


## ORIGINAL ARTICLE

# Determination of Daily Fluid Intake Levels and Affecting Factors of Elderly Individuals Living at Home

## Evinde Yaşayan Yaşlı Bireylerin Günlük Sıvı Alım Düzeyleri ve Etki Eden Faktörlerin Belirlenmesi

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**ABSTRACT**

**Objective:** In this study, it was aimed to determine the daily fluid intake and the factors affecting the fluid intake of elderly individuals living at home.

**Method:** This descriptive study collected data from a total of 91 elderly individuals. The sociodemographic characteristics form, daily fluid intake determination form, Edmonton Vulnerability Scale, Katz Activities of Daily Living Scale and Perceived Well-being Scale were used to collect data. For the fluid consumption status, the body surface area of the elderly individuals, the amount of fluid they should take daily, and the amount of fluid consumption deficiency were calculated.

**Results:** It was determined that the elderly individuals consumed an average of 1247.25 ± 428.71 milliliters of fluid per day and the average daily fluid deficit was 1065.60 ± 417.91 milliliters. It has been determined that elderly individuals are in the middle-frail border, semi-dependent in activities of daily living, and their well-being is low. In addition, it has been determined that elderly individuals do not want to go to the toilet frequently, have the most constipation problems due to lack of fluid consumption, and consume the most liquid between meals.

**Conclusion:** It has been determined that elderly individuals consume half as much fluid as they should daily are in the moderate fragility limit, are semi-dependent in daily living activities, and have low well-being. It has been determined that elderly individuals who use less than four drugs, live with their spouse, have been hospitalized before, and do not have a chronic disease consume more fluids.

**Keywords:** Elderly, dehydration, nursing, fluid consumption

**ÖZ**

**Amaç:** Bu çalışmada evde yaşayan yaşlı bireylerin günlük sıvı alımlarının ve sıvı alımını etkileyen faktörlerin belirlenmesi amaçlanmıştır.

**Yöntem:** Tanımlayıcı tipteki bu çalışmada toplam 91 yaşlı bireyden veri toplanmıştır. Verilerin toplanmasında sosyodemografik özellikler formu, günlük sıvı alımını belirleme formu, Edmonton Duyarlılık Ölçeği, Katz Günlük Yaşam Aktiviteleri Ölçeği ve Algılanan İyi Oluş Ölçeği kullanılmıştır. Sıvı tüketim durumu için yaşlı bireylerin vücut yüzey alanı, günlük almaları gereken sıvı miktarı ve ekssik sıvı tüketimi miktarı hesaplanmıştır.

**Bulgular:** Yaşlı bireylerin günde ortalama 1247,25 ± 428,71 mililitre sıvı tükettiği, ortalama günlük sıvı açığının ise 1065,60 ± 417,91 mililitre olduğu belirlenmiştir. Yaşlı bireylerin orta-kırılgan sınırdaki oldukları, günlük yaşam aktivitelerinde yarı bağımlı oldukları ve iyilik hallerinin düşük olduğu belirlenmiştir. Ayrıca yaşlı bireylerin sık sık tuvalete gitmek istemedikleri, sıvı tüketiminin az olmasından dolayı en çok kabızlık sorunu yaşadıkları ve en fazla sıvıyı öğün aralarında tükettikleri tespit edilmiştir.

**Sonuç:** Yaşlı bireylerin günlük sıvı alımının yarı kadar sıvı tükettikleri, orta kırılganlık sınırında oldukları, günlük yaşam aktivitelerinde yarı bağımlı oldukları ve iyilik hallerinin düşük olduğu belirlenmiştir. Dörtten az ilaç kullanan, eşyle birlikte yaşayan, daha önce hastaneye yatmış, kronik bir hastalığı olmayan yaşlı bireylerin daha fazla sıvı tükettiği belirlenmiştir.

**Anahtar Kelimeler:** Yaşlı, dehidrasyon, hemşirelik, sıvı tüketimi

**Introduction**

Frailty is defined as a functional loss in multiple organs or systems, decreased physiological reserve, and decreased defense against stressors. The emergence of fragility reveals negative health consequences such as the increase in the frequency of falls in the elderly, the prolongation of hospital stay, the need to receive special care services, and the increase in health costs and morbidity (1).

