Descriptive Cross-Sectional Survey of Xerosis in General Middle-Aged and Elderly at Benchakiti Park hospital

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Abstract

This study aimed to identify the prevalence and occurrence environment related of xerosis in middle-aged and elderly Thai people. Methodology: A cross-sectional study was conducted at Benchakiti Park hospital, Thailand on 18 and 23 December 2019. Participants (n = 163) were included. Demographic data, skincare knowledge, lifestyle factors, environment predispose to skin dry were determined correlation with clinical skin dryness examination. Skin dryness was examined by the Overall Dry Skin (ODS) score and corneometer measurement. Results: The prevalence of skin dryness was 100%, the mean age ±SD was 65.09±6.98 years. The middle-age group; dry skin 67.3%, very dry skin 50.5%, whereas the elderly group dry skin 32.7%, very dry 50%. Stratum corneum hydration was significantly related to ODS scores by an expert's observation. Conclusion: The prevalence of xerosis in Thailand display critical number and find in pre-geriatric nowadays. This study recognizes age, lifestyle and environment play a role to predispose skin dryness.

Keywords: *Xerosis, Skin dryness, Prevalence, Middle-aged and elderly, A cross-sectional survey, Thai*

1. Introduction

Dryness of the skin known as xerosis appears with white color, fine-scale, irregular texture and tends to erythema and an elevated number of ridges. Xerosis may commonly appear in the elderly who age over 65 yrs. The pathogenesis of skin dryness in old age is the result of the loss of water capacity and hydration maintenance in the stratum corneum (SC) that is the outer layer of skin. An epidemiological study in primary and secondary care, xerosis is correlated with the elderly aged (Augustin et al, 2019; Lichterfeld, et al, 2016; Mekic et al, 2018; Paul et al, 2011) and the study showed over half 55.6-58 % of xerosis patients had aged 65 or older (Iqbal et al, 2017). In older, intrinsic aging process defects barrier function, decreases water content as well as lipid content in stratum corneum, decreasing the content of epidermal filaggrin effect of increasing xerosis. Extrinsic aging or photoaging causes skin dryness by increased compaction of stratum corneum, increased thickness of granular cell layer, reduced epidermal thickness, reduced epidermal mucin content (Burge et al, 2011). Also, multifactorial etiology factors include pollution, environmental, temperature, lifestyles, irritable products using, bathing, sex can predisposing to xerosis (Dunn et al, 1997), (Verdier et al, 2006). The present study determined the prevalence of xerosis in general middle-aged and elderly in Thai people, using a questionnaire-based method, clinical score examination and evaluation skin hydration.

2. Objectives

The objectives of the study to identify the prevalence of xerosis in general middle-aged and elderly in Thai people. Including determine concomitant disease, skincare knowledge, and skin-caring, personal history, irritable environment and sun exposure in xerosis in general middle-aged and elderly groups.

3. Materials and Methods

Participants were selected from Thai people age 45 or older defined between about 45 and 65 years for middle-aged and aged 65 or older defined for elderly, and who have Fitzpatrick skin Types III to V. People who have active skin disease at the site of the skin measurement were excluded from analyses. Participants voluntarily attended were recruited (n= 163) at Benchakiti Park Hospital by announcement through invitation poster to the coffee shop, restaurant, Benchakiti Park hospital office, board in front of Dermatology

Benchakiti Park outpatient department for general people interesting enroll. Directly notice and ask at the personal office, singing club of retirement employee at Thailand tobacco monopoly, market beside Benchakiti Park hospital include an announcement in social media line chat. We inform participants about our objective, the benefit, and risk of survey, methods, and ask participants for consent. Collected data in the separated day on 2019, December 18Th and 2019, December 23Th. Research design: Cross-sectional observational study. Approval by the Institutional Review Board of Thammasat University. The questionnaire about demographic data (age, gender, socio-occupational category before retirement), concomitant diseases (Eczema, Seborrheic dermatitis, Diabetes mellitus, renal failure, and others); Eczema were defined as erythematous, scaly, lichenified, excoriated, and fissured patches; Seborrheic dermatitis was defined as erythema with greasy scaling on the typical locations of the scalp, face, or chest, personal living including smoking, drinking water, bathing habits, soaps or detergents using, moisturizer using, perfumes detergents using, climatic conditions and treatments potentially related to xerosis including retinoids, lipid-lowering drugs, air room temperature during the day, itching after sweating and others were collected by using google form.

