Biomedical & Pharmacology Journal, September 2020. Vol. **13**(3), p. 1513-1521

Comparison Between Moisturizing Cream Containing 10% Urea and 10% Lanolin in Petrolatum in Skin Hydration Improvement among Elderly

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https://dx.doi.org/10.13005/bpj/2025

(Received: 08 July 2020; accepted: 30 September 2020)

Inadequate xeros is treatment may result in complications. This study aimed to comparing the efficacy and side effects of moisturizing cream containing 10% urea and 10% lanolin in petrolatum for the treatment of xerosis in elderly.A randomized, double blind clinical trial was conducted in 35 elderly from a nursing home in Jakarta. Evaluation of skin capacitance (SC),specified symptoms sum score(SSRC), and pruritic degree were measured at baseline, week-2 and -4 after the start of therapy. Followinga 2-week preconditionperiod, eachsubjectreceivedarandommoisturizer for each limb, to be applied twice daily.Thepercentageof SC increaseatweek-4 was significantly higher in limb receiving cream containing 10%urea than 10% lanolin/petrolatum (64.54% vs. 58.98%; p=0.036). Thepercentage of SSRC decreaseatweek-4 did not differ between groups (100%; p=0.089). Pruritus was equally improved in both groups at week-2, and completely diminishedatweek-4. Overall, the most frequent side effect was sticky feel, more common, but not statistically significant, in 10% lanolin/petrolatum group.Afterfour-week application moisturizer containing 10% urea gave higher percentage of SC increase than 10% lanolin/petrolatum in the xerotic limbs of the elderly. Sticky feeling was more frequently found in 10% lanolin/petrolatum group, butstatisticallynotsignificant.

Keywords: Elderly, 10% lanolin, Petrolatum, 10% urea, Xerosis.

The World Health Organization (WHO) defines elderly as over 60 years old.[1] The aging process causes a decreased of multiple organ function in the elderly, including the skin, causing various health problems in the elderly. In addition to systemic diseases, skin health problems in the elderly are also common, one of which is dry skin or xerosis. Some studies report the prevalence of dry skin in the elderly may varies between 30% to 85%.[2,3]According to Legiawati et al.,[4] xerosis is the fifth most common skin diseases in the Geriatric Division of the Dermatology and Venerology Policlinic of Cipto Mangunkusumo National Hospital (RSCM) Jakarta for six years (2008-2013).

Xerosis in elderly patients is caused by various factors, including changes in the structure and function of the skin. These changes include: (1) epidermal depletion; (2) decreased blood supply, fluids, and nutrients to the skin; (3) decreased of elastin fibers; (4) reduced amount of oil glands and sweat; and (5) decreased lipid production and natural moisturizing factor (NMF) in the stratum corneum.[5,6] Other factors causing xeroxis in the

elderly are systemic diseases, environment and lifestyle factors.[5-7]Although it doesn't cause death, xerosis can cause serious disorders, especially in the elderly. In xerosis, skin barrier breakdown followed by scaling, fissure, and itching. Scratching in response to itching stimuli, can trigger eschoriation and inflammatory responses, which are clinically seen as asteatotic dermatitis, irritant or allergic contact dermatitis, and potentially increase the risk of secondary bacterial infection. Chronic pruritus in the elderly can cause sleep disorders and depression, thereby reducing quality of life.[8-13]

There are several efforts to overcome xerosis, including applying a moisturizer (occlusive, emollient, or humectant), regulating fluid intake, reducing sun exposure, and overcoming systemic disease that triggers xerosis. Using moisturizer is an important effort to overcome xerosis.[14-15]Occlusive moisturizers coat the stratum corneum and inhibit water evaporation from the skin, so hydration of the stratum corneum remains well. One favorable occlusive moisturizer is petrolatum.[16]Humectant moisturizers work by drawing water from the environment to the stratum corneum. Glycerol and urea are examples of effective humectants in xerosis.[17-19]Emollient moisturizers fill in the spaces or gaps between desneamated corneocytes to create a smooth surface. Besides being emollient, lanolin is also occlusive and is often used as an effective moisturizer.[8]

Study on various types of moisturizers in elderly patients has been conducted. Kottner et al.,[14] conducted a systematic study and found that moisturizers with humectants, such as urea, lactic acid, and glycerin, can improve the state of xerosis in the elderly. However, that study was conducted not in a tropical country, while the environment (temperature and relative humidity) is a factor that affects skin dryness.

