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The Effectiveness of Cold Compress on Reducing Edema in Post-Filler Procedure Patients at the Aesthetic Lounge

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ABSTRACT

This study aims to evaluate the effectiveness of cold compress application in reducing edema in patients following facial filler procedures at the Aesthetic Lounge Clinic. Edema is one of the most common post-procedural side effects of facial fillers and can negatively affect patient comfort, aesthetic outcomes, and overall satisfaction. Therefore, effective and practical interventions are needed to manage this condition. This research employed a pre-experimental design using a one-group pretest–posttest approach to assess changes in edema before and after the intervention. A total of 70 patients who experienced edema after undergoing facial filler procedures were included as study participants. All respondents received a cold compress intervention applied to the affected area for a duration of 10–15 minutes. The level of edema was measured and recorded prior to the intervention and reassessed after the cold compress application. Data analysis was conducted using the Wilcoxon Signed Rank Test to determine differences in edema conditions before and after treatment. The results demonstrated a statistically significant reduction in edema, both in terms of severity scale and physical size, following the cold compress intervention. The statistical analysis yielded a p-value of less than 0.05, indicating a significant difference between pre-intervention and post-intervention edema conditions. These findings suggest that cold compress therapy is an effective, non-invasive method for reducing post-filler edema. In addition to its effectiveness, cold compress application offers advantages such as ease of use, minimal risk, and low cost, making it a practical option for routine post-procedural care in aesthetic clinical settings.

KEYWORDS *Cold compress; edema; facial filler; aftercare; non-invasive intervention*

INTRODUCTION

Facial aesthetic treatments using fillers are increasingly popular among the public as a method to improve the shape of the face, reduce wrinkles, and add volume to certain areas. Facial fillers are considered a non-surgical procedure that has minimal risk and a relatively fast recovery time. However, even though it is safe, this procedure can still cause side effects such as swelling, redness, and pain in the injected area.

Fillers are products that are injected through a sharp needle or cannula into the skin at different depths to give volume to the dermis and subcutaneous fat. Fillers are widely used for aesthetic indications, as they can improve the appearance by smoothing or disguising lines, signs of aging, and wrinkles on the face and body (Nabila & Srihartati, 2022; Santoso & Putri, 2020; Wahyuni & Setiawan, 2022).

The filler must be biocompatible, biodegradable, resistant to infection, and easy for tissue fixation. Fillers also have a long duration, are easy to store, easy to inject, and produce minimal pain. Fillers must be non-toxic, non-migratory, non-teratogenic, non-carcinogenic, and do not provoke immunological reactions, so the use of fillers does not require sensitivity testing prior to application.

Based on their origin, there are several types of filler materials. Xenogenous fillers are of animal origin (e.g., bovine collagen, porsin collagen, animal-derived hyaluronic acid). Allogenous fillers are taken from humans but not patients (e.g., cadaveric collagen, bioengineered human collagen). Autologous fillers are made from the patient's own body (e.g., autologous fat transfer). Synthetic fillers are made from certain materials or materials that resemble natural fillers (e.g., silicone, non-animal stabilized hyaluronic acid), while semisynthetic fillers are a combination of synthetic materials and organic matrices (e.g., calcium hydroxylapatite).

In the Aesthetic Lounge clinic itself, Teoxane brand filler is used from Switzerland with hyaluronic acid content, and from Teoxane there are several levels of strength and durability of fillers, namely UD (hard filler), RHA4 (medium filler), RHA3 and RHA2 (soft filler), RD (filler especially in the eye area). Teoxane fillers provide long-lasting results, with some formulas lasting up to 1–2 years.

According to the International Society of Aesthetic Plastic Surgery (ISAPS, 2023), there were 34.9 million global aesthetic procedures, an increase of around 3.4% compared to the previous year. In 2024, the ISAPS report notes that filler procedures reached approximately 6.3 million, an increase of about 5.2% compared to the previous year, indicating fillers as one of the most in-demand procedures in aesthetics.

According to the aesthetic market in Indonesia, there was a significant increase from USD 234.11 million in 2022 to USD 257.05 million in 2023. According to the Aesthetic Lounge clinic, if calculated from the beginning of the clinic's opening in 2022 with an average monthly income of IDR 1.5 million and compared to the last quarter of 2024 with an average monthly income of IDR 3 million, it can be interpreted that the filler procedure has increased.

