

Clinical effect and Cost-effectiveness of alternative facial treatment using soft-prepared chalk

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Abstract

This one group quasi-experimental research aimed to evaluate clinical effect and cost-effectiveness of “soft-prepared chalk”, known as Din Sor Pong Satu in Thailand, for facial treatment. The intervention was facial exfoliation using the soft-prepared chalk provided by the researcher. These provided soft-prepared chalks had been tested that they were clinically safe by the Regional Medical Science Centre - Khon Kaen. The volunteers were asked to exfoliate their faces after cleaning step in the evening every day. The intervention lasted one month. The facial conditions in term of oiliness, smoothness, hair follicle size, skin tone and acne condition were assessed and compared between before and after the intervention. The data were analyzed by paired t-test. For more understanding and cost analysis, in-depth interviews and focus group discussions were adopted by the researcher. The collected qualitative data were analyzed by content analysis technique.

The result showed significant improvement of facial condition in term of oiliness, smoothness, hair follicle size, skin tone and acne condition, with 99% confident interval. In term of cost-effectiveness, facial treatment by using the soft-prepared chalk everyday for a week was as effective as facial treatment program from skin clinic once a week, but the cost of soft-prepared chalk was 37 times less than the skin clinic program. Furthermore, the soft-prepared chalk did not cause redness, rash, burn, and photo-sensitivity, but the skin clinic treatment.

In conclusion, the soft-prepared chalk effectively and efficiently improved facial skin condition amongst adolescents with oily and acne prone skin at low cost. Since efficiency of the soft-prepared chalk had been proved, this Thai traditional wisdom, using soft-prepared chalk for facial

treatment, should be promoted immediately. The possible strategy would be health education and trend creation through advertising media. The aforementioned strategy should be implemented in parallel with the product development and value added strategy.

Keywords: Facial treatment, lime stone, soft chalk, alternative health promotion, cost-effective

1. Introduction

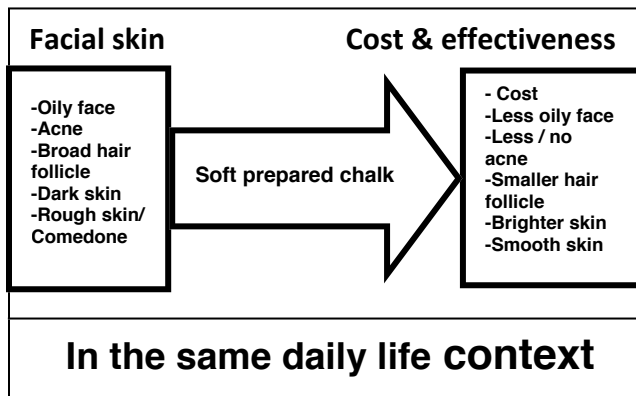
The utilization of soft chalk for skin beauty has been told generation to generation. Its indication included anti-rash, acne treatment, and face exfoliation [1]. Yet it was not popular as it should be. This was because three main reasons. Firstly, there were reports about bacterial contamination which might cause allergy and diseases [2, 3]. Secondly, products of soft chalk have been produced with traditional technology, so they were not attractive among consumers. Lastly, there was no scientific evidence providing clinical effect of this local wisdom. However, the first and second problems have been addressed. There were attempts to purify soft chalk by using heat from gas, solar energy [4], as well as Gamma ray [5]. This heated soft chalk is called soft-prepared chalk. Next, there were many researches aiming to add value to soft chalk [6, 7], and promote soft chalk community industry [1, 8]. As a consequence, the researcher conducted this study to proof clinical effect and economic cost of the facial treatment using soft-prepared chalk.

2. Aims

- 2.1 To proof clinical effect of soft-prepared chalk for facial treatment.
- 2.2 To evaluate economic cost of the facial treatment using soft-prepared chalk

3. Theory, concept of the research and related findings

The effectiveness of soft prepared-chalk has been told generation to generation in Thailand [9], but there is no concrete evidence showing its clinical proof. The conceptual framework of this study is to add intervention which is soft prepared-chalk facial treatment into the volunteers' daily activity, without interfering their routine. The dependent factor is facial skin condition consisting of oiliness, acne condition, hair follicle size, skin tone, and smoothness. The framework can be depicted as followed:



8. Methodology

This study applied mix method approach in its methodology. The quantitative part was quasi-experimental design, whereas the qualitative part adopted in-depth interview and focus group discussion techniques. The volunteers were recruited from the students studying in Sirindhorn College of Public Health, in 2013. The inclusion criteria were 1) being the students studying in Sirindhorn College of Public Health, in 2013; and 2) having facial skin problems, either oily face, acne, broad hair follicle, dark skin, rough skin, or Comedone. The exclusion criteria were 1) having allergic reaction with soft-chalk; and 2) having dry facial skin.