A slow and progressive dehydration process and hyperosmotic stress disorder occur in individuals during aging (2). More than 60% of the human body consists of water. As people age, the water content in the body

decreases below 50% (3). If adequate hydration levels are not maintained and regulated, this decrease can have adverse effects on the body. Therefore, although water is necessary at every stage of life, its importance increases with old age (4).

In the absence of fluid intake, death occurs much faster within a few days to a week than in the absence of any other nutrient. High mortality rates due to dehydration and hyponatremia among older adults have been reported in the literature (5). Other risk factors such as changes in the body's physiological and hormonal systems, inactivity, visual impairment, and urinary

incontinence predispose the elderly to dehydration (6).

Clinical manifestations of dehydration included dry mouth (tongue grooves, dry mucous membranes), weight loss, decreased skin turgor, constipation, orthostatic hypotension, and increased urine concentration. It is known that dehydration is associated with many chronic health problems in elderly people such as falls, fractures, confusion, delirium, pressure ulcers, poor wound healing, constipation, urinary tract infections, heat stress, infections, kidney stones, and kidney failure (7). In some individuals, the loss of as little as 2-3% of body fluid can cause physical and cognitive impairment. Elderly individuals are at the risk of dehydration due to not feeling hungry or thirsty, decreased thirst, decreased renal perfusion, changes in sensitivity to antidiuretic hormones and neurocognitive changes. In addition, access to water and fluids may be reduced in older individuals. The elderly have problems such as oropharyngeal dysphagia (OD), which may cause dehydration and malnutrition due to a lack of fluid and food intake (8).

Although various studies have shown that the elderly are at high risk for health problems related to dehydration, there is little information about the conditions that affect the appropriate amount of fluid intake in the elderly (9). It is emphasized that the factors affecting fluid intake variability in the elderly and the daily fluid intake associated with adequate hydration status should be determined (3). We think that determining the factors affecting the daily fluid intake of the frail elderly will contribute to the literature. For this reason, this study aims to determine the factors affecting the daily fluid intake of frail elderly people.

## Materials and Methods

### The pattern of the research

The research was conducted with individuals aged 70 and over admitted to a secondary-level public hospital for outpatient treatment. Questionnaire forms were used to collect research data. Research data were collected between April 2022 and October 2022.

The power level and effect size calculations were calculated in the study with G\*Power Version 3.1.7. Since the population of the study is not known exactly, the power and sample level of the study was calculated based on the study of Dönmez and Demir (2022) (10). Dönmez and Demir's research was conducted with 98 participants. Accordingly, it can be seen that at least  $n=69$  participants, who are planned to be included in the study, can represent the study with 80% power (values of 0.70 and above are valid in studies and 0.80 is expected to be quite sufficient). In addition, it was determined that the effect size level of the study was 0.37 (0.10 small, 0.25 medium, and 0.40 large effect size) (10).

### Inclusion Criteria

Individuals aged 70 years and older who meet at least one frailty criterion and can walk independently

(with the possibility of ambulatory assistive devices without the assistance of another person) and present to a health center for outpatient treatment. Elderly individuals use only simple painkillers and antihypertensive drugs.

### Exclusion Criteria

Participants with hearing or vision loss and moderate to severe cognitive impairment. Elderly individuals have been told by their physicians to restrict fluids. The elderly with diabetes and kidney failure. Elderly individuals using diuretic drugs.

### Data Collection Tools

Research data; sociodemographic characteristics form, determination of daily fluid consumption form, Edmonton Vulnerability Scale, Katz Activities of Daily Living Scale, and Perceived Well-Being Scale were employed. The researcher administered the questionnaires through face-to-face interviews with elderly individuals within the scope of the research.

Descriptive Characteristics of the Patients and Questionnaire Regarding the Disease: It was created by the researchers (11-13). It was composed of questions about the sociodemographic characteristics and illnesses of the participants. There are 13 items in the form.