Side effects of the facial filler procedure usually include swelling in the injection area because the filler itself is hyaluronic acid (HA), which makes the face feel and look swollen because it is filled by the filler itself; bruising; light bleeding, usually because patients who undergo the filler procedure consume vitamins regularly, so it can cause bleeding; redness; mild pain; and numbness around the injection site because the filler contains lidocaine.

Edema (swelling) is an inflammatory reaction that is common after filler injection and can cause discomfort and affect the patient's appearance within a few days after the procedure. Proper treatment of this swelling is very important so that the patient can feel comfortable and the aesthetic results of the filler can look optimal (Guyton & Hall, 2016; Lent-Schochet & Jialal, 2023; Tortora & Derrickson, 2017).

Post-filler edema (swelling) usually occurs on days 1–7; the swelling is a reaction of the hyaluronic acid itself. Usually, patients who undergo filler procedures at the Aesthetic Lounge clinic do not want the swelling to last too long because it will affect their appearance, so the most efficient way to reduce swelling done at the Aesthetic Lounge clinic itself is to use cold compress intervention (ice pack gel) because cold compresses are effective in reducing edema and creating local vasoconstriction, reducing permeability while reducing pain by slowing down the speed of nerve impulse transmission.

In a review of filler complications and practical recommendations (Hong GW et al., 2024), a comprehensive review mentions the use of cold compresses to minimize bruising and

swelling and calls compresses a conservative measure. And according to Nestor MS et al. 2010), cooling devices reduce pain and ecchymosis (bruising) after filler injection.

Cold compresses are one of the pain management interventions that provide a cold sensation to the painful area so that it causes an analgesic effect by slowing down the transmission of pain receptors so that fewer pain impulses reach the brain. This is shown from the subjects who said that after being given cold compress therapy, the pain was noticeably reduced. The mechanism for reducing pain intensity using cold compress therapy is based on the theory of endorphins. Endorphins are produced by the body as painkillers, where the pain felt by a person will be lighter if a person's endorphin levels are high (Tuna & Yunus, 2024). For the compress itself, use ice cubes coated with a thin cloth or ice gel pack for 5–10 minutes, starting 30 minutes after filler injection in the injected area, and it must be checked periodically so that there is no burning in the skin area.

The dermal filler injection procedure is an increasingly popular aesthetic intervention. Side effects that often appear are local swelling, bruising, and temporary pain. Early post-operative treatment is important for patient comfort and final aesthetic outcomes. Cold compresses are a widely recommended non-invasive intervention to reduce edema through vasoconstriction and capillary permeability reduction. Cold compresses have the potential to be effective in relieving swelling in patients after facial fillers and are an inexpensive and easy-to-apply aftercare intervention at the Aesthetic Lounge. Start cold compresses immediately after the procedure; 10–15 minute sessions must always be checked so that they do not burn or cause frostbite. Use easy-to-store gel cold packs for daily practice.

The purpose of this study is to determine and analyze the effectiveness of cold compress on reducing edema in post-filler procedure patients at the Aesthetic Lounge. The benefits of this research are expected to provide practical contributions for health workers and aesthetic practitioners as the basis for the application of safe, easy, and low-cost non-invasive interventions in the management of post-filler edema. In addition, the results of this study can increase patient comfort and satisfaction with the results of aesthetic procedures, as well as become a scientific reference for the development of post-filler care standards in beauty clinics.

METHOD

The design of this study provided a framework for collecting and analyzing data. The selection of research design reflected priorities that provided various dimensions in the research process, including connecting the cause and effect of research variables (Swarjana, 2015). The research design used in this study was pre-experimental with the one-group pretest–posttest design method. This design was used to determine the effectiveness of a treatment (intervention) on changes that occurred before and after the treatment without a control group (Notoatmodjo, 2018). In this study, the treatment given was a cold compress on the face of patients who experienced edema after the filler procedure.

Measurements were taken twice, namely before the administration of cold compresses (pretest) and after the administration of cold compresses (posttest). The difference in the results of edema measurements before and after treatment was then statistically analyzed to determine the effectiveness of cold compresses on the reduction of edema (Swarjana, 2015). This method was chosen because it was suitable for observing changes in the patient's condition due to the

intervention in a short period and could illustrate the direct effect of cold compresses on the reduction of edema after facial filler at the Aesthetic Lounge clinic.

