

DRY SKIN: SPECIFIC FEATURES IN CHINESE WOMEN

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Summary

Dry skin, a very common complaint in China, has not been extensively investigated in Asia. Thus we conducted a multicentric study, involving 1800 Chinese women from 5 cities with a view to determine the prevalence and specific factors related to dry skin.

Skin type self-assessment, environmental factors and cosmetic use were recorded using a questionnaire. In addition a clinical evaluation and measurement of skin capacitance and sebaceous follicles activity were performed by trained dermatologists. The skin typology as defined by a multiple correspondence analysis of the self-assessed skin type resulted in a prevalence of dry skin of 30.8%. Women with self-assessed dry skin were clinically characterized by presence of skin scales on forehead, cheeks and lips and by a lower sebum excretion level (Sebumeter®) but no lower hydration level (Corneometer®). Self-assessed dry skin was found to be associated with: non-seborrheic skin, facial tightness discomfort and dry lips. Two factors appear to be linked with the pathogenesis of dry skin condition: (i) climate, as demonstrated by a higher prevalence of dry skin in Harbin, a northern Chinese city; (ii) use of water or soap only as face cleansing product.

Riassunto

La cute secca, che rappresenta un problema comune in Cina, non è stata ancora esaustivamente analizzata in Asia.

A tal proposito, abbiamo condotto uno studio multicentrico su 1800 donne cinesi provenienti da 5 città con l'intento di determinare la prevalenza dei fattori specifici collegati alla cute secca.

Sono stati riportati in un questionario alcuni dati quali: l'autovalutazione di cute secca, i fattori ambientali e le abitudini cosmetiche dei soggetti. In più esperti dermatologi hanno condotto una valutazione con relativa misurazione clinica della capacitanza e dell'attività sebacea dei follicoli dei soggetti in studio.

La tipologia cutanea, definita attraverso un'analisi di corrispondenza multipla con l'autovalutazione del proprio biotipo, ha messo in evidenza una prevalenza di cute secca del 30.8%. Le donne che hanno definito la propria cute secca, clinicamente mostravano la presenza di squame sulla fronte, guance e labbra ed un minore livello di secrezione sebacea (Sebumeter r) ma non presentavano alcun livello inferiore di idratazione (Corneometer r).

E' stato riscontrato inoltre che la cute autodefinita secca viene associata con: cute non seborroica, spiacevole senso di stiramento facciale e labbra secche.

2 sono i fattori che sembrano essere legati alla patogenesi relativa alla condizione di cute secca: (i) il clima, come dimostrato dell'alta prevalenza di cute secca ad Harbin, una città della Cina del nord; (ii) l'uso di acqua o sapone come unici prodotti per la pulizia del viso.

INTRODUCTION

Dry skin is a major problem which dermatologists and cosmeticians are often faced with. It is frequently a sign of epidermal dysfunction, especially involving the stratum corneum (1). Dry skin is sensitive to a variety of exogenous influences, such as climate, detergents and air conditioning (2-3). It is mainly clinically characterized by scaling, tightness, and redness. In Western countries it is a very common complaint that has been extensively investigated (4-6). However, few relevant data are available on this condition in China. We therefore undertook a multicentric clinical study to determine the prevalence of dry skin in China at different latitudes. Moreover, the statistical typology was based on the self-assessment of skin type in order to take into account the specificities linked to the different regions of the country. This self-assessed dry skin was statistically characterized by looking at the parameters (clinical, instrumental, environmental,) which are discriminating in this group (women with dry skin) as compared to the whole studied population.

MATERIALS AND METHODS

Population sample

After approval by local ethical committees, 1800 healthy women (Northern cities: Harbin n=360, Shenyang n=360, Beijing n=360; Southern cities: Chengdu n=360, Suzhou n=360) were involved in the study after signing an informed consent. They were distributed in five age-balanced sub-groups in each center (18-25 yr., 26-35 yr., 36-45 yr., 46-55 yr., 56-65 yr.; mean age=40±13 yr.).

Evaluation criteria

Each volunteer underwent 3-step procedure: cli-

nical interview, clinical skin assessment and non-invasive measurements. In order to limit investigator related bias as much as possible, we chose and trained only one investigator in each center. Furthermore, all the centers carried out the study simultaneously from November to December, 2001. On the morning of examination, all the volunteers were recommended to wash their face with water only and not to use any cosmetic.