One of the humectant moisturizers that is often used in the Dermatology and VenerologyPoliclinic of Cipto Mangunkusumo National Hospital (RSCM) is a moisturizing cream containing 10% urea.Moisturizing cream containing 10% urea was included in the 2013 national formulary.[20]Urea is one of the NMF components and can bind more water to the skin, both from the dermis and from the environment, so it is hoped that urea administration can improve skin hydration. However, the effect of stinging on the skin is often reported on urea administration.[15,16,21]Until now,using moisturizing creams that contain urea has not been used as a standard therapy for the treatment of elderly xerosis. Elderly patients with xerosis are often given lanolin 10% in petrolatum which is occlusive and emollient. Petrolatum with the addition of lanolin 10% has a lower price than urea cream, but the vehicle is ointment shaped so it is more sticky than urea cream. Both creams have different mechanisms of action. As far as the authors know, there have been no studies comparing the effects of giving moisturizing creams containing 10% urea with 10% lanolin in petrolatum as xerotic therapy in the elderly in Indonesia.This study aims to compare the efficacy and side effects of moisturizing cream containing 10% urea and 10% lanolin in petrolatum for the treatment of xerosis in elderly.

METHODS

Study design

This study was a double blind randomized clinical trial of elderly patients with xerosis. This study was conducted at TresnaWerdha Social Institution (PSTW) Budi Mulia 3 Margaguna, Cilandak, South Jakarta in November-December 2015.

Subject

Subject were elderly patients with xerosis in PSTW Budi Mulia 3 Margaguna, Cilandak, South Jakarta who are selected consecutively and meet the inclusion criteria i.e. age 60-80 years; diagnosed xerosis clinically; able to communicate well and carry out daily activities independently; willing to follow the research and sign the consent form. While the exclusion criteria were having a history of hypersensitivity to the moisturizer being tested and dermatitis skin disorders or other diseases of the skin of the lower limbs. The subjects who met these criteria totaled 35 people. Determination of the location of the limbs (right or left) given each type of moisturizer was based on a random table and wasn't known by the subject and researchers.Each subject undergoes a precondition period of two weeks before participating in this study. During the precondition, subject bathing twice a day using plain water and baby soap and didn't use any moisturizer. During the study subject only used soap provided by the researcher.

Treatment

Moisturizing creams containing 10% urea (Carmed® cream) and 10% lanolin in petrolatum were put by pharmacists in similar pots and each pot was given a serial number and location. The pharmacists record and put the type of moisturizer in the pot according to a random table. Each subject gets two types of moisturizers with active ingredients in accordance with predetermined codes. Moisturizing was carried out by trained nursing workers. Moisturizer was spread evenly on all lower limbs.Officers wash their hands with soap before applying moisturizer to different limbs. Moisturizing was done twice a day immediately after bathing with plain water and baby soap and dried with a towel. The amount of moisturizer that was applied to one lower leg for one week was 20 grams. Each subject gets two kinds of moisturizers with an amount of 40 grams each every two weeks. Moisture remaining weight was measured every two weeks of evaluation. Supervision of moisturizing is carried out every day by the research team.

Skin Capacitance (SC) Measurement

SC measurement was carried out before starting the study as a baseline, after the second and fourth weeks of treatment. Subjects underwent acclimatization for 15-30 minutes before measurement. Acclimatization and measurement of SC values were carried out in a quiet examination room, with a constant temperature and relative humidity, that was a temperature of 20-25° C and a relative humidity of 40-70%, and were not carried out under light or direct sunlight.SC measurements were carried out within 3 hours after the application of the last moisturizer. Measurements were made at the location of the lateral limb extensors with minimal hair area, i.e. at the midpoint between the head of the fibulae and the lateral malleolus.[22]SC measurement using CM825 corneometer with arbitrary unit (AU). The corneometer probe was inserted into the socket in the German manufacturer of the Courage & Khazaka electronic GmbH multi probe adapter (MPA) instrument until it was detected on a computer screen and the type of corneometer probe was selected; the probe head was placed vertically touching the surface of the skin at the measurement location; the button on the side of the probe was pressed to start and stop the measurement; SC values appear on the computer screen. SC measurements and evaluations were carried out by the researcher three times and the mean value was taken and recorded on the research status form.