Sample size

The equation for sample size calculation of one group t-test-one tail was shown in equation (1):

$$\begin{aligned}
 Z_{\alpha} \sigma_{\bar{x}} + Z_p + \sigma_{\bar{x}} &= ES \\
 \sigma_{\bar{x}} (Z_{\alpha} + Z_p) &= ES \\
 \sqrt{n} &= (Z_{\alpha} + Z_p) (\sigma_{\bar{x}} / ES), (\sigma_{\bar{x}} = \sigma_x / \sqrt{n}) \\
 n &= (Z_{\alpha} + Z_p)^2 (\sigma_x / ES)^2 \quad \text{---(1)}
 \end{aligned}$$

After the expected quality was added into the equation, the result was shown in the next column.

$$\begin{aligned}
 n &= (Z_{0.05} + Z_{0.1})^2 (0.1/0.1)^2 \\
 n &= (1.96 + 1.28)^2 (0.1/0.1)^2 = 10.4976
 \end{aligned}$$

So in this study the sample size needed was at least 11 participants.

This one group quasi-experiment was designed by adding an intervention: facial exfoliating by using soft-prepared chalk into the volunteers' daily activity. The volunteers were asked to exfoliate their faces after cleaning step in the evening every day. After volunteering process, all volunteers were test for soft-chalk allergy. The recruited volunteers were trained how to exfoliate their faces by the provided soft-prepared chalk. In order to control the original context throughout the experiment, the volunteers were asked to agree upon one condition. The condition stated that there would not be any significant changes in daily activity, food and medicine consumption, and facial skin products.

The intervention lasted one month. The facial conditions in term of oiliness, smoothness, hair follicle size, skin tone and acne condition were assessed and compared between before and after the intervention. The questionnaire identifying perceived facial condition was developed by the researcher. The questions covered knowledge and experience of soft chalk and facial skin condition including oiliness, type of acne, number of acne per week, length of time to cure an acne, facial hair follicle size, facial skin tone, and smoothness of facial skin. Face validity was tested among the students. Content validity was sought from three experts. Reliability of the questionnaire was tested among 30 students who did not volunteer to the project. The Cronbach's alpha was 7.80 which was acceptable. The data collected from questionnaires were analyzed by paired t-test. For more understanding and cost analysis, in-depth interviews and focus group discussions were adopted by the researcher. The collected qualitative data were analyzed by content analysis technique. Sound records were transcribed within 24 hours after the interviews and group discussions by a research assistant. The researcher read, understood, and interpreted the transcription. Then themes and categories of the data were created. After that the data were related and compared to each other for explanation and conclusion according to the objective of this study.

9. Ethics/Study-experiment results

The researcher got ethical clearance from the national authorized SCPH-KK research ethical committee, in order to ensure that subjects in this study would not be harmed. Then the study information was announced to ask for volunteers among the students. Every volunteer had been informed about the study detail. The volunteers were asked to sign consent forms if they still agreed to participate in this study. They had also been emphasized that they could leave the study anytime they wanted, without any consequences affecting their lives and learning process. Moreover, the researcher’s mobile phone number was given to the participants, just in case, if they had any questions or difficulties, so they could contact the researcher immediately and directly.

There were 38 students volunteering to participate in this research. The majority of volunteers were female (32 students, 84.2%). The average age was 19 years (18-22 years, sd: 1.03). General facial condition of the volunteers before participating in this research was described as follow: “The facial skin is very oily”; “The hair follicles are big”; “The facial skin is rough and dark”; “There are 3 new acnes emerging every week. Most of them are infectious acnes. It will take around 6 days to treat acne”. After implementing facial exfoliation using soft prepared-chalk for a month, there was significant improvement of facial skin condition described as follow: “The facial skin oiliness is reduced to the level of moderate to mild stage”; “The size of hair follicle is smaller than before by half”; “The facial skin is smoother and brighter than before”; “Number of new acne emerging each week is reduced to 1-2 acnes, though they are still infectious type”; “Each acne takes only 4 days to treat, which is shorter time than before the intervention”. The detail of these results is given in the following table.