The clinical interview was composed of 4 main parts: 1) Self-assessment of global skin type, dry or greasy skin intensity (with a three point-scale) on forehead and cheek, and frequency of lip scaliness. 2) Cosmetic habits for face cleansing and skin care. 3) Skin sensitivity to the sun (sunburn frequency and sun exposure habits), skin reactivity to different environmental factors and the related symptoms. 4) History of atopy (family and personal atopy).

Clinical skin examination assessed skin dryness as roughness and degree of scaling on the forehead and cheeks; and scaling intensity and chapping intensity on the lips. Skin greasiness was assessed based on the shiny intensity appearance and seborrheic condition was estimated by touch on forehead, nose and cheek and also by the presence of open skin pores on these areas. All the clinical evaluations were performed using a four-point scale (none, mild, moderate or severe).

Corneometer® (CM825 Corneometer®, Courage & Khazaka, Electronic GmbH, Cologne, Germany) measurement was performed on the cheekbone. It measures changes of the capacitance with increasing or decreasing hydration level of the skin (7-8). The results are also related to skin roughness as the capacitance value depends on tight contact between the probe and the skin surface. Ten measurements were recorded and averaged for each volunteer. Sebum excretion rate was measured with a Sebumeter® (SM810 Sebumeter®, Courage & Khazaka,

Electronic GmbH, Cologne, Germany) on the forehead. In this photometric method, the transmitted light is related to the sebum content on the measured surface.

Statistical analysis

A multiple correspondence analysis (MCA) was performed on self-assessed skin type parameters on the different facial sites (i.e. active variable) to identify skin types and define a skin typology. A hierarchical clusters analysis (HCA) was carried out on the factorial components determined by the MCA. The cluster characterisation was carried out on the Value-Test (V-test). Variables with V-tests of more than 2.0 are judged statistically significant at the 5% level (non-adjusted) and are potentially discriminatory between items of the variable to be characterised. Statistical analysis was carried out using SPAD (version 4.00; CISIA, Montreuil, France). In order to identify some links between the facial cleansing habits (i.e. active variables = water, soap, or milk/lotion) according to the other variables (i.e. skin types and Corneometer® and Sebumeter®), the same method was applied.

RESULTS

Multiple correspondence analysis led to identify 4 skin types: women with self-assessed dry skin represented 30.8% of the total population involved in the study and were characterized by self-assessed dry skin on the cheeks and forehead. Women with self-assessed greasy skin represented 25.6% of the population, women with self-assessed combination skin represented 27.4%, while women with neither dry nor greasy skin amount to 16.2 %.

When compared to overall population sample (mean age: 39.9 yr.), women with self-assessed dry skin (mean age: 44yr.) were relatively older

($p < 0.001$), with a greater number of them used to spend more than 4 hours a day outdoors (5.6% in women with dry skin vs 3.9% in the whole population, $p = 0.01$). They were more numerous in Harbin (Fig. 1a) (23.5% of the women with dry skin live in Harbin and 19.9% of the whole population live in Harbin, $p = 0.002$). These women are more frequently menopausal women (28.9% of women with dry skin are menopausal versus 22.9% in the whole population, $p < 0.001$) but this is probably linked to the age.

Thirty percent of women in this group experienced tightness and discomfort on their skin versus 20% in the whole population ($p < 0.001$). They were also more numerous to be affected with dry lips (43.7% vs 33.9% in the overall population sample, $p < 0.001$).

Clinical parameters, as assessed by the investigator, showed that self-assessed dry skin women more frequently exhibited some scales on the forehead (Fig 1b) (20.4% vs 14.4%, $p < 0.001$), on the cheeks (23.5% vs 18.1%, $p < 0.001$), and on the lips (45% vs 39.6%, $p < 0.001$) as compared to the whole population. They also had a lower level incidence of seborrhoeic skin (69% vs 39.4%, $p < 0.001$), and for a larger part no open skin pores when compared to the overall population sample (77.1% vs 64.6%, $p < 0.001$). Non-invasive instrumental methods did not evidence statistically significant differences in the skin capacitance mean values between women with dry skin and the whole population (Fig. 1c), whereas the women with dry skin had a significantly lower sebum excretion ($p < 0.001$) (Fig. 1d).