Xerosis Score Measurement

Measurement of xerosis scores was carried out before starting the study as a baseline, after the second and fourth weeks of treatment. Measurement was carried out in a room with sufficient light. Determination of xerosis score using the SSRC method by assessing the degree of squama, erythema, skin roughness, and fissure. Scores range from 0 to 16.The SSRC assessment was carried out by two examiners. The results of the assessment were analyzed for their suitability. Both examiners are free and blind to the allocation of moisturizer given. The evaluation of the score includes the difference in the value of the SSRC and the percentage of decrease in the SSRC from before therapy to the second and fourth week of therapy, as well as the second week to the fourth week of therapy.

Side Effect Measurement

Side effects are symptoms that arise outside the main goal of therapy. Side effects can be subjective and objective. Subjective side effects include itching, pain, stinging, stickiness, and oiliness. Objective side effects include contact dermatitis, folliculitis, and miliaria.Assessment of the degree of itching in the lower limbs using a visual analogue scale (VAS) pruritus with a scale of 0 (zero) indicates no itching until 10 indicates very severe itching. Itching is categorized: no itching (0), mild itching (1-3), moderate (4-6), and severe (7-10).

Statistical Analysis

The results were analyzed using the T independet test or Mann Whitney test if did'nt meet the requirement of T test. The level of appropriateness of the measurement of the SSRC values between the two assessors was analyzed by the Kappa test. $p<0,05$ was considered statistically significant.

Ethical Clearence

This study has passed the ethical review in accordance with a letter issued by the Health Research Ethics Committee FKUI number 978 / UN2.F1 / ETIK / 2015.

RESULTS

Sociodemographic Characteristic

Most of samples were male (51.4%), with a median age of 70 (60-80) years. Most of samples had low levels of education, i.e. have no education (37.1%) and elementary school (28.6%). Samples were bathed twice a day with antiseptic soap (68.6%) and most of them dried themselves by tapping with a towel (54.3%). All samples did not use air conditioner (AC) and most of the samples had not been treated (60%) (Table 1).

Clinical Characteristic

The average subject had suffered from xerosis before receiving treatment for 12 (2-10) weeks. Most subjects complained of itching (82.9%) with varying degrees, i.e. mild (45.7%), moderate (31.4%) and severe (22.9%). Most of the subjects (60%) had received treatment to resolve complaints of xerosis and itching. Therefore, to negate the effects of the treatment, preconditioning was carried out for 2 weeks, so that itching complaints at the time of history taking was no longer affected by previous treatment.

Change in SC Value

SC values in the group given moisturizing cream containing 10% urea, showed an increase along with the increase in treatment duration. The same results were also shown by the group that received 10% lanolin in petrolatum.There were significant differences in mean SC values between the two groups in the fourth week after treatment (Table 2). The administration of a moisturizing cream containing 10% urea, showed a significantly higher mean difference in SC from the base line to the fourth week when compared to the 10% lanolin cream in petrolatum (37.38 vs. 29.05 AU; $p = 0.001$) (Table 3).

Change in SSRC Score

SSRC score in the group given a moisturizing cream containing 10% urea and lanolin 10% in petrolanum, showed a decrease after the second and fourth weeks of treatment. There was a significant difference in the score of the SSRC between the two groups after 2 weeks of treatment, but no significant difference was found in the score of the SSRC after 4 weeks of treatment

Table 1. Sosiodemographic Characteristic

Sosiodemographic Characteristic	Total	
	n	%
Age (years), median (min-maks)	70 (60 – 80)	
Sex		
Women	17	48,6
Man	18	51,4
Education		
Have no education	13	37,1
Elementary School	10	28,6
Midle School	12	34,3
Habit		
Bathing frequency, median (min-maks)	2 (1-4)	
Type of soap		
• Antiseptic	24	68,6
• Non antiseptic	10	28,5
• Without soap	1	2,9
Way to dry the body after bathing		
• scrub hard with a towel	16	45,7
• wipe or pat the body with a towel	19	54,3
Daily used of AC		
• Didn't used AC	35	100,0
• Used AC	0	0,0
History of treatment		
• No treatment	21	60,0
• Treatment	14	40,0

(Table 4). The SSRC assessment is carried out by two appraisers to determine the appropriateness of the appraisal. Based on the Kappa test the Kappa SSRC score were obtained at the baseline 0.956 (p = 0,000), the second week 0.975 (p = 0,000), and the fourth week 0.955 (p = 0,000). This shows that the level of appropriateness between the assessors and the determination of the SSRC value at each measurement was primely.