According to the guidelines of the European Group on Efficacy Measurement of Cosmetics and Other Topical Products, the Overall Dry Skin (ODS) scores (Serup et al, 1995) were used to define clinical severity of xerosis. Defining grading score of ODS ; 0 describe absent dry skin, 1 describe faint scaling, faint roughness, and dull appearance, 2 describe small scales in combination with a few larger scales, slight roughness, and whitish appearance, 3 describe small and larger scales uniformly distributed, definite roughness, possibly slight redness, and possibly a few superficial cracks describe, 4 describe dominated by large scales, advanced roughness, redness present, eczematous changes, and cracks. Corneometer CM825 manufactured by Courage-Khazaka was used to measures the SC hydration base on the change in dielectric constant in the skin surface. Before the measurement, participants were informed to avoid any topical cream and bathing in the measurement area. Stratum corneum (SC) hydration measurement was done at the lower legs at the left shin site area according to EECMO recommendation, an acclimatization at least 15-30 min, T 20–22°C and RH 40–60%. Following (Heinrich et al, 2003) study interpreting corneometer results in lower extremities region as; < 35 very dry, 35- 50 dry, >50 sufficiently moisture. Statistical Testing: Means±standard deviation and frequency used for descriptive analysis. Pearson correlation coefficient finds correlation with clinical score and SC hydration.

4. Results and Discussion

In Table1 showing demographics data, all 163 participants affect dry skin. The prevalence of any degree of xerosis was 100%, the mean age was 65.09 years ± 6.98; 18.40% were male, 81.6% were female. Clinical feature of xerosis as shown in Figure1. Corneometer as a good tool defines skin moisture status. Pearson correlation found an association between corneometer value and ODS score (rho= -0.586, p-value < 0.001) in the opposite direction, high skin hydration is associated with low ODS score. Table2 showed the frequency of stratum corneum hydration in this population; 69.9% showed very dry; 30.1% showed dry skin. Frequency of individual age group according to severity skin dryness (Table3), in "dry skin" group found participants who age 45-65 years 67.3 %, participants who age over 65 years 32.7%, whereas in "very dry skin" group, we found participants who age 45-65 years 50% equally with participants who age >65 years. It could be defined that the middle age group (45-65 yrs) had a dry skin problem more, whereas the elderly group (>65 yrs) had very dry skin problems more compare between an individual group. Mean age in dry skin groups; 62.57±7.37, mean age in very dry skin groups; 66.17±6.54.

For descriptive concomitant disease (Table4), we found hypertension was the highest frequent disease (28.8%) while the common other diseases found lower, e.g. diabetes (10.4%), dyslipidemia (6.1%), cardiovascular disease (3.1%). However, it inconclusive that hypertension association with risk of xerosis. The second disease of frequent disease was allergic skin or eczema (19%). Another history of asthma, allergic rhinitis, allergic conjunctivitis was 0.6 percent,18.4 percent, and 9.8 percent consequently. All participants in our participant found seborrheic dermatitis (9.8%), psoriasis (2.5%), cancer (2.5%), hyperthyroidism (3.1%) and hypothyroidism (1.8%). Questions about skincare knowledge (Table 5) showed 49.7% of participants ranging from middle-age to older-age groups believed that the bar soap is suitable for healthy skin than liquid