Daily Liquid Consumption Amount Determination Form: It was composed of questions about the amount of daily fluid consumption by the elderly person, the time of fluid consumption, and the obstacles in front of fluid consumption. The questions were prepared by the researchers. There are 7 items in the form.

Edmonton Vulnerability Scale: It was developed by Rafson et al. in 2006 to define vulnerability (14). The validity and security study of ECO in Türkiye was carried out by Aygör and Fadiloğlu in 2018. As a result of the adaptation of the scale to Turkish society, the Cronbach alpha value was determined as 0.75 (15).

The scale consists of 11 items in total. The questions are evaluated with 0, 1, and 2 points, if the total score from the scale is 0-4, it is not fragile, if it is 5-6 points, it is vulnerable, if 7-8 points are slightly fragile, if 9-10 is moderately fragile, and if it is 11 and above, it is defined as severely fragile. In this study, the scale's Cronbach's alpha value was found as 0.91.

Katz Activities of Daily Living Evaluation Form: It was developed by Katz et al. for the evaluation of treatment and prognosis in chronic disease states and the elderly. Pehlivanoğlu et al. reported that the Turkish adaptation of the scale was reliable and the Cronbach Alpha coefficient was calculated as 0.83. Evaluation is made by giving 3 points if the elderly person can do their daily living activities independently, 2 points if they do it with help, and 1 point if they cannot do it at all. In the ADL index, 0-6 points are considered as "dependent", 7-12 points as "semi-dependent", and 13-18 points as "independent" (16). In this study, the scale's Cronbach's alpha value was 0.89.

Perceived Well-being Scale (PES): The scale was developed by Adams (1997) and its Turkish adaptation was made by Memnun (2006) (17). The Cronbach Alpha value of the scale was found as 0.84. It consists of six sub-dimensions: emotional, physical, spiritual, social, intellectual and psychological. There are a total of 36 items, six of which are in each dimension, and the answers given are in the form of a six-point Likert. While some items on the scale have positive meanings, some have negative meanings. Positive statements in the scale range from 6 to 1 changing from "Totally Agree" to "Strongly Disagree" and negative statements from 1 to 6 changing from "Totally Agree" to "Strongly Disagree" by inverting the negative statements scored with numbers. The lowest score that can be obtained from the scale is 36, and the highest score is 216. A score of 144 or less indicates low well-being, while a score above 144 indicates high well-being. It is accepted that the higher the score obtained from the scale, the higher the state of well-being. In this study, the scale's Cronbach's alpha value was determined as 0.92.

### Application of Research

Elderly individuals who met the inclusion criteria of the study and agreed to participate in the study were asked to fill out the questionnaires. The data of the elderly who could fill out the questionnaires were considered valid. Then, the amount of fluid consumed by the elderly individuals in the last two days was questioned and this information was recorded in the Daily Fluid Consumption Determination Form. Questions about the amount of liquid consumed by the elderly individual included water and other liquids, and a glass calculation was made to measure it. The standard size was used in the glass calculation (water glass: 200 ml, tea glass: 100 ml). The elderly were asked to answer water, milk, fruit juice, buttermilk, herbal tea, etc. with the size of a glass of water and black tea from the size of a tea glass. Then, the body surface areas of the elderly individuals were calculated from the height and weight values, and then the amount of fluid needed daily was determined with the Gaspar formula (Body surface area x 1200 ml) (18). For example, if the individual's height is 170 cm and weight is 80 kg, the surface area is calculated as 1.96 m<sup>2</sup>. Then, when this value is multiplied by 1200 ml according to the Gaspar formula, the amount of fluid that the individual should consume daily is calculated as 2352 ml. The average of the amount of fluid taken by individuals for two days was subtracted from the amount of fluid that should be taken daily, and as a result, the amount of fluid deficiency of the individual was determined.

Data collection was terminated for that patient when the elderly could not remember their fluid intake status.

### Evaluation of Data

The analysis of the data was carried out with the SPSS 23 program. Descriptive data are presented as numbers (n), mean and percentage (%). Within the scope of the research, Mann Whitney U tests Z test value was used in the evaluation of daily fluid consumption levels

according to demographic variables, dehydration status and drug use.