Difference in SSRC score and percentage of decrease in SSRC score calculated from baseline to the second week and the fourth week, and from the second week to the fourth week are shown in Table 5. The administration of a moisturizing cream containing 10% urea and lanolin 10% in petrolatum showed a decrease in the median SSRC score from baseline to the second and fourth week, and the second to fourth week. Nevertheless, the decrease in score between the two groups was not significantly different (p> 0.05). The percentage decrease in SSRC score in the two groups didn't significantly difference could be due to the same median percentage decrease in the two groups even though the range of values was different. Nevertheless, the administration of a moisturizing cream containing 10% urea and lanolin 10% in

Table 2. Comparison of SC values of subjects who received a moisturizing cream containing10% urea and 10% lanolin in petrolatum

Weeks	Urea 10% Mean (SD)	Lanolin 10% + petrolatum Mean (SD)	Mean Difference (SE)	*p*
0	19,84 (4,94)	19,68 (5,20)	0,16 (1,21)	0,895
2nd	42,44 (8,67)	38,53 (8,27)	3,91 (2,02)	0,057
4th	57,21 (11,77)	48,72 (8,16)	8,49 (2,42)	0,001*

Exp:* there are mean difference at α=0,05 by T independent test

Table 3. The percentage of increase in SC after receiving a moisturizing cream containing 10% urea and 10% lanolin in petrolatum

Change of SC	Urea 10% Cream	Lanolin 10%+ petrolatum Cream	*p*
Increased, Mean (SD)			
Week 0-2	22,61 (8,16)	18,85 (8,89)	0,070[a]
Week 2-4	13,5 (1,04-39,10)	7,8 (0,47-34,03)	0,093[b]
Week 0-4	37,38 (10,89)	29,05 (8,57)	0,001[a*]
Percentage of Increased (%)			
Week 0-2	52,16 (11,94)	47,10 (16,64)	0,148[a]
Week 2-4	22,2 (1,80-60,86)	19,1 (1,16-51,14)	0,267[b]
Week 0-4	64,54 (9,80)	58,98 (11,86)	0,036[a*]

Exp:[a]*p* value based on T independent test; [b]*p value* based on Mann Whitney test; [*]there are mean difference at α=0,05.

Table 4. Comparison of SSRC Scores of subjects who received a moisturizing cream containing10% urea and 10% lanolin in petrolatum

Weeks	Urea 10% Median (Min-Max)	Lanolin 10% + petrolatum Median (Min-Max)	*p*
0	4 (3-7)	4 (3-7)	1,000
2nd	2 (1-4)	2 (1-3)	0,041*
4th	0 (0-2)	0 (0-1)	0,108

Exp:* there are mean difference at α=0,05 by Mann Whitney test

petrolatum shows a good percentage decrease in SSRC values from the beginning to the fourth week of therapy, which is 100%.

Changes in the degree of itching

The degree of itching at baseline (week 0), the second and fourth weeks after therapy were the same in both groups. A good change occurred at the end of therapy, i.e. 100% of subject did not complain of itching. This change in degree of itching corresponds to a decrease in SSRC and an increase in the value of SC after four weeks of moisturizing (Table 6).

Table 5. The percentage of decrease in SSRC Score after receiving a moisturizing cream containing 10% urea and 10% lanolin in petrolatum

Change of SSRC	Urea 10% Cream	Lanolin 10%+ petrolatum Cream	*p*
Decrease, Median (Min-Max)			
Week 0-2	2 (1-5)	2 (1-5)	0,173
Week 2-4	2 (0-4)	2 (1-3)	0,243
Week 0-4	4 (2-7)	4 (3-7)	0,401
Percentage of Decrease (%)			
Week 0-2	50 (33-80)	50 (25-75)	0,108
Week 2-4	100 (0-100)	100 (50-100)	0,096
Week 0-4	100 (50-100)	100 (75-100)	0,089

Exp:*p* value based on Mann Whitney test at α=0,05.

