Current Journal of Applied Science and Technology

40(6): 96-102, 2021; Article no.CJAST.68372
ISSN: 2457-1024
(Past name: British Journal of Applied Science & Technology, Past ISSN: 2231-0843, NLM ID: 101664541)

Chemical Peeling: Indications, Side-Effects and Outcome among Patients at a Private Clinic in Port Harcourt

Bolaji I. Otike-Odibi[1] and Dasetima D. Altraide[1*]

[1]Department of Internal Medicine, University of Port-Harcourt Teaching Hospital (UPTH), Port Harcourt, Nigeria.

Authors' contributions

This work was carried out in collaboration between both authors. Author BIOO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author DDA managed the analyses of the study and managed the literature searches. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/CJAST/2021/v40i631350
Editor(s):
(1) Dr. Ashish Anand, G V Montgomery Veteran Affairs Medical Center, USA.
Reviewers:
(1) Haider A. Alsabak, University of Kufa, Iraq.
(2) Deepthi Enumula, Balaji Institute of Pharmaceutical Sciences, India.
Complete Peer review History: http://www.sdiarticle4.com/review-history/68372

Original Research Article

Received 20 February 2021
Accepted 25 April 2021
Published 26 April 2021

ABSTRACT

Background: Chemical peeling is a technique that aims to achieve rejuvenation of the skin by application of chemical peels. The technique dates back to several decades, yet little is known about the indication, side-effects and outcome among a Nigerian population.
Purpose: The aim of the study was to assess the type of chemical peels, their indication, side – effects and outcome among patients at a private dermatology clinic.
Materials and Methods: This was a retrospective study, which employed a pro forma to obtain data required to attain the objectives. Data were obtained from all patients who underwent chemical peeling. Chi square and student t test were determined at a statistically significant level of 0.05.
Results: The study had a total of twenty-seven patients, comprising of 7 (25.9%) males, and 20 (74.1%) females, who underwent chemical peeling. Superficial chemical peel was the most dominant peel method (81.5%). Among the superficial peel, mandelic peel, salicylic peel and glycolic peel were commonly. Five of the patients (18.5%) received medium depth, and none (0%) received deep chemical peel. The most frequent indication among the patients in the study was

**Corresponding author: E-mail: daltraide@yahoo.com;*

Acne Vulgaris (55.6%), followed by Melasma (14.8%). The comparison of treatment outcome on clinical improvement by age, sex and category of chemical peel revealed no significant differences. Two of the patients reported side-effects (7.4%) namely skin dryness and hyperpigmentation.
Conclusion: Chemical peeling among Nigerian population has few side-effects and is effective. Acne is the most common indication for chemical peel. There is a need for further studies employing analytic study designs and involving a larger population.

Keywords: Chemical peeling; dermatology; Port Harcourt.

1. INTRODUCTION

The self-perception of individuals are affected to a large extent by their skin appearance [1]. The application of chemical exfoliating agents to the skin for the regeneration of epidermis, dermis or both, is referred to as chemical peeling [2]. These exfoliating agents are referred to as chemical peel, and they rekindle epidermal growth with an evenly distributed melanin [3]. Notably, chemical peels are classified by the depth of action into superficial, medium, and deep peels [2]. Identifying the appropriate depth chemical peel is fundamental for successful treatment outcome.

Superficial chemical peels affect the epidermis .They can be applied in almost all skin types due to their superficial action. Superficial chemical peel increases dermal collagen, and epidermal regeneration occurs within three to five days. Consequently, they are the preferred technique for rejuvenating the epidermis and upper dermal layers of skin [3]. Medium-depth chemical peels takes a longer healing process, with full epithelialization occurring after almost one week. Whereas, the deep peels takes an even longer time, with full epithelization occurring in two to three weeks. Remarkably, rapid denaturisation of surface keratin and other proteins in the dermis and outer dermis occur in deep chemical peels [3,4].

Concerning the indications for use, superficial chemical peels are mainly for acne, post-inflammatory pigmentation and mild dyschromias; medium-depth peels are useful in the treatment of pigmentary disorders, solar lentigines, multiple keratoses, and superficial scars; deep peels are beneficial for deep or coarse wrinkles, severe photoaging andscars. Precancerous skin lesions have been managed with deep chemical peels [3,5]. Irrespective of the type of chemical peel, the use of sun screen is recommended [3].

The