soap, 30.7% count on liquid soap, only 8 % thought that the pH5 wash soap is suitable for healthy skin. Of the rest, 11.7% indicated no specific soap. For a question about bathing frequency, 73% realized showering frequency contributes to dry skin. For question about environment susceptibility to skin dryness, 81% showed they knew a harsh brush/exfoliative scrub cleaning skin could affect skin dryness. A small number of xerosis participants, 19% showed they should use a brush/ exfoliative scrub to clean their skin while bathing. Knowledge about using moisturize after baths and showers for skin health and hydration, almost half 41.1% of middle-age to older-age group participants, they couldn't answer correctly. Personal history (Table 6) 24.5% of participants had a history of drug allergy, 4.3% had a history of alcohol drinking, 1.9% had a history of smoking. More than half, 52.1% showed caffeine intake, 36.2% had a history of statin drug intake and/or isotretinoin drug intake. There were 87.7% of participants no using any topical treatment for skin dryness before whereas 12.3% using it. Menopause found 68.1% of our participants. Personal or family history of allergies(Table7); skin dryness is strongly associated with pruritus may be an increase in expression nerve elongation factor in dry skin (Lichterfeld et al, 2016; Browning, 2018). However, 32.5% have experienced chronic itching in their skin, and it appeared in skin rash during childhood or adolescence 23.3%. A percentage of family history atopy were related by 17.8% and were unrelated by 82.2%. Oil supplement (Table 8), our subjects who are middle-aged to elderly aged and have skin dryness taking oil supplement; according to the most popular to lower popular; Fish oil 15.3%, Rice bran oil 8.6%, Coconut oil 6.1%, Sunflower oils 2.5%, Safflower seed oil 1.8%, Evening Primrose oil 1.8%. The environmental risk factors that contribute to skin dryness were investigated by the questionnaire in Table 9. The proportions of people subjected to bathing using bar soaps and liquid soap in the household were average 3:2, 60.1% and 45.4% respectively. It is reported that 1.2% of them used septic solution showering and 14.1% used brush or exfoliative scrub for skin cleansing. 84.1% of them took a shower more than one time/day, mostly normally two times/day (80.4%). Minimal number, 3.7% took a bath more than two times. Long soaks or hot bathing can affect skin sebum production still 30.7% of our participants showed showering for a long time; 1-5 minutes (25.8 %), 5-10 minutes (39.9%), 10-15 minutes (22.7%), >15 minutes (11.7%). No soaking bathtub history was found at 98%. Hot/warm bathing was found at 44.2%. The use of talcum powder for hygiene appears to increase in the middle age to the elderly; the study found 73.6% used it. Participants who using fragrance cream found 9%. It discovered that 60.1% using moisturizer on a daily. Air conditioners to provide efficient cooling during Thai weather; however, it may affect the dry skin of ambient air; 33.1% of our participants live or work in air-conditioned rooms during the day, while 66.9% of them do not live/work in air-conditioned rooms, both of which still have skin dryness. Itching when sweating was observed; 26.4% feel itchy symptoms when sweating. Drinking water per day; drink < 8 glasses per day (63.2%), drink ≥ 8 glasses per day (36.8%). Ultraviolet radiation exposes to the skin (Table10) finding 33.1% of participants had outdoor activities/the daily hobby, which supposed related to low SC hydration. We asked all participants about UV radiation exposure during the day; 22.1% of participants did not wear covered-up clothing while on an outing.

Table 1 Demographic characteristics (N = 163)

Variable	N (%)
Sex	
male	30 (18.40)
Female	133 (81.60)
Age (mean±sd)	65.09±6.98
BMI (mean±sd)	22.89±3.27
National	
Thai	132 (80.98)
Thai-Chinese	29 (17.79)
Thai-American	2 (1.23)
Occupational before retirement	
Government employee	21 (12.83)
Housekeeper/butler	93 (57.06)
Outdoor staler	4 (2.45)
Factory worker	2 (1.23)
Office clerk(Outdoor)	7 (4.29)
Office clerk(Indoor)	24 (14.72)
Others	12 (7.36)