Scheme 1. Research Design

	Pre-test	Treatment	*Post test*
Intervention Groups	A1	X	A2

Description:
A1 : Assessment conducted before treatment was given to the intervention group (*Pre-test*)
A2 : Assessment conducted after treatment in the intervention group (*post test*)
X : Treatment (cold compress on the area of the patient's face that has edema after filler action)

The research was carried out from September to November 2025 at the Aesthetic Lounge clinic, Jl. Green Permata Residence, South Jakarta. The population consisted of all patients who underwent facial filler treatment at the Aesthetic Lounge clinic and experienced edema (swelling) after filler treatment during September to November 2025, totaling 70 patients (Notoatmodjo, 2018).

A sample is a collection of individual or measurable objects that represent a population. The sample should represent the population. In this study, the entire population of 70 patients from September to November 2025 served as respondents.

Sample selection was based on inclusion and exclusion criteria. Inclusion criteria included patients who underwent facial filler treatment at the Aesthetic Lounge clinic, experienced mild to moderate edema in the treated area, used hyaluronic acid on the day of the study, did not receive other post-operative interventions that might affect edema during the observation period, and were willing to participate by signing informed consent. Exclusion criteria included patients with a history of allergy to cold exposure and those unable to follow the edema measurement schedule, to ensure data validity and consistency.

This research involved human subjects and complied with ethical principles of health research, upholding autonomy, justice, respect for human dignity, beneficence, and non-maleficence, based on guidelines from Polit and Beck (2017). Principles included respect for persons (via informed consent), beneficence and non-maleficence (monitoring for side effects), justice (fair selection), and confidentiality (identity coding).

Data collection used direct measurement via observation and edema assessment sheets. Instruments included an edema scale, photo documentation sheets (standardized position, angle, lighting), and identity sheets (age, gender, education, occupation, filler type, treated area, procedure duration).

Data processing followed four stages (Sutanto, 2016): (1) editing (checking completeness, clarity, relevance, consistency); (2) coding (1 = no edema, 2 = mild, 3 = moderate, 4 = severe); (3) data entry into computer programs; (4) cleaning (error checks).

Data analysis included univariate and bivariate analyses. Univariate analysis tabulated variables for frequency distribution using the formula $P = \frac{F}{N} \times 100$(Notoatmodjo, 2018). Bivariate analysis tested pre–post differences using the Wilcoxon Signed Rank Test ($p < 0.05$) after normality checks, suitable for ordinal data in a one-group pretest–posttest design.

RESULT AND DISCUSSION

Univariate Analysis

Univariate analysis was performed to analyze individual characteristic variables using frequency and proportion distributions. The univariate analysis in this study describes the picture of age, gender, education, and occupation.

Distribution of Respondent Frequency Based on Demographic Data

Table 1. Distribution of respondents based on demographic data in patients with facial edema after filler action at the Aesthetic Lounge in 2025 (n=70)

No	Demographic characteristics of respondents	Category	F	%
1	Age	25-55 Years	70	100%
2	Gender	Women	38	54.3%
		Male	32	45.7%
3	Education	SD	1	1.4%
		SMP	1	1.4%
		SMA	24	34.3%
		BACHELOR	44	62.9%
4	Jobs	PNS	10	14.3%
		POLICE	10	14.3%
		TNI	3	4.3%
		Private	35	50.0%
		Entrepreneur	12	17.1%

Based on table 1 above regarding the demographic characteristics of the respondents, it shows that all respondents are aged 25-55 years (100%), 38 respondents are female (54.3%) and 32 respondents are male (45.7%). Based on the data above, the level of undergraduate education is more owned by the respondents, namely 44 respondents (62.9%), Most of the respondents are private employees as many as 35 respondents (50.0%).

Frequency distribution of respondents based on independent variables

Table 2. Distribution of cold compress intervention frequency for patients with facial edema after filler action in the Aesthetic Lounge in 2025 (n=70)

No	Cold compresses	Frequency of respondents	%
1	Cold compress duration 10-15 minutes	70	100%

Based on table 2, the results were obtained that 70 respondents (100%) got the same cold compress duration, which was 10-15 minutes.