### Permissions

Permission was obtained from the ethics committee of a university with the number 2022/153. All principles of the Declaration of Helsinki were complied with throughout the study. Informed consent was read and signed by each participant. In informed consent, the participants were assured that their participation was voluntary and that if they decided to withdraw from the study, there would be no change in the care provided by the staff.

### Results

**Table 1.** Sociodemographic characteristics of elderly individuals and some characteristics of fluid consumption (N=91)

	n	%	
Gender	Woman	55	60.4
	Male	36	39.6
Marital status	married	44	48.4
	single	47	51.6
Educational status	primary education	30	33.0
	secondary education	43	47.3
	license	18	19.7
People living with	lives alone	47	51.6
	lives with his wife	44	48.4
Number of drugs used	less than 4	38	41.8
	more than 4	53	58.2
Prior hospitalization status	Yes	73	80.2
	No	18	19.8
The state of having a chronic disease	Yes	65	71.4
	No	26	28.6
Age	74.67 ± 3.03 (min: 70, max: 80)		
Daily amount of fluid consumption (milliliters)	1247.25 ± 428.71 (min: 600ml, max: 2000ml)		
Daily fluid deficit (milliliters)	1065.60 ± 417.91 (min: 300ml, max: 1700ml)		
Fragility	7.91 ± 0.63 (min: 7, max: 9)		
GYA	11.85 ± 3.52 (min:5, max:16)		
well-being scale	141.06 ± 5.86 (min:132, max:148)		

The average age of the elderly individuals participating in the study was 74.67 ± 3.03 ( min : 70, max : 80), 60.4 % were female, 48.4% were single , 47.3% were secondary school graduates, 51.6% lived alone. It was determined that 58.2% used more than 4 drugs, most of them were hospitalized before and 71.4% of them had at least one chronic disease. In addition, it was determined that elderly individuals consumed an average of 1247.25 ± 428.71 ( min : 600ml, max : 2000ml) milliliters of fluid per day, and the average daily fluid deficit was 1065.60 ± 417.91 ( min : 300ml, max : 1700ml) milliliters. Elderly individuals are 7.91 ± 0.63 ( min : 7, max :9) in the middle frail limit, 11.85 ± 3.52 ( min :5, max :16) in which they are semi-dependent in activities of daily living , and 141.06 ± 5.86 ( min :132, max:148 ) where their well-being is low.

**Table 2.** Findings on fluid consumption characteristics of elderly individuals

		n	%
Reason for not drinking water	I forget to drink liquid	17	18.7
	I do not like to drink liquid	18	19.8
	I have pain when urinating	18	19.8
	Not to go to the toilet often	38	41.8
Common problem	Constipation	47	51.6
	Indigestion	9	9.9
	Dry mouth	17	18.7
	Hot flashes	18	19.8
Fluid consumption time	Between meals	30	33.0
	During the meal	8	8.8
	After meals	18	19.8
	When seeing water	9	9.9
	When thirsty	26	28.6

It has been found that the elderly do not want to go to the toilet more often, they have the most constipation problems due to the lack of fluid consumption, and they consume the most liquid between meals.

**Table 3.** Conditions affecting daily fluid consumption of elderly individuals

		Mean $\pm$ SD	Test and p value
Number of drugs used	Less than 4	1361.84 $\pm$ 313.96	Z:-3.100
	More than 4	1165.09 $\pm$ 481.14	<b>p=0.002</b>
People living with	With his wife	1394.31 $\pm$ 479.36	Z:-3.059
	Alone	1109.57 $\pm$ 323.64	<b>p=0.002</b>
Prior hospitalization status	Yes	1675.00 $\pm$ 77.17	Z:-5.038
	No	1141.78 $\pm$ 413.90	<b>p=0.000</b>
The state of having a chronic disease	Yes	1160.00 $\pm$ 427.85	Z:-3.209
	No	1465.38 $\pm$ 351.78	<b>p=0.000</b>

Z: Mann Whitney U-tests

It has been determined that when the factors affecting the daily fluid intake of elderly individuals are examined, elderly individuals who use less than 4 drugs ( $p=0.002$ ), live with their spouses ( $p=0.002$ ), have been hospitalized before ( $p=0.000$ ) and do not have a chronic disease ( $p=0.000$ ) they consume too much fluid.

## Discussion

This study was conducted to determine the amount of fluid intake of elderly individuals and the factors affecting the amount of fluid intake. Our findings reveal some results regarding the factors affecting the fluid consumption characteristics, fluid deficit levels and fluid intake of the elderly.

In our study, it was determined that elderly individuals consumed an average of 1247.25 milliliters of fluid per day and the average daily fluid deficit was 1065.60 milliliters. Similar studies with elderly individuals have shown similar results in this study. Güleç and Küçükğüçlü stated that 84.4% of elderly individuals take less fluid than they should take daily (19). Bennett et al. (2004) found chronic thirst symptoms in 48% and mild thirst symptoms in 26% of 185 elderly individuals (20). In a more recent study, it was reported that 72.7% of the elderly living at home and 77.1% of the elderly living in a nursing home consumed less than four glasses (800 milliliters on average) (21). Our findings are similar to

other studies in the literature in this respect.

In a recent similar study, Dönmez and Demir (2022) found the average daily fluid intake of elderly individuals living at home to be 1721.4 $\pm$ 478.6 ml. (18). Elderly individuals participating in this study consumed less liquid than the participants in Dönmez and Demir (2022). We think that this difference between the two studies is since the elderly do not want to go to the toilet more often and consume the most liquids between meals.

In our study, it was determined that the elderly who used less than 4 drugs consumed more fluids. In Güleç's (2013) study on elderly people living in nursing homes; There was no significant difference between the number of drugs consumed and water consumption (19). Muz et al. (2017) did not find a relationship between the number of drugs used and the state of dehydration (21). It has been determined that the combination of factors such as advanced age, polypharmacy, and lack of mobility, especially with the use of diuretic drugs, will increase the risk of dehydration in the elderly (22). Taking the drug with water is expected to increase water consumption. Studies indicate that elderly individuals reduce their fluid consumption due to increased urine production and fear of incontinence (23, 24). It is thought that the difference in our study may be due to the fear of urinary incontinence in elderly individuals.

In our study, it was determined that there was a significant difference between the daily fluid consumption of elderly individuals and those living together. Dönmez and Buse (2022) stated that the amount of fluid deficit decreases as much as the elderly individuals who are independent in their living activities can do, on the other hand, the amount of fluid deficit increases as the addiction of elderly individuals who are dependent in life activities increases (18). Laruiola et al. (2018) stated that there is a significant relationship between the dependent elderly and dehydration (25).

In our study, it was determined that elderly individuals who were hospitalized before and who did not have a chronic disease consumed more fluids. Fluid consumption in elderly individuals has a very important place. In particular, the decrease in the level of water reabsorption due to the effects of the drugs used on kidney functions causes a decrease in the feeling of thirst that occurs in elderly individuals during this period and ultimately leads to the elderly individuals not consuming enough fluids (21). It can be said that regular follow-ups of the elderly with chronic diseases and training of health personnel increase fluid consumption for elderly individuals.

## Conclusion

In our study, it was determined that elderly individuals consumed an average of 1247.25  $\pm$  428.71 milliliters of fluid per day, and the average daily fluid deficit was 1065.60  $\pm$  417.91. It has been determined that elderly individuals are in the middle-frail border,



semi-dependent in activities of daily living, and their well-being is low. It has been determined that the elderly consume less liquid because they do not want to go to the toilet frequently, and they have the most constipation problems due to the lack of liquid consumption. When the factors affecting the daily fluid intake of elderly individuals are examined, it has been determined that elderly individuals who use less than 4 drugs, live with their spouses, have been hospitalized before, and do not have a chronic disease consume more fluids. In line with these results, our recommendation should be to determine the amount of fluid that elderly individuals should take and to remind elderly individuals to consume fluids.

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**Ethical aspects of the research:** In order to conduct the research, permission was obtained from the ethics committee of a university, number 2022/153. All principles of the Declaration of Helsinki were complied with throughout the study. All participants read and signed the informed consent form.

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