Table 6. Changes in itching complaints after getting a moisturizing cream containing 10% urea and lanolin 10% in petrolatum

Change	Urea 10% n (%)	Lanolin 10%+ petrolatum n (%)	*p*
0 Week			
• Mild	16 (45,7)	16 (45,7)	1,000
• Medium	11 (31,4)	11 (31,4)	
• Severe	8 (22,9)	8 (22,9)	
2nd Week			
• No itching	33 (94,3)	33 (94,3)	1,000
• Mild	2 (5,7)	2 (5,7)	
4th Week			
• No itching	35 (100)	35 (100)	N/A

Exp:*p* value based on Chi Square test at ±=0,05; N/A can't calculated.

Table 7. Subjective side effects after getting a moisturizing cream containing 10% urea and lanolin 10% in petrolatum

Subjective side effects	Urea 10% n (%)	Lanolin 10% + petrolatum n (%)	*P*
2nd Week			
• No side effects	35 (100)	30 (85,7)	0,054*
• Stickiness	0 (0)	5 (14,3)	
4th Week			
• No side effects	35 (100)	30 (85,7)	0,054*
• Stickiness	0 (0)	5 (14,3)	

Exp:* there are mean difference at ±=0,05 by Fisher Exact test.

Side Effect

The subjective complaints reported by 5 (14.3%) subject in the group that received 10% lanolin in petrolatum were sticky, whereas there were no subjective complaints in the administration of moisturizing creams containing 10% urea (Table 7). However, the complaints did not significantly difference between both groups. No objective side effects were found in both groups.

DISCUSSION

In accordance with the criteria of exclusion and inclussion, 35 consecutive subjects were obtained from 260 residents of PSTW Budi Mulya 3 Margaguna. After going through the precondition period for two weeks, each subject gets a different moisturizer on the two lower limbs according to randomization. All subjects completed the study.

Most of the subjects in this study were male (Table 1). This was different from patient demographic in the Dermatology and Venerologyl Polyclinic of RSCM Jakarta, which had a greater proportion of elderly women with xerosis. The difference can be due to the way of consecutive recruitment at PSTW Budi Mulya 3, following the allocation of space divided by gender. Meanwhile, the pattern of visits to the clinic was influenced by several factors, including pain threshold or concern for diseases that may be related to gender. A prevalence study in the elderly in France conducted by Paul et al.,[2] reported the average age of the elderly with xerosis was 75.9±6.9 years and 62.6% were women.

In this study, comorbid complaints in most subjects (82.9%) were itching to varying degrees. According to White-Cu et al.,[5] xerosis is a major cause of pruritus in the elderly.The median SSRC at baseline in the two groups was not significantly different (p = 1,000), which was 4 with a range of scores that were not too wide (3-7) (Table 4). Clinically, baseline skin dryness in the two subject legs was same. This is evident from the mean baseline SC values in the legs that received moisturizing cream containing 10% urea and in the legs that received lanolin 10% in petrolatum did not show any significant differences (Table 2). Baseline SC values in this study were lower than previous studies conducted in Jakarta by Rimawardhani[21] with baseline SC values before moisturizing was 44.62±11.03 AU. The difference in the measurement location can be one of the factors causing the difference, i.e. the measurement in the forearm while the study was carried out the measurement in the lower leg. Another study conducted by Kuzmina et al.,[19] also reported a mean SC value higher than the results of this study, which is in the range of 40-55 AU. The environment can be one of the factors causing these differences. Low humidity and temperature, as well as sun exposure or high ultraviolet light can make the skin more dry. In this study, the range of humility when measuring SC was 63.4%-66.9% and the temperature range was 25.6^{0}C-26.7^{0}C. Subject in this study more often exposed to UV exposure. The study of Kuzmin et al.,[19] carried out in Sweden had relative humidity and lower temperatures, i.e. 23.8% (10-29%) and 23.6^{0}C (22-24^{0}C). While research conducted by Rimawardhani[21] in Jakarta did not mention the average temperature and humidity at the time of measurement.

The results of this study indicate that administration of moisturizing creams containing 10% urea has been shown to increase SC values in subjects (Table 2). The results of this study were in accordance with Rimawardhani[21] study, which reported an increase in SC after administration of moisturizing cream containing 10% urea for three weeks, from the mean SC from baseline 44.62 AU to 52.21 AU after the second week and 58.80 AU after the third week. This study is also in line with the results of research conducted by Kuzmina et al.,[19] which showed an increase in SC after administration of a moisturizing cream containing 10% urea for 14 days. The mean SC in the study, in the range of 40-55 on day 0 increased to 50-63 AU after 14 days. This increase significantly occurred from the first week to the second after the administration of moisturizing cream ($p<0.05$). Scholermann et al.,[18] reported the same thing, which was a significant increase in SC after administration of moisturizing lotion containing 10% urea in the elderly for four weeks of therapy, from baseline 59.61 AU to 89.30 AU after four weeks. The study also compared the mean difference of SC 10% urea moisturizing lotion with vehicles that did not contain urea, and obtained significant differences between the two groups (7.41 AU; $p <0.0001$).