Distribution of respondent frequencies by dependent variables

Table 3. Distribution of the frequency of decreased edema on the face of patients after filler treatment at the Aesthetic Lounge in 2025 (n=70)

No	Distribution of the frequency of decreased edema	Frequency of respondents	%
1	Skala edema pretest	25	35.7%
	Scale 1 mild edema	40	57.1%
	Scale 2 moderate edema	5	7.1%
	Scale 3 heavy edema		
2	Size of edema pretest	26	37.1%
	2mm	39	55.7%
	3-5mm	5	7.1%
	8-9mm		
2	Skala edema posttest	25	35.7%
	Scale 0 no edema	40	57.1%
	Scale 1 mild edema	5	7.1%
	Scale 2 moderate edema		
4	Posttest edema size	27	38.6%
	0mm	30	42.9%
	2mm	13	18.6%
	3-5mm		

Based on table 3. The results of the pretest edema scale were obtained with a scale of 2 moderate edema of 40 respondents (57.1%), a scale of 1 mild edema of 25 respondents (35.7%) and a scale of 3 severe edema of 5 respondents (7.1%). After cold compress intervention, the edema scale decreased and the results of the posttest edema scale were obtained with a scale of 1 mild edema of 40 respondents (57.1%), a scale of 0 without edema of 25 respondents (35.7%) and a scale of 2 moderate edema of 5 respondents (7.1%). For the pretest edema size, the most results were obtained with 3-5mm size as many as 39 respondents (55.7%), 2mm size as many as 26 respondents (37.1%) and size 8-9mm as many as 5 respondents (7.1%) and after intervention for the size of edema decreased by a maximum of 2mm with 30 respondents (42.9%), 0mm as many as 27 respondents (38.6%) and 3-5mm edema size as many as 13 respondents (18.6%).

Bivariate Analysis

Bivariate analysis is an analysis used to determine whether there is a difference in the level of facial edema before and after the administration of cold compresses as an independent variable in the same group of respondents. In this study, bivariate analysis was carried out with the *Wilcoxon Signed Rank Test* on pretest and posttest edema scales (plus edema measures in pretest and posttest mm) to assess whether cold compresses were able to meaningfully reduce the patient's facial edema after filler action.

Table 4. Test Statistic

Ranks				
		N	Mean Rank	Sum of Ranks
Scale of edema posttest - Scale edema pretest	Negative Ranks	70a	35.50	2485.00
	Positive Ranks	0b	.00	.00
	Ties	0c		
	Total	70		
Posttest edema size - Pretest edema size	Negative Ranks	70d	35.50	2485.00
	Positive Ranks	0e	.00	.00
	Ties	0f		
	Total	70		

Test Statistic

	Scale of edema posttest – Scale of edema pretest	Posttest edema size - Pretest edema size
Z	-8.367b	-7.601b
Asymp. Sig. (2-tailed)	.000	.000

Based on the results of the Wilcoxon Signed Rank Test, it was shown that all respondents (n = 70) experienced a decrease in the scale and size of edema after the intervention. In the edema scale variable, all respondents were included in negative ranks (70 respondents), without positive ranks or ties, with a value of Z = -8.367 and a p-value = 0.000 ($p < 0.05$). Similarly, in the edema size variable, all respondents experienced a decrease, with a value of Z = -7.601 and a p-value = 0.000 ($p < 0.05$). Thus, there was a significant difference between the pre- and post-intervention conditions, so H0 was rejected and H1 was accepted, suggesting that the intervention effectively reduced the scale and size of the patient's facial edema after filler action.

Cold Compresses in Patients Post Filler Action

Based on the results of the study shown in Table 5.2, all respondents totaling 70 respondents (100%) received cold compress intervention with the same duration, which is 10-15 minutes. There was no variation in the duration of cold compresses in respondents, so the interventions administered were uniform across the study sample. This uniformity is methodologically important because it can minimize the potential for bias due to the difference in the length of intervention exposure, so that the change in edema conditions that occur can be more believed to be related to the effect of cold compresses Cold compresses are one of the nonpharmacological interventions commonly used in the treatment of post-traumatic and post-invasive edema, including action of facial fillers (Rang et al., 2018).