Table 2 Frequency of stratum corneum hydration

Corneometer value	N (%)
>50	0 (0)
>= 35-50	49 (30.1)
< 35	114 (69.9)
Total	163 (100)

Table 3 Frequency of individual age group according to severity skin dryness

Age(yr) / Severity	45-65	>65
Dry(N%)	33 (67.3)	16 (32.7)
Very Dry(N%)	57 (50)	57 (50)

Table 4 Concomitant disease that found in middle-aged and elderly in general for xerosis

	N (%)
Diabetes	17 (10.4)
Hypertension	47 (28.8)
Dyslipidemia	10 (6.1)
Cardiovascular diseases	5 (3.1)
Asthma	1 (0.6)
Allergic rhinitis	30 (18.4)
Allergic conjunctivitis	16 (9.8)

	N (%)
Dermatitis	31 (19)
Renal disease	3 (1.8)
Seborrheic dermatitis	16 (9.8)
Psoriasis	4 (2.5)
Cancer	4 (2.5)
Hyperthyroidism	5 (3.1)
Hypothyroidism	3 (1.8)
Others	30 (18.4)

Table 5 Questions about skincare knowledge

	N (%)
The type of shower product that they think suitable for healthy skin.	
Liquid soap	50 (30.7)
pH5 wash soap	13 (8.0)
Bar soap	81 (49.7)
No specific	19 (11.7)
Thinking that showering more than 2 times a day increase moisture to the skin and reduce skin itching.	44 (27)
Thinking that should use a brush/exfoliative scrub to clean skin while bathing.	31 (19)

Table 6 Personal history

	N (%)
Drug allergy	40 (24.5)
Alcohol drinking	7 (4.3)
Smoking	3 (1.9)
Caffeine intake	85 (52.1)
Statin and/or isotretinoin intake	59 (36.2)
Using topical treatment for skin dryness before	20 (12.3)
Menopause	111 (68.1)

Table 7 Personal or family history of allergies

	N (%)
Have an experienced chronic itching in their skin	53 (32.5)
Have a problem dry skin, redness rash, skin itching since childhood or adolescence	38 (23.3)
Have a personal history or family history of atopy	29 (17.8)

Table 8 Information for taking oil supplement

	N (%)
Fish oil	25 (15.3)
Sunflower oil	4 (2.5)
Safflower seed oil	3 (1.8)
Evening Primrose oil	3 (1.8)
Rice bran oil	14 (8.6)
Coconut oil	10 (6.1)

Table 9 Questions about participant's daily life predisposing skin dryness

	N (%)
Bar soap bathing	98 (60.1)
Liquid soap bathing	74 (45.4)
Septic solution soap bathing	2 (1.2)
Brush/exfoliative scrub using	23 (14.1)
Take a shower > 1 time/day	137 (84)
Number of showers	
1 time/day	26 (16)
2 times/day	131 (80.4)
3 times/day	5 (3.1)
>3 times/day	1 (0.6)
Take shower for a long time	50 (30.7)
Timing of shower	
1-5 min	42 (25.8)
5-10 min	65 (39.9)
10-15 min	37 (22.7)
>15 min	19 (11.7)
Soaking bathtub	2 (1.2)
Hot/warm bathing	72 (44.2)
Talc/ powder using	120 (73.6)
Fragrance cream	34 (20.9)
Moisturizer using	98 (60.1)
Air-conditioner environment during the day	54 (33.1)
Itching when sweating	43 (26.4)
Drinking water (per day)	
< 8 glasses	103 (63.2)
≤ 8 glasses	60 (36.8)

Table 10 Information related to sun exposure

	N (%)
Outdoor activities or sun-exposed during the day	54 (33.1)
Wearing covered outfits, trousers / long skirts while outing	124 (78.0)
Outdoor activities or sun-exposed during the day	54 (33.1%)

