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Araştırma Makalesi/ Research Article

Skin Dryness in the Elderly Staying in a Nursing Homes and Affecting Factors

Bakım Evinde Kalan Yaşlılarda Cilt Kuruluğu ve Etkileyen Faktörler

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ABSTRACT
Objective: This study is a descriptive study conducted to examine skin dryness, pH level, skin turgor and the affecting factors in the elderly staying in nursing homes.
Method: The study population was composed of 53 elderly who stayed in a care and rehabilitation center. 50 elderly who met the participant selection criteria and who gave their consent to participate were included. Elderly Information Form and devices that measure skin moisture and pH were used as the data collection tools. Descriptive statistics, Man-Whitney U test and Spearman correlation test were used.
Results: The results of the study revealed that the rate of arm dryness in the female elderly was higher compared to the male elderly and that skin turgor duration was longer in the elderly with cardiovascular diseases. When the relationship between water-fluid consumption of elderly and skin turgor duration was examined, it was seen that the duration of skin turgor extends as water-fluid consumption decreases.
Conclusion: Dry skin was observed in all the elderly staying in the nursing homes; the duration of skin turgor extended; and skin pH was at normal levels. It was further revealed that daily water-fluid intake of the elderly affected the duration of skin turgor.
Keywords: Skin, Dry, Elderly, Nursing Homes.

ÖZ
Amaç: Bu çalışma, bakım merkezinde kalan yaşlılarda cilt kuruluğu, pH seviyesi, cilt turgoru ve bunu etkileyen faktörleri incelemek amacıyla tanımlayıcı olarak yapıldı.
Yöntem: Çalışma evrenini bakım merkezinde kalan 53 yaşlı oluşturmuştur. Çalışmaya, dahil edilme kriterlerini karşılayan ve katılmaya onay veren 50 yaşlı çalışmaya alındı. Veriler Yaşlı Bilgi Formu ve cilt nemi ve pH'ı ölçen cihazlar aracılığı ile toplanmıştır. Verilerin değerlendirmesinde tanımlayıcı istatistikler, Mann-Whitney U testi ve spearman korelasyon analizi kullanıldı.
Bulgular: Araştırma sonuçları yaşlı kadınlarda kol kuruluğu oranının yaşlı erkeklere göre daha yüksek olduğunu ve kardiyovasküler hastalığı olan yaşlılarda cilt turgor süresinin daha uzun olduğunu ortaya koydu. Yaşlıların su-sıvı tüketimi ile cilt turgor süresi arasındaki ilişkisi incelendiğinde, su-sıvı tüketimi azaldıkça cilt turgor süresinin uzadığı görüldü.
Sonuç: Bakım merkezinde kalan tüm yaşlılarda kuru cilt görüldü; cilt turgorunun süresi uzundu; ve cilt pH'ı normal seviyelerdeydi. Ayrıca yaşlıların günlük su-sıvı alımının cilt turgoru süresini etkilediği ortaya çıktı.
Anahtar Kelimeler: Cilt, Kuru, Turgor, Yaşlı, Bakım Merkezi.

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Ordu University J Nurs Stud
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Introduction