The application of cold temperatures to body tissues causes vasoconstriction of peripheral blood vessels. Vasocontraction plays a role in reducing blood flow to areas that have experienced tissue trauma due to filler injection, so that it can reduce capillary hydrostatic pressure and inhibit the exit of fluid into the interstitial space. Which ultimately decreases the formation of edema. In addition, cold temperatures also decrease cell metabolism and

inflammatory mediator activity, so the acute inflammatory response can be suppressed. Thus, the administration of cold compresses in the initial phase after the filler action becomes a rational and relevant intervention to control swelling of facial tissues (Johns et al., 2023; Leite et al., 2023; Nugraheni & Masfuri, 2024).

According to the researchers, the uniformity of the duration of cold compresses is one of the strengths in the study, as it can minimize the bias caused by the difference in the length of time the intervention is given. With the same duration, the effect of cold compresses on facial edema can be observed more objectively and controlled, so that the changes that occur in the edema condition can be directly attributed to the intervention given. It also increases the internal validity of the research. Because the variation in results that appeared was not affected by differences in the duration of the intervention.

Reduction of facial edema after filler action

Based on the results of the study shown in Table 5.3, there is a clear difference between the condition of edema before (pretest) and after (posttest) the administration of cold compresses, both from the edema scale and the size of edema in millimeters (mm).

In the measurement of the edema scale (pretest), most of the respondents experienced edema with a scale of 2 moderate edema, namely 40 respondents (57.1%). Respondents with a scale of 1 mild edema amounted to 25 respondents (35.7%) while respondents with a scale of 3 severe edema amounted to 5 respondents (7.1%). This data shows that the majority of post-filler patients experience moderate to severe edema before cold compress intervention is performed. In addition, based on the size of pretest edema, most respondents experienced edema with a size of 3–5 mm as many as 39 respondents (55.7%), followed by a size of 2 mm as many as 26 respondents (37.1%), and a size of 8–9 mm as many as 5 respondents (7.1%).

After the cold compress intervention was carried out, there was a significant change in the condition of the respondent's edema. On the posttest edema scale, the majority of respondents decreased to a scale of 1 mild edema as many as 40 respondents (57.1%), even as many as 25 respondents (35.7%) no longer experienced scale 0 edema.

Only a small number of respondents were still on the scale of 2 moderate edema, namely 5 respondents (7.1%), and there were no respondents with severe edema. The same change was also seen in the size of posttest edema, where most respondents experienced a decrease in the size of edema to 2 mm as many as 30 respondents (42.9%) and 0 mm as many as 27 respondents (38.6%). Respondents with an edema size of 3–5 mm decreased to 13 respondents (18.6%), and no more edema with a size of 8–9 mm was found.

According to the researchers, this decrease in the scale and size of edema suggests that cold compresses are effective in controlling the inflammatory process after the filler action. Cold compresses work by slowing down the inflammatory process, lowering capillary permeability, and reducing fluid accumulation in the interstitial tissues, so that swelling can be gradually reduced.

Results of the Wilcoxon Signed Rank Test on the Scale and Size of Edema

Based on the results of bivariate analysis shown in Chapter V, the statistical test used in this study is the Wilcoxon Signed Rank Test**,** because the data analyzed is paired data (pretest

and posttest) and is not normally distributed. This test is used to find out if there is a significant difference between facial edema conditions before and after cold compress intervention.

The results of the Wilcoxon test showed that on the edema scale variable, all respondents (n = 70) experienced a decrease in the edema scale after the intervention. This is shown by all respondents included in **the** negative ranks of 70 respondents, without positive ranks or ties. The statistical value of the test obtained was Z = -8.367 with a significance value of p-value = 0.000 ($p < 0.05$).

In the edema size variable**,** the same results were also found. All respondents experienced a decrease in the size of edema after the administration of cold compresses, which was shown by negative ranks of 70 respondents, without positive ranks or ties. The statistical value of the Wilcoxon test on this variable is Z = -7.601 with a significance value of p-value = 0.000 ($p < 0.05$).

According to the researchers, these results showed that a decrease in the scale and size of edema occurred consistently in all respondents after being given a cold compress intervention. The absence of positive ranks or ties indicated that none of the respondents experienced improvement or permanent edema conditions, so the effect of the intervention can be said to be even and comprehensive.

A p-value of less than 0.05 indicates that there is a statistically significant difference between the conditions before and after the intervention. Thus, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted. The results of the Wilcoxon test reinforce the finding that cold compresses are effective in reducing facial edema after filler action, both in terms of clinical scale and physical size of edema.

Research According to Theory

The results of this study are in line with physiological theories regarding the effects of cryotherapy on body tissues. According to Yang et al. (2025) the main mechanism of cryotherapy in reducing swelling involves local vasocontraction and suppression of the inflammatory response. A decrease in tissue temperature leads to narrowing of superficial blood vessels, resulting in decreased local blood flow and capillary pressure, which results in reduced extravasation of fluid into the interstitial space. In addition, a decrease in tissue temperature has an effect on cellular processes, the activity of inflammatory cells (neutrophils, macrophages) and the release of pro-inflammatory mediators decrease, which contributes to a decrease in vascular permeability and the rate of edema accumulation (Yang et al., 2025).

Thus, theoretically cold compresses are an effective intervention to control edema in the acute phase after action Liang (2024) also emphasized that the effectiveness of cryotherapy is greatly influenced by application parameters, such as duration, temperature intensity, and cooling methods (simple compresses, cold gel masks, continuous controlled/halotherapy). Vasoconstriction effects usually appear quickly (in minutes) but the magnitude and duration of the effects depend on how cold and how long the application is taken, therefore a consistent protocol (10–15 minutes as in this study) can maximize benefits without incurring the risk of frostbite or tissue irritation.

Research Results According to Others

The results of this study are in line with the findings of Jardak et al. (2023), who conducted a narrative review of the use of cryotherapy after rhinoplasty, the available evidence

suggests that various cooling techniques (e.g. cold packs, cold saline irrigation, hilotherapy/continuous cooling) are often associated with a decrease in edema and ecchymosis in postoperative patients of the face. positive, however the authors emphasize the need for higher quality RCTs and standardization of cooling protocols for robust clinical practice recommendations (Jardak et al., 2023).

The findings of this study are also consistent with a meta-analysis by Fernandes et al. (2019) regarding the use of cryotherapy after molar removal (third molar), the application of cryotherapy on the first day postoperatively reduces clinical edema compared to without cold therapy; however, this meta-analysis also states that the variety of methods and quality of the studies limits definitive conclusions and demands better RCTs (Fernandes, Armond, & Falci, 2019).

In addition, Lee et al. (2023) in a systematic review of cryotherapy after total knee arthroplasty reported that cold therapy can provide benefits in reducing swelling in the acute phase, although its effectiveness is influenced by the type of device and protocol used. This corroborates the findings that consistency and application time are key factors in cryotherapy success.

Research Results According to Researchers

According to the researchers, the results of this study prove that cold compresses with a duration of 10–15 minutes are effective in reducing the scale and size of facial edema in patients after filler action. The decline in all respondents showed that this intervention had a real and consistent impact.

The researchers argue that the success of this intervention is influenced by the timing of the right cold compress administration, i.e. in the early post-action phase when the inflammatory response is still active. Cold compresses in this phase are able to suppress the development of edema before it reaches a heavier level. In addition, the use of cold compresses as a non-pharmacological intervention has the advantages of ease of application, relatively low cost, and minimal risk of side effects. Thus, cold compresses have great potential to be used as part of the standard of post-filler care in aesthetic clinics. Although this study had limitations because it did not use a control group, the results provided a strong empirical basis to support the use of cold compresses in clinical practice and served as a foundation for further research with a more robust design.

CONCLUSION

This study at the Aesthetic Lounge Clinic demonstrated that cold compresses using ice pack gel for 10–15 minutes effectively reduced post-facial filler edema, a common side effect from tissue inflammation and hyaluronic acid's hygroscopic properties. Initial mild-to-moderate edema (3–5 mm) shifted to no edema or mild levels (0–2 mm) in all 70 patients, with the Wilcoxon Signed Rank Test confirming statistical significance ($p < 0.05$) and no cases of no improvement. As a simple, safe, non-invasive aftercare method, it accelerates recovery without affecting appearance and supports strengthening clinic SOPs and nursing education. For future research, a randomized controlled trial comparing cold compresses with other non-

pharmacological interventions, such as lymphatic drainage massage, across larger, diverse populations would enhance generalizability and explore synergistic effects.

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