Regarding the cosmetic uses are concerned, the analysis evidenced that a greater number of women in the dry skin group used water or soap to wash their face (49.3 % of women with dry skin vs 39.4% for the whole population, $p < 0.001$) and a greater number did not wear

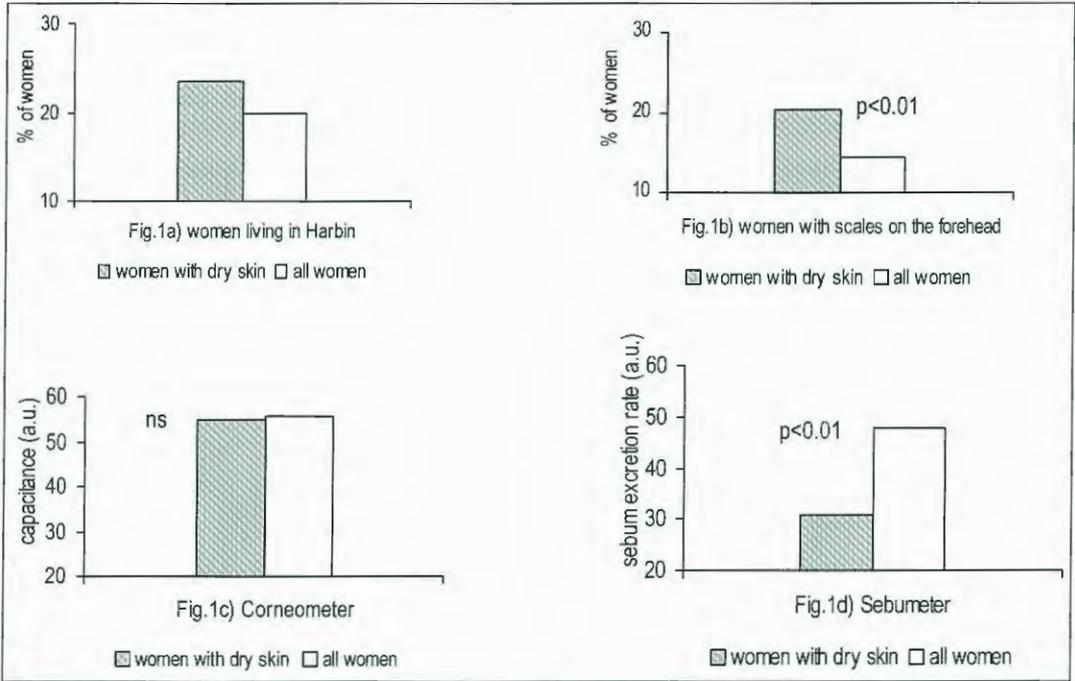


Fig. 1 Characterization of skin type (dry skin) according to other variables 1a) more women with dry skin live in Harbin; 1b) women with dry skin have more scales on the forehead; 1c) Corneometer® and 1d) Sebumeter® mean values for women with dry skin and for the overall study population..

make up frequently (78.6 % of women with dry skin vs 75.3% of the overall population studied, $p < 0.05$).

However the prevalence of women using water or soap only to wash their face was shown to be age-related: a larger number of women using water rather than soap or milk/lotion were found in the 46-55 yr. sub-group (Table I). Thus the link between facial cleansing habits and dry skin condition could be biased by age factor, as the mean age is older in women with dry skin than in the whole population.

Specific analysis was therefore carried out on facial cleansing habits. Multiple correspondence analysis focussed on women who used water only as daily facial cleansing routine showed that they were found for a larger part in the

group of women with self-assessed dry skin and low seborrhoeic skin.

Although Corneometer® measurements did not show any significant difference in the group of women with dry skin, lower skin capacitance values were obtained in the group of women who used water only as their daily cleansing routine when compared to the aggregate population (Fig. 2). In contrast, women who used milk or lotion to cleanse their face had significantly higher skin conductance values than the overall population sample (59.9 versus 56.2, $p < 0.001$) (Fig. 2)

Table I

Facial cleansing habits in different groups of age. Percent of women within the age group is written in italic, percent of women within face cleansing habits group is written in bold character.

n= women number % row % column	Only water	Soap	Milk or lotion	All
18-25 yr.	n= 62 18.8% <i>8.8%</i>	n= 43 13.1% <i>11.4%</i>	n= 224 68.1% <i>31.5%</i>	n= 329 100.0% <i>18.3%</i>
26-35 yr.	n= 117 30.9% <i>16.5%</i>	n= 73 19.3% <i>19.4%</i>	n= 189 49.9% <i>26.6%</i>	n= 379 100.0% <i>21.1%</i>
36-45 yr.	n= 176 45.8% <i>24.9%</i>	n= 76 19.8% <i>20.2%</i>	n= 132 34.4% <i>18.6%</i>	n= 384 100.0% <i>21.4%</i>
46-55 yr.	n= 210 49.2% <i>29.7%</i>	n= 105 24.6% <i>27.9%</i>	n= 112 26.2% <i>15.8%</i>	n= 427 100.0% <i>23.8%</i>
56-65 yr.	n= 143 52.0% <i>20.2%</i>	n= 79 28.7% <i>21.0%</i>	n= 53 19.3% <i>7.5%</i>	n= 275 100.0% <i>15.3%</i>
All	n= 708 39.5% <i>100.0%</i>	n= 376 21.0% <i>100.0%</i>	n= 710 39.6% <i>100.0%</i>	n= 1794 100.0% <i>100.0%</i>