Table 11 Summarized data the previous prevalence study

Authors	study	Prevalence	Mean age
Smith et al, 2002	Descriptive study, between 1999-2000	N= 75, 13.3% have xerosis	45 years, 89% were female
Paul et al, 2011	Cross-sectional study, database from 81 General practitioners, July-Dec, 2018	N=756, 55.6% have xerosis	75.1 years ± 6.9, 57% were female
Lichterfeld et al, 2016	Cross-sectional study, 2014	N=1710, 48.8% (835 subjects) have xerosis	81.6 years ± 12.3 in the nursing residents and 69.1 years ± 17.1 years in the hospitals
Mekic et al, 2018	Large cohort study, between 2010-2016	N= 5547, 60% have xerosis	70 years, 57% were female

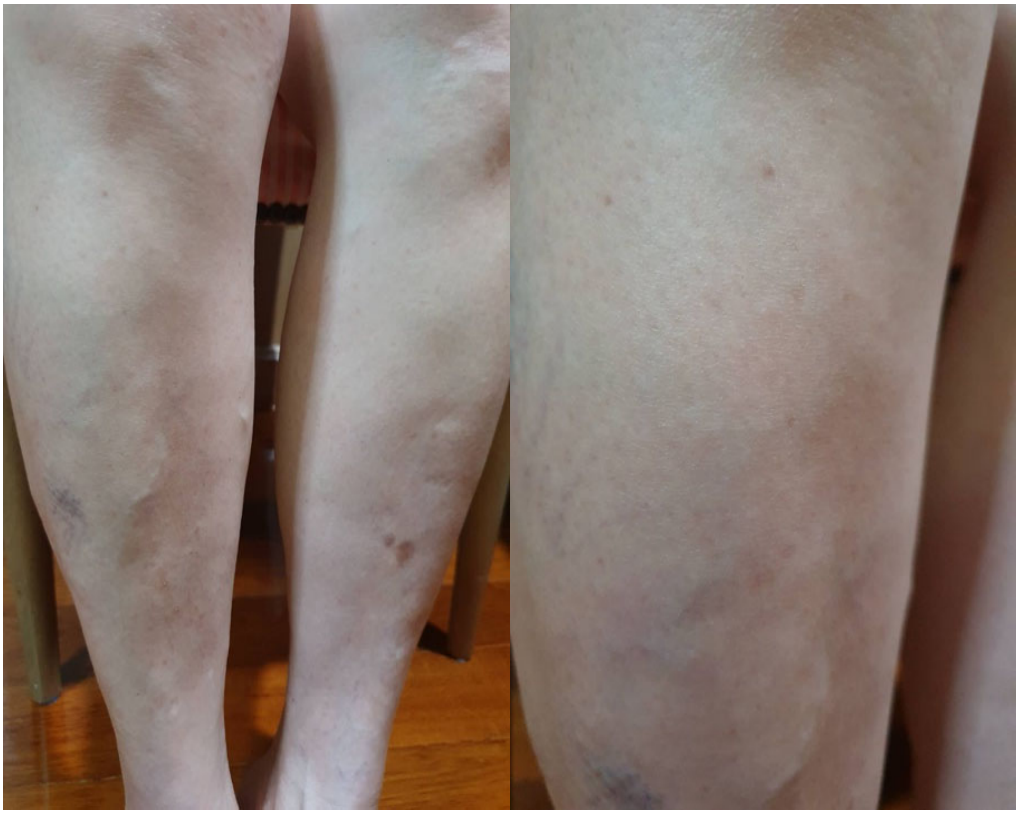

Figure 1 Clinical feature of mild xerosis showing faint scaling and faint roughness