The results of this study also showed that the administration of moisturizing creams containing 10% urea was able to provide a higher percentage of SC difference compared to 10% lanolin in petrolatum, both in the second and fourth week after treatment.Research conducted by Rimawardhani[21] also reported a significant percentage increase in SC after used of urea cream by 10% from the beginning to the end of the study, which was 31.8%. The results of this study were greater, that is 64.54% which could be due to the duration of the administration of the moisturizing cream, which was longer at four weeks, whereas the previous study was only three weeks. In addition, the SC value at the baseline of this study was also lower compared to the SC value of the previous study. However, Rimawardhani[21] study did not use 10% lanolin in petrolatum as a comparison. Research conducted by Scholermann et al.,[18] and Kuzmina et al.,[19] did not report the percentage increase in SC values from baseline to the end of the study.

According to Kottner et al.,[14]moisturizer that contain humectants are able to provide significant improvements in the xerosis of the elderly.In accordance with the results of this study due to better skin hydration after the administration of a moisturizing cream containing 10% urea. Although 10% urea is the main moisturizing ingredient used as a test material, there are other ingredients, namely sodium pidolate, sodium lactate, and vegetable oils. Some of these mixtures also have an emollient effect so that the urea moisturizing cream can have a better effect on skin hydration compared to lanolin 10% in petrolatum.

The results of this study also showed that there were differences in SSRC scores between the two groups in the second week, but not in the fourth week (Table 4). This can be due to the fourth week SSRC median in both groups is 0 with a range of values that are too short. Research conducted by Scholermann et al.,[18] Kuzmina et al.,[19] and Rimawardhani[21] did not assess the parameter change in xerosis score. However, Rimawardhani[21] reported a clinical assessment of improvement in skin roughness after administration of urea cream 10%, that is 54.5% little/no improvement and 45.5% moderate improvement.

Provision of 10% urea cream and 10% lanolin in petrolatum, proved to be able to reduce the degree of itching suffered by subjects (Table 6). This was caused by the improvement of skin hydration that occurs due to treatment. However, the same assessment of itchy score may also be influenced by the cognitive ability of the elderly subject which decreases, making it difficult to distinguish itchy sensations in the two limbs. In addition, the VAS measurement tool used may not be able to assess in detail the subject itching complaints because it only uses a scale of 0 to 10.

The administration of 10% urea cream and 10% lanolin in petrolatum did not cause side effects for the subjects (Table 7). Research conducted by Kuzmina et al.,[19] also reported no side effects such as allergic reactions or irritation after administration of 10% urea cream. This is different from the Rimawardhani[21] study, in which 6 out of 22 (27.2%) subjects who received 10% urea cream experienced mild itching and erythema. The study of Scholerman et al.,[18] also reported side effects in the form of erythema, itching, and peeling of skin with 10% urea lotion. This results also differ from studies conducted by Jennings et al.,[23] who reported side effects such as itching, burning, erythema after the use of lanolin moisturizers to treat moderate to severe xerosis in subject aged over 45 years. This difference might be due to the application of the moisturizer which was done by subject. In elderly patients with decreased cognitive abilities, good supervision is needed in applying moisturizer. The application of moisturizers with the right dose, frequency and method influences the success of xerosis treatment. The absence of objective side effects in this study was thought to be due to correct application by trained staff before starting the study.

The SC value in elderly patients after using moisturizing creams containing urea was 10% higher than the using of lanolin 10% in petrolatum. Xerosis scores in elderly patients after using moisturizing creams containing 10% urea were not lower than lanolin 10% in petrolatum. There is no difference of side effects incidence in elderly patients after using a moisturizing cream containing 10% urea and 10% lanolin in petrolatum. The preference of elderly patients to choose of using moisturizing cream containing 10% urea was greater than 10% lanolin in petrolatum for the treatment of xerosis.

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