blending smoothies with fresh greens.

**2. Use technology.**

Check out some of the many apps (such as [Hydro Coach](https://hydrocoach.com/) or [WaterMinder](https://waterminder.com/%22%20%5Ct%20%22_blank)) that can track the number of drinks you consume in a day or that notify you when it's time for a drink.

**3. Keep drinks nearby and visible.**

Seniors often miss out on drinking fluids because they simply forget or can't access them. An attractive [water bottle](https://www.amazon.com/s?k=water+bottle&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=e67568442f95205a7aedb852b15d7a1d&camp=1789&creative=9325) provides a portable way to always have a drink at hand.

**4. Make drinks enticing and consider alternatives to water.**

Some seniors find water a bit too boring. Adding a little juice or a flavored drink mix can boost its appeal. Sparkling water is also a nice change.

So if you know a senior who is struggling to get enough fluids, ask what his or her preferred non-alcoholic drink is. (But remember that diabetics should limit sweet drinks, and seniors with hypertension should limit drinks with sodium.)

**5. Create routines.**

Adding fluid intake to daily routines will make drinking a habit. For example, if you take medication, drink a full glass of water with it.

**6. Work on fall-prevention strategies.**

Feeling more confident on your feet can reduce worries about falling at night if you have to pee.

**7. Work with staff in**[**assisted living facilities**](https://www.greatseniorliving.com/living-options/assisted-living)**or nursing homes.**

Seniors in residential or long-term care facilities can face extra challenges in getting enough fluids. If you're concerned about a loved one, be sure to talk to the facility's staff to find out how they encourage and monitor fluid consumption.

Some strategies used in these facilities can include:

* Using beverage carts to offer drinks
* Serving plenty of soft foods with high water content
* Scheduling times for staff to remind residents to drink something
* Hosting "happy hours" with fancy, nonalcoholic drinks

**Products that can help prevent dehydration:**

[Electrolyte powder](https://www.amazon.com/s?k=electrolyte+powder/&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=71675972575fcae1e31e451b02850c5c&camp=1789&creative=9325): Simply add to water to help restore and replenish electrolytes.

[Water bottle with time markers](https://www.amazon.com/Hydration-Nation-Water-Bottle-Marker/dp/B088FYC665/?&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=4b747b7ea068dade89bd03f4bac468b2&camp=1789&creative=9325): This 32-ounce water bottle with a leak-proof lid helps you keep track of your water intake. Large time and measurement markers make this suitable for older adults. This water bottle includes a foldable mouthpiece and attachable straw is backed up with a 5-year warranty.

[Water flavoring drops](https://www.amazon.com/b/ref%3Ddp_bc_aui_C_5?ie=UTF8&node=15525242011&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=3f74fbf61cbb8c19b8fcacaa8cb39c51&camp=1789&creative=9325): Sugar-free drops to add to water for people who prefer flavor to plain water. Pro-tip: add to sparkling water as a healthier alternative to soft drinks.

[SodaStream sparkling water maker](https://www.amazon.com/SodaStream-Sparkling-Water-Silver-Bottle/dp/B001KYT6CS/?&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=9ffa09ba55d2c84be06e7690088b07c4&camp=1789&creative=9325): Save money and reduce waste by making your own sparkling water.

[Kitchen timer](https://www.amazon.com/dp/B07MK1YZ2G?&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=93a66025cc6b15ff7e261b75d96cfd52&camp=1789&creative=9325): With a sleek, stainless steel design, this digital timer has large, backlit digits and adjustable volume. You can set and monitor for two events simultaneously. The memory program restores the last timer date after it finishes, so you can preset for your loved one to help them remember to hydrate. Option to use with the magnetic back or a tabletop stand, so it is conveniently close as needed.

[Aquaphor lip repair ointment](https://www.amazon.com/Aquaphor-Repair-Fluid-Ounce-Carded/dp/B004FHZKOA?&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=2db8cead6078877a7fbd3bc43e216895&camp=1789&creative=9325): Soothe and repair dry, chapped lips if you do become dehydrated. This lip repair ointment contains shea butter and chamomile and is preservative and fragrance-free.

[Cetaphil moisturizing lotion](https://www.amazon.com/Cetaphil-Advance-Hydrating-sensitive-Fragrance/dp/B086LJM3XH/?&_encoding=UTF8&tag=gsl082019-20&linkCode=ur2&linkId=045018cd76ad0df041d41ca13add457a&camp=1789&creative=9325): Hydrate dry skin with this fragrance-free lotion that is made with shea butter. Non-greasy formula that is designed to protect sensitive skin for 24 hours.

**Consequences of Dehydration in Seniors**

You may have already experienced some mild dehydration effects. Most of us have. If so, you probably didn't feel that you were at your best. Perhaps you experienced some of the possible dehydration symptoms, including:

* Fatigue
* Memory problems
* Poor concentration
* Irritability
* Headache

These symptoms can appear quickly. In fact, according to the article in *Age and Ageing*, even a small drop in our body-fluid levels (as small as two to three percent) can lead to physical and cognitive problems in older adults.

The long-term effects of not drinking enough water are the factors that lead to chronic dehydration. Elderly people can experience some of the following symptoms when they're chronically dehydrated:

* [Low blood pressure](https://www.greatseniorliving.com/articles/low-blood-pressure)
* Dizziness
* Skin problems, including pressure sores
* Constipation
* Kidney problems, including kidney stones
* Increased risk of urinary tract infections

If left untreated, you can die from dehydration. Some of the severe dangers of dehydration are:

* **Seizures:** Dehydration can lead to an electrolyte imbalance. In elderly people, particularly those with cardiac problems, the consequences can be grave. Because electrolytes carry electrical signals to our muscles, changes to our body's electrolyte balance can lead to seizures. Warning signs of an electrolyte imbalance include:
	+ Muscle cramps
	+ Irregular heartbeat
	+ Mental confusion
* **Shock:** Low blood volume shock (also called hypovolemic shock) happens when we experience a sudden drop in blood volume. Dehydration can lead to low blood volume, which in turn leads to a drop in blood pressure and, sometimes, shock.
* **Kidney failure:** Dehydration complications such as low blood volume can reduce blood flow to the kidneys, which can cause lasting damage to the renal system over time.
* **Heat exhaustion or heat stroke:** When we get too hot, our bodies cool down by sweating. But if we don't have enough fluid to produce adequate amounts of sweat, we can quickly become overheated.

Depending on a person's overall health, a person can typically survive about [3 days](https://www.medicalnewstoday.com/articles/325174) without water. In general, a loss of more than 10 percent of a person's body weight through fluid loss is a [medical emergency](https://en.wikipedia.org/wiki/Dehydration) that can lead to death if not treated.

**Knowledge Is Prevention**

Being aware of the risk of dehydration is the first step toward averting it. So don't hesitate to talk to your healthcare providers about creating strategies for getting enough fluids. And watch for the warning signs of dehydration (in yourself and your loved ones). Although dehydration in elderly people can be serious, it's also preventable and treatable.

SOURCE: <https://www.greatseniorliving.com/articles/dehydration-in-elderly>