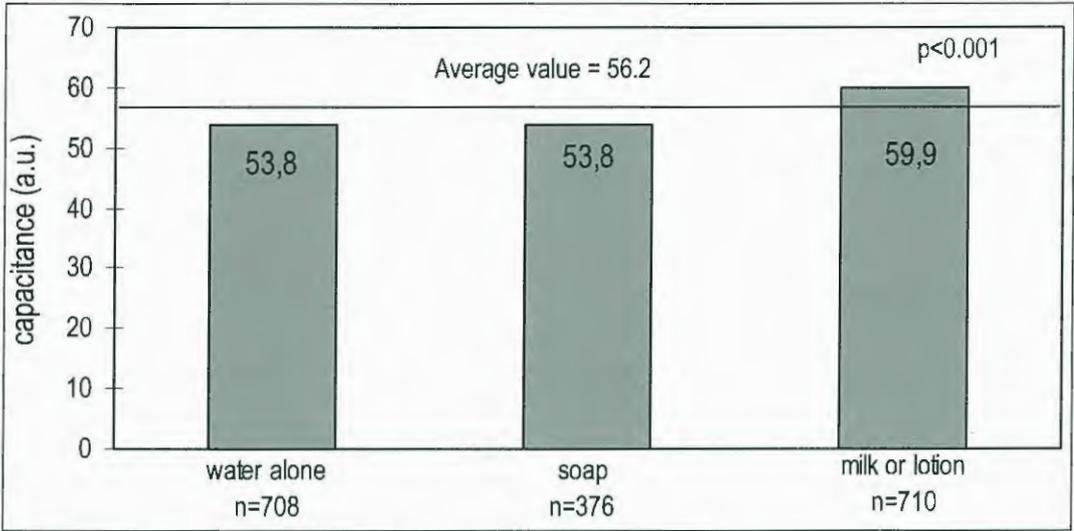


Fig. 3 Corneometer® values according to facial cleansing use.

DISCUSSION

To date there is no standardised objective methods available for classifying facial skin type (9-10). In this study a statistical method was used to establish a classification based on self assessed parameters. According to the typology obtained from these parameters, women with self-assessed dry skin represented 30.8% of the population involved in the study.

On clinical examination, women with self-assessed dry skin showed significant differences in skin scaling on the forehead, cheeks and lips. They had non seborrhoeic skin and more frequently experienced facial tightness and discomfort. They also reported dry lips with more scales and more chapping. This indicates that the presence of scales is an important clinical sign in the diagnosis of dry skin. Moreover there is a good agreement of self-assessment of this parameter with clinical examination of dry skin. Sebumeter® values in women with dry skin were

significantly lower than those observed for the overall population sample. This result was in accordance with both the self-assessment and the clinical exam of greasy aspect of the skin. However Corneometer® values did not confirm the clinical examination as no statistical differences were evidenced between the group of women with dry skin and the aggregate population. Corneometer® values tended to decrease with age but not significantly, as it had been frequently published, even recently (11). It would mean that Corneometer® measurement alone is not sufficient to assess dry skin typology.

Climatic factors also contributed to this condition (12-14). The prevalence of dry skin was higher in Harbin, where there was a Siberian like weather. Furthermore in this study, women who spent more time outdoors were most likely to have dry skin.

The use of water or soap for facial cleansing also increased the prevalence of skin dryness. In this study more than 50% of women who used water

or soap only to wash their face had dry skin and a significantly lower skin capacitance than women who used cosmetic cleansing products. In cleansing milks and lotions, there are moisturizing ingredients, which improve skin mildness and help maintain proper hydration level of the stratum corneum.

CONCLUSION

In conclusion, self-assessment of dry skin in Chinese women was well correlated to clinical assessments but poorly concurred with instrumental measurement of skin capacitance. It was shown that the overall prevalence of dry skin was around 31% in China, which represented a mean value encompassing different latitudes involved in the multicentric study. The presence of scales was an important clinical sign for dry skin, which was also associated with facial tightness discomfort and dry lips. Specific features related to dry skin in China were similar to what was known in Western countries. However two factors increased dry skin prevalence: siberian-like climate and face cleansing habits.

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