Facial condition	mean(sd) before	mean(sd) after
Oiliness	7.58 (2.31)	4.39 (2.44)
Hair follicle size	7.24 (2.16)	4.74 (2.37)
Smoothness	6.82 (2.43)	4.39 (2.43)
Skin tone	6.42 (3.07)	4.39 (2.83)
Time spent to treat one acne	6.03 (5.23)	4.11 (3.29)
Number of acne emerging/week	3.05 (3.40)	1.58 (1.94)

The results from paired t-test showed that soft prepared-chalk could reduce facial oiliness,

size of facial hair follicle, number of new emerging acne, length of time for acne treatment with statistical significance at 99% confident interval. In addition, the soft prepared- chalk could make facial skin smoother and brighter than before using it, with statistical significance at 99% confident interval. There was only one thing that the soft prepared-chalk could not change. It was type of acne.

The results from interview and focus group discussion showed that the majority of the volunteers had known about soft-prepared chalk before participating in the research. Their knowledge could be categorized into 3 groups including 1) characteristics of soft prepared-chalk; 2) utility of soft prepared-chalk; and 3) tale about soft prepared-chalk having been told generation to generation. Sources of the knowledge were “media and internet”, person such as “parents” and “friends”, and direct experience.

For experience with soft prepared-chalk of volunteers, it was found that they used soft prepared-chalk for both body and facial skin. Most of the volunteers mixed soft prepared-chalk with some liquid such as lime juice, tamarind juice, or fresh milk. Some volunteers mixed soft prepared-chalk with cumin powder before using it. The purpose of using soft prepared-chalk were 1) “to improve skin condition”; 2) “to treat urticaria and rash”; 3) “to treat acne”; 4) “to play in the Thai New Year tradition”; and 5) “to decorate face and body in a sport day”.

For cost effectiveness consideration, the soft prepared-chalk was compared to the skin/beauty clinic’s facial treatment program. It was found that facial treatment by using the soft-prepared chalk everyday for a week was as effective as facial treatment program from skin clinic once a week. Most of all, the soft-prepared chalk did not have adverse effect such as irritation, burn, rash, redness, and photosensitivity, unlike the facial treatment program from skin clinics. In term of cost, the volunteer had to pay 700 THB/week for one episode of care in the skin clinic’s facial treatment program, whilst it would take only 19 THB/week for soft prepared chalk. Thus, with comparable clinical effect and much less undesirable effect, the soft prepared chalk was 37 times cheaper than the skin clinic’s facial treatment program.

10. Summary and explanation of results

The result of this quasi-experimental research has proved that soft-prepared chalk was safe and effective to use for facial treatment as it was told from our ancestor [1]. Importantly, it had been proved that soft-prepared chalk had comparable clinical effects to the skin clinic's facial treatment program. It could significantly improve facial condition in term of oiliness, smoothness, hair follicle size, skin tone, and acne condition, at 99% confident interval. Yet it had much less adverse effects; including irritation, redness, rash, burn, and photosensitivity, compared to the skin clinic's facial treatment program [10]. When the cost was compared to it was 37 times cheaper than the skin clinic's facial treatment program.

The declared effects of facial exfoliation using soft-prepared chalk could be explained that dead facial cells were removed gently. Thus, theoretically, residual blocking facial hair follicles had been eliminated, resulting in the reduction of follicle size. As a consequence, it revealed clear and smooth facial skin. In addition, a number of new emerging acne per week was reduced. The curative process of acne was also shortened. In term of chemical explanation, the soft-prepared chalk is in base condition, and then it has negative ions which are totally opposite to substances applied in facial treatment program in modern skin clinics [11]. On the other hand, oily prone facial skin is always in acid condition, having positive ions. According to ion exchange rule [12], negative ions in soft-prepared chalk will neutralize positive ions on oily face and in acne heads. As a consequence, the facial skin condition will be improved. In addition, soft-prepared chalk is a natural product which has been heated to eliminate bacterial contamination, so it is very mild. Then it will not cause irritation and undesirable effects.

11. Recommendations

11.1 The use of soft-prepared chalk should be promoted, especially amongst teenagers who are vulnerable to facial skin problem. For instance, the use of soft-prepared chalk should be included in health education program for teenagers.

11.2 The weak point of this study is the length of implementation which is too short. In order to improve confidence of the

finding, time series analysis might be applicable. In addition, the environmental context of this study has not been properly controlled. The true experimental design might be a better option for the next study [13].

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