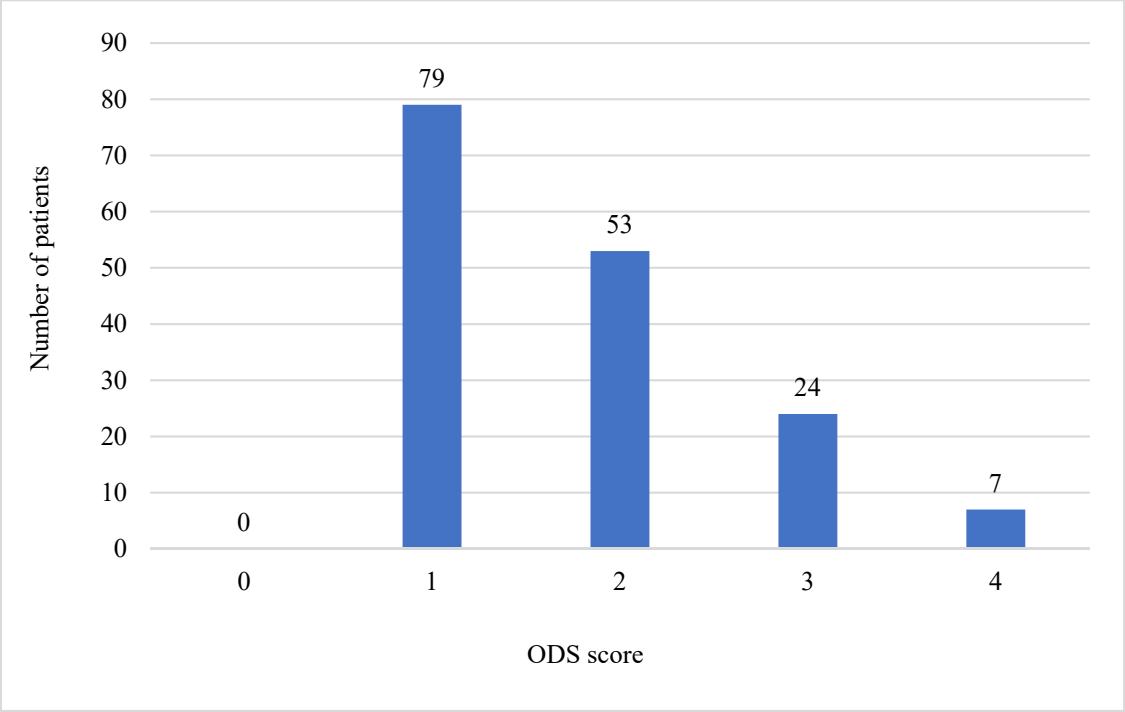

Figure 2 Bar graph of clinical assessment of xerosis according to ODS score

Discussion

xerosis is a common health problem in aging especially in the elderly. Summarized data the previous prevalence study show in Table11. The western prevalence study of xerosis cutis in the elderly at nursing homes or primary care reported 29.5% to 58.3% (Lichterfeld, et al, 2016; Mekic et al, 2018; Paul et al, 2011; Augustin et al, 2019). Some studies in Berlin, Germany (Hahnel et al, 2017) discovered xerosis was the most frequent dermatological diagnosis (99.1%) in aged nursing home residents. In Asian, there are minimal reports about the prevalence of xerosis. Southern Taiwan study (Smith et al, 2002) revealed that 13% in seventy-five nursing home staff having xerosis, 81% of xerosis was the mild grade. They supposed in the aging process, depleting in natural moisture factors and may be the occupational irritant contact involvement. Our data reported the high prevalence of xerosis among the participants who middle to elderly aged, all the participants 163 affect dry skin in mild severity (ODS score1-2). The older aged have severity skin dryness more than younger age (middle-aged frequently found dry skin, the elderly frequently found very dry skin) that physiology of skin aging can answer it. And our form data also presented a high number of menopause persons. It might reflect that most participants were female over age more than 50 years which the menopause age common finding in 40-60 yrs.