Skin is the most important organ showing the signs of aging, and thus, the changes that occur during the aging process have a negative effect on the lives of the elderly. The changes are observed in the skin in old age are thinning, coarsening, wrinkles, decrease in the elasticity of skin, brown spots and dry skin (Baykal et al., 1999; Baş et al., 2014). At least one dermatological problem is observed in the elderly over 65. One of these problems is dry skin (Kökçam and Dilek, 2007). In the literature, frequency of dry skin in the elderly is specified between 30% and 60% (Smith et al., 2002a; Paul et al., 2011; Kılıç et al., 2008; Smith et al., 2002b; Hurlow and Bliss, 2011). Among the factors leading to dry skin in the elderly are old age, decrease in subcutaneous fat tissue, a sedentary lifestyle, change of taste, forgetfulness, slowdown in reflexes and neural activities, pH change and inadequate water-fluid intake (Karaarslan et al., 2009). These conditions lead to epidermal water loss as well as dander, eruption and stretch mark in the elderly skin. Another factor affecting dry skin is skin pH. It is known that skin pH increases with age. Increasing pH leads to pathological skin problems like atopic dermatitis, irritant contact dermatitis, acne and dry skin. It is found that the elderly with lower skin pH develop a better resistance to irritants (Lambers et al., 2006). The studies in the literature also revealed that skin pH's as well as the amount of water in the skin are equally important in the activation of skin reductases and the emergence of natural moisture factor (NMF) in the skin (Loden, 2003). Kılıç et al. found that 45.1% of the the elderly living in nursing home in Turkey have dry skin problem (Kılıç et al., 2008). Another study conducted with the elderly living in nursing homes also revealed that dry skin is the second most frequently observed disease among dermatological diseases (78.1%) (Kara Polat et al., 2017). It is of great importance to take the necessary measures to prevent the changes that occur on the elderly skin and to have an awareness of the skin changes that could occur in order to protect and care for the skin. Older people and their carers (both formal and informal) require training to recognise early signs of dehydration and we need strategies for promoting drinking (Paul et al., 2011; Smirt et al., 2002b; Lambers et al., 2006). Water plays a crucial role in life. Water is the basis of all biological processes. The amount of water in the human body gradually decreases with age. Especially in aged populations water loss dehydration is associated with poor health outcomes (e.g. falls, fractures, constipation, delirium, confusion, drug toxicity, dry skin, pressure ulcers, poor wound healing and death). For this reason, it is even more important for the elderly people living in nursing homes (Akdeniz et al., 2018; Hooper et al., 2014).

In Turkey, limited number of studies have yet explored dry skin in the elderly living in nursing homes and the influencing factors (Kılıç et al., 2008; Karaarslan et al., 2009). This study is believed to contribute to the literature and the elderly care by exploring dry skin, pH level, skin turgor and the influencing factors. Furthermore, this study is aimed to increase the awareness of the caretakers in the care and nursing homes by emphasizing the importance of dry skin in the elderly.

Methods

Study design

We conducted a desciriptive study the elderly living in nursing homes in Central Anatolia, Turkey.

Research questions

What is the level of dry skin, pH and skin turgor in the elderly?

What are the factors influencing dry skin in the elderly?

Setting and samples

The population of the study involves 53 the elderly living in a nursing home. However, 50 (%94.3) the elderly who met the inclusion criteria and gave their consent to participate were included in the study (two individuals' psychiatric problem and one individual's skin problem were not included in the sample). The features of skin care in the elderly living in nursing homes is as follows: giving a bath twice a week with warm water followed by the application of a moisturizer, encouraging fluid intake, and providing three meals a day prepared under the supervision of a dietician.

Inclusion Criteria

- Being 65 or older

Exlusion Criteria

- Having alzheimer and dementia or psychiatric problems that could affect mental state (two person),
- Having diagnosed with a disease requiring fluid restriction (renal failure, heart failure),
- Having diagnosed skin problems (one person).

Ethical Considerations

In order to conduct the study, ethics committee approval was obtained from a University Faculty of Medicine (2017-06), and institutional approval was received from nursing homes. The participants gave

Ordu University J Nurs Stud
2022, 5(1), 1-8
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their verbal and written informed consent prior to the study. The study followed the ethical principles in Helsinki Declaration, and the confidentiality of personal information was ensured.

Measures

The elderly Information Form and devices measuring skin moisture and pH were used as data collection tools. Measurements were performed before one day applying moisturizer to the skin. The data were collected in face-to-face interviews with the participants in 20 to 40 minutes.

The elderly Information Form: The form is composed of 14 questions which determine the socio-demographic characteristics, chronic illnesses, daily water and fluid consumption amount, pruritus presence and mobility state of the participants (Paul et al., 2011; Kılıç et al., 2008; Smith et al., 2002b).

Skin Moisture Meter: Skin Moisture Meter is used to measure the amount of moisture on any point of the body. This device, which was specifically designed for sensitive measurements, shows the amount of moisture only through contact without causing any damage to skin. It has a legible digital screen that shows the amount of moisture in skin from 0 percent to 99.9 percent. It is enough to touch the device on the area where measurement will be performed. The skin on which the measurement will be performed should not be dirty, wet or very hairy. The device has the dimensions of 131 mm x 27 mm x 24 mm. It gives the most sensitive results with leading Bio-Sensor technology. Skin moisture rate is grouped as low between 0% and 34.9%, moderate between 35.0% and 54.9%, and high between 55.0% and 100.0%.

The Skin-pH-Meter: The Skin-pH-Meter is a quick, easy, and cost-effective tool to specifically measure the pH on the skin surface or the scalp. The role of the pH has gained importance in skin health and is therefore subject to basic research. The measurement is based on a high quality combined, where both glass H+ ion sensitive electrode and additional reference electrode are placed in one house. The probe head is planar for measuring optimally on the skin surface. pH is expressed in a decimal.

The independent variables of the study are the socio-demographic characteristics of the participants and information on their chronic illnesses, the ability to perform daily life activities, and water-fluid consumption, while dependent variables are skin moisture rate, pH value, and skin turgor.

Data analysis

Statistical Package for Social Science (SPSS) 21 was used to analyze the data. The Kolmogorov-Smirnov test and Shapiro-Wilk test were used to determine the normal distribution of the data. Descriptive statistics (percentage, average, and standard deviation), Mann-Whitney U test and Spearman correlation test were used. The results were considered to be statistically significant at 95% confidence interval ($p< 0.05$).

Results

More than half of the participants were 75 years or olders (72%) and age average was 69.2+6.3 years. Participants were male (58%), illiterate (70%), cardiovascular disease (62%), while the others had diabetes mellitus, musculoskeletal, and respiratory diseases at 10%, 18%, and 16%, respectively. The average number of pills the participants was 5.3±3.9. It was found that the participants consumed 912.0±352.6 ml water and 1392.0±567.8 ml fluid on average and that 96% of them did not use a moisturizer and 57% can perform daily life activities by receiving help (Table 1). The nurses at the institution help to basic needs such as bathing, skin care, dressing, excretion, nutrition and movement according to the level of the individual needs. Elderly patients living in nursing home need maximum level of support in bath and skin care.

Skin turgor of the elderly in the study was 5.2±1.5 seconds on average, while the pH level was 5.8±1.0 and the rate of moisture was 24.4%±5.0 on the top of the hand. It was also found that all the points on which measurements were performed skin moisture rate low (Table 2). It was found that female the elderly had higher levels of dry skin compared to the male the elderly in arms and that the duration of skin turgor was longer in the elderly with cardiovascular disease. These differences were statistically significant ($p<0.05$, Table 3). No statistically significant difference was found between the dry skin and skin turgor averages of the elderly and age, presence of diabetes, state of performing daily life activities, and musculoskeletal, neurological and respiratory system ($p>0.05$).

It was further revealed that there is no relationship between the averages of water and fluid consumption in the elderly and dry skin, and as far as the relationship with skin turgor duration is concerned, it was found that the duration of skin turgor is longer as water and fluid consumption decreases (Table 4).

Ordu University J Nurs Stud
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Table 1. Distribution of the identification characteristics of the elderly (n=50)

Characteristics	n	%
Age (year)	69.2 (6.3)	
65-74	14	28.0
75 and ↑	36	72.0
Gender		
Female	21	42.0
Male	29	58.0
Marital Status		
Marriage	5	10.0
Not Marriage	45	90.0
Education Status		
Illiterate	35	70.0
First-secondary education	15	30.0
Cardiovascular Disease		
Yes	31	62.0
No	19	38.0
Diabetes Mellitus		
Yes	5	10.0
No	45	90.0
Musculoskeletal System Disease		
Yes	9	18.0
No	41	82.0
Neurological Disease*		
Yes	17	34.0
No	33	66.0
Respiratory System Disease		
Yes	8	16.0
No	42	84.0
Number of Pills	5.3±3.9	
Consume Water (ml)	912.0±352.6	
Consume Fluid (ml)	1392.0±567.8	
Use a Moisturizer		
Use	2	4.0
Not use	48	96.0
Smoking Status		
Use	5	10.0
Not use	45	90.0
State of Performing Daily Life Activities		
Not receiving help	22	43.0
Receiving help	28	57.0

*S*troke and multiple sclerosis*

Discussion

Metabolic, physiological and histological changes are observed in all the compartments of the skin during the aging process. Conditions like systemic diseases that increase with age, long-term exposure to ultraviolet lights, polypharmacy, immunodeficiency, circulatory abnormalities, and skin pH change increase the frequency of occurrence of dry skin (Özyurt et al., 2014). Skin moisture and pH rate are two of the most important parameters used in the evaluation of skin health. Normal pH rate of skin is between 4.5 and 5.5. As skin pH increases and reaches alkali pH level, the protective acid mantle of the skin is damaged. This distortion in the structure of the mantle leads to problems like skin sensitivity, dry skin, inflammation, eczema and dermatitis (Gül, 2009). Furthermore, when the rate of moisture is below 10%, dermatological problems and pruritus occur in addition to dry skin (Lambers et al., 2006; Loden, 2003). Especially aged people are vulnerable to dry skin due to elevated skin surface. Nurses can detect skin problems early with pH assessment. Our study revealed that pH levels in various parts of the the elderly skin were within normal levels (Face 5.7±0.6; Upper part of the hand 5.8±1.0; Trunk 5.5±0.5; Arm 5.6±1.0); however, skin moisture level was below the normal level (34.9%) (Face 28.4±5.5; Upper part of the hand 24.4±5.0; Trunk 29.6±7.9; Arm 28.2±5.9), and dry skin was also observed (Table 2).

The uncovered parts of the skin are exposed to environmental pollution, sunlight (UV) and bacteria; and thus they are drier and have higher levels of pH (Lambers et al., 2006). These changes and increasing age decrease the ability of skin to protect and renew itself. Smilar to the literature, our study also revealed that on face and upper part of the hand, which are the exposed parts of the skin, dry skin and pH levels were higher (Lambers et al., 2006). Similar to our study, Roh and Kim also found that the patients who received care in the hospital for a long time had dry skin in their trunk, arms and legs (Roh and Kim, 2013).

Table 2. Skin moisture, pH and turgor averages in the body parts of elderly individuals

Skin Assessment	$\bar{X}$ (SD)
Skin pH	
Face	5.7±0.6
Hands	5.8±1.0
Trunk	5.5±0.5
Arms	5.6±1.0
Skin moisture(%)	
Face	28.4±5.5
Hands	24.4±5.0
Trunk	29.6±7.9
Arms	28.2±5.9
Skin turgor (saniye)	5.2±1.5

Ordu University J Nurs Stud
2022, 5(1), 1-8
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Table 3. Comparison of skin moisture rates and skin turgor by characteristics of the elderly

Characteristics	Hands		Arms		Face		Trunk		Skin Turgor (sn)	
	$\bar{X}\pm SD$	Min-Max	$\bar{X}\pm SD$	Min-Max	$\bar{X}\pm SD$	Min-Max	$\bar{X}\pm SD$	Min-Max	$\bar{X}\pm SD$	Min-Max
Age										
65-74	24.7±6.3	18.1-35.6	27.7±6.6	18.3-42.5	29.5±5.2	19.2-37.4	28.3±4.9	19.4-34.5	4.7±1.3	2.0-6.0
75 and ↑	24.3±4.5	18.1-33.9	28.4±5.7	18.1-41.3	28.0±5.6	18.3-42.7	30.4±9.5	18.3-55.8	5.3±1.6	2.0-6.0
Test *	247.500		241.000		251.500		93.500		205.00	
P	0.923		0.812		0.381		1.000		0.298	
Gender										
Female	24.1±5.1	18.1-33.9	26.2±5.2	18.3-37.0	27.9±5.6	19.0-41.2	30.0±0.0	19.8-30.0	5.5±1.6	2.0-10.0
Male	24.6±4.9	18.2-35.6	29.7±6.0	18.1-42.0	28.7±5.5	18.3-47.2	29.6±8.1	18.3-55.8	4.9±1.5	2.0-8.0
Test*	274.000		190.000		300.000		11.000		251.500	
P	0.549		***0.024***		0.929		0.757		0.286	
Cardiovascular Disease										
Yes	23.5±4.4	18.1-32.1	28.8±6.3	18.3-42.5	28.1±6.0	18.3-42.7	29.7±8.7	18.3-55.8	5.5±1.1	4.0-8.0
No	25.9±5.5	18.2-35.6	27.2±5.3	18.1-37.0	28.8±4.6	19.0-34.3	29.4±7.2	20.1-49.7	4.6±2.1	2.0-10.0
Test*	214.000		262.500		244.000		79.500		187.500	
P	0.108		0.522		0.313		.522		***0.029***	
Diabetes Mellitus										
Yes	21.7±3.1	18.1-24.8	28.1±10.2	18.3-42.5	25.6±8.0	18.3-37.5	29.2±7.0	21.2-34.5	5.0±1.0	4.0-6.0
No	24.7±5.1	18.1-35.6	28.2±5.4	18.3-41.3	28.7±5.2	19.0-42.7	29.6±8.2	18.3-55.8	5.2±1.6	2.0-10.0
Test*	77.500		107.500		77.000		28.000		105.000	
P	0.258		0.872		0.251		0.480		0.804	
Musculoskeletal System Disease										
Yes	25.1±4.8	18.2-30.4	29.2±5.9	20.5-39.9	27.1±4.6	20.3-30.4	29.7±1.4	28.7-30.7	6.0±2.3	2.0-10.0
No	24.3±5.1	18.1-35.6	28.0±6.0	18.1-42.5	28.7±5.7	18.3-42.7	29.6±8.3	18.3-55.8	5.0±1.3	2.0-8.0
Test*	163.500		175.500		170.500		24.000		128.500	
P	0.596		0.820		0.724		0.858		0.148	

** Mann-Whitney U test*

The studies in the literature highlighted that in the elderly over 70, a decrease is observed in the moisture content and sebum release of skin, while an increase is observed in the level of PH (Lee et al., 2016). Level of dry skin increases with age. Kara Polat et al. (2017) revealed in their study that 78.1 percent of the elderly in nursing centers have dry skin. As stated in the literature, frequency of dry skin varies from 30 percent to 60 percent (Smith et al., 2002a; Kılıç et al.,2008; Smith et al., 2002b). Our study reports more findings compared to the other studies in the literature. The reason behind low level of skin moisture, that is, high level of dry skin can be attributed to the fact that the elderly living in nursing homes cannot provide themselves with active care; they do not determine the duration of bath themselves; they live in a city with high altitude and continental climate (severe and long winter), and city water is hard. Moreover, not using a moisturizer after bath in nursing homes may be another factor contributing to dry skin.

Ordu University J Nurs Stud
2022, 5(1), 1-8
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Table 3. Comparison of skin moisture rates and skin turgor by characteristics of the elderly (Table continued)

Characteristics	Hands		Arms		Face		Trunk		SkinTurgor (sn)	
	$\bar{X}\pm SD$	Min-Max	$\bar{X}\pm SD$	Min-Max	$\bar{X}\pm SD$	Min-Max	$\bar{X}\pm SD$	Min-Max	$\bar{X}\pm SD$	Min-Max
Neurological Disease										
Yes	24.1±4.6	18.2-32.1	29.7±6.6	18.3-41.3	26.8±4.7	18.3-32.3	31.1±7.2	21.2-49.7	5.6±1.5	2.0-8.0
No	24.6±5.2	18.1-35.6	27.5±5.5	18.1-42.5	29.3±5.8	19.0-42.7	28.7±8.4	18.3-55.8	4.9±1.5	2.0-10.0
Test*	271.500		208.500		209.500		72.000		200.500	
P	0.854		0.140		0.146		0.388		0.093	
State of Performing Daily Life Activities										
Not receiving help	24.3±5.9	18.1-35.6	28.7±5.4	18.6-1.3	27.4±6.4	19.0-42.7	31.8±1.1	20.1-55.8	4.9±1.5	2.0-8.0
Receiving help	24.5±5.1	18.1-33.9	27.8±4.9	18.1-2.5	29.2±5.7	18.3-41.2	27.7±4.9	18.3-34.5	5.1.6	2.0-10.0
Test*	300.000		291.500		259.000		78.000		276.000	
P	0.856		0.747		0.338		0.369		0.522	

** Mann-Whitney U test*

Table 4. Correlation of skin moisture rates and skin turgor with characteristics of the elderly

Characteristics	Hands		Arms		Face		Trunk		SkinTurgor (sn)	
	r_s	*P*	r_s	*P*	r_s	*P*	r_s	*P*	r_s	*P*
Number of Pills	-0.145	0.315	-0.013	0.928	-0.233	0.104	0.163	0.407	0.259	0.069
Consume Water (ml)	-0.012	0.933	0.090	0.535	-0.064	0.661	0.113	0.565	-0.289	***0.042***
Consume Fluid (ml)	-0.015	0.920	0.078	0.590	-0.063	0.662	0.119	0.548	-0.298	***0.035***

rs: Spearmen corelation

Skin turgor, which is one of the factors showing dry skin, refers to stretchy and plump skin. Normal turgor is composed of skin and subcutaneous cells with enough water, which is combined with other materials in tissues. The elderly decrease in elastic fibers in skin and the increase in water loss in the body and skin may increase the duration of skin turgor (Dorrington, 1981; Leungh, 2017). Our study revealed that the duration of skin turgor in the elderly extends (5.2±1.5 sn (min 2-max 8). As daily water and fluid intake decreased in the elderly, the duration of skin turgor extends. Our study also found that the amount of water and fluid the elderly consume were insufficient.

A study which was carried out with the elderly who were 65 and over and who were living in nursing centers in Canada and the US for a long time showed that 79 percent of the elderly had insufficient water consumption (Craigh, 2013).

A study conducted in Turkey on the elderly living in nursing home found that 84.4 percent of the elderly have inadequate fluid intake (Güleç, 2013). Thus, careful attention must be paid to daily water and fluid intake of the elderly living in nursing homes (Muz et al., 2017).

Menopausal process and aging have a negative impact on the skin health of women. During the post-menopausal years, skin thickness decreases by 1.13 percent a year (Durmazlar and Eskioğlu, 2008). Our study revealed that dry skin in the arm area of women is more compared to that of men. Paul et al. also found that women have higher levels of dry skin than men (Paul et al., 2011).

Chronic diseases lead to skin problems as well. Particularly diabetes mellitus increases the prevalence of skin problems in the elderly. Although not statistically significant, our study revealed that the elderly with diabetes had drier upper hand and face compared to those without diabetes. Bahadır and Atış indicated that the most prevalent skin problem in patients with Type II diabetes is dry skin (Bahadır and Atış, 2014). Moreover, our findings

Ordu University J Nurs Stud
2022, 5(1), 1-8
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suggest that the elderly with cardiovascular system disease have longer periods of skin turgor compared to those without such a disease. Cardiovascular system disease facilitates fluid-electrolyte imbalance that could occur in the elderly, which is thought to extend the duration of skin turgor.

Limitations

The study is limited to the extent covered by the data collection tools used and to the statements of the elderly who participated in the study. The results of the study can be generalized to the elderly living in a nursing homes.

Conclusions

The findings of our study revealed that dry skin was observed in all the elderly living in nursing homes; the duration of skin turgor extended; and skin pH was at normal levels. It was further revealed that daily water-fluid intake of the elderly affected the duration of skin turgor. These findings suggest that in order to decrease the risk of decubitus and dermatological problems that could occur as a result of dry skin, caretakers in nursing homes should be given seminars on the importance of daily water-fluid intake, regular skin evaluation and use of appropriate moisturizers after bath.

Implication for practice

It can be said that dry skin is a serious problem that negatively affects the quality of life of the elderly. For this reason, nurses working in nursing homes can make skin evaluations and add skin care to their routine program.

Ethics Committee Approval: Ethical approval was obtained from the Clinical Studies Ethics Committee of Yozgat Bozok University (2017/06).
Hakem/Peer-review: External referee evaluation.
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What did the study add to the literature?

- In Turkey, limited numbers of studies have yet explored dry skin in the elderly living in nursing homes.
- Dry skin was observed in all the elderly living in nursing homes; the duration of skin turgor extended; and skin pH was at normal levels.
- It was supported that dry skin should be evaluated routinely in nursing homes.
- Randomised controlled studies with a larger sample size are needed to examine the effectiveness of skin care.

Kaynaklar

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