Lichterfeld, et al, 2016 study reported the proportions in concomitant disease with 10% dementia, 60% cardiovascular diseases and 23% diabetes mellitus. Nevertheless, our study reported those diseases finding less proportion (Table4). Because this study also investigates in the middle age range and mean age less than Lichterfeld, et al. study. We assume that the elderly aged over 70 years have the common disorder to find dementia, cardiovascular disease and diabetes but in our study the age in late fifty have commonly found concomitant disease proportion in 28.8% hypertension, 19% eczema, 18.4% allergic rhinitis, 10.4% diabetes. Our data showed a high prevalence of hypertension; however, no correlation was identified in xerosis. Interesting finding a personal or family history of allergies, our participants presented having personal history about chronic itching 32.5%, having dry skin or rash since childhood or adolescent 23.3%, having family history atopy18.8%, only 19% having dermatitis and eczema thus we summarized that their dry skin developed since the early age before aging. The irritant and allergic from the external environment

may be sensitizing it. Allergy and irritant conditions could be found increasing TEWL (Blichmann & Serup, 1987) and develop to xerosis condition. We can not diagnosis senile atopic dermatitis (AD) (Tanei, 2009) because of the lack of IgE lab investigation and lower prevalence of AD in the elderly than in children.

The higher prevalence in the Thai population might be the personality habit in daily life that susceptibility in skin hydration including skincare knowledge. In the personality habit in daily, data found talcum using (73.6%) having greater finding than the moisturizer using (60.1%). It is possible in the effect of hot weather in Thai country, so most of the cases preferred the dry or cool agents than the thick agents. Talcum gives the feeling of light and comfortable feeling than the condense moisturizer however it is recommended to avoid preventing dry skin in expert opinion (White-Chu & Reddy, 2011). In skincare knowledge, our data result showed a greater number of our participants misunderstand thinking that bar soap to be a good choice for their skin and 60.1% of participants were still bathing with the bar soap. As a result of bar soap is an irritant product from harsh and rubbering include more alkaline than other soap (Proksch et al, 2008) so our data discovered the high number of xerosis conditions. Moreover, our study found 14.1% of participants also use brush/exfoliative scrub using, 44.2% hot/warm bathing although most expert opinions guided recommendations management of xerosis and pruritus by bathing not hot water, avoiding harsh soap (White-Chu & Reddy, 2011). It realizes the health promotion of skincare in our country should encourage since the early aged continue to older aged.

In conclusion, Thai has a high prevalence of xerosis in middle-aged and elderly. It is more likely to appear in middle-aged people. Advance aging and several personal lifestyle factors, as well as the environment, predispose resulting in the high number of xerosis in general Thai people. Dehydration skin cause of pathophysiologic change in the aging process; failure of water retention; decreasing in ceremide 1, 3 level and lipid content (Farage et al, 2017, Akimoto et al, 1993); depleting the "natural moisturizing factor" (NMF) (Hashizume et al, 2004) and aquaporin-3 (AQP3) membrane (Li et al, 2010) include impairment normal desquamation. Finding the use of irritation products such as bar soap, exfoliative scrub, the drying agent which susceptibility to defect in barrier function most found in Thai middle-aged and elderly. Understanding the prevalence of xerosis situation in Thai will awareness health care persons and general people attention to their skin healthy.

Limitations in our preliminary study, the small sample size of n=163 was not adequate for multiple factors when compared with the other forensic observational study. And lack of investigation lab workup for concomitant disease because of limitation in timing in one visit. The article only recognized skin health problems about the number of xerosis in the pre-geriatric and geriatric community. Identify the environment or situation that finding in general middle-aged and elderly whom in xerosis conditions, however further study, try access the association factors relate with xerosis or xerosis intensity to avoid those factors should be done.

5. Conclusion

The high prevalence of xerosis affects100% in middle-aged and elderly Thai population and find in pre-geriatric nowadays. Stratum corneum hydration represented skin dryness and showed an association with a clinical score assessment. This study recognizes age, lifestyle and environment should be observed to progress xerosis conditions. For the future, A larger sample size should be collected, finding association factors and new management guidelines should be further study to be prevention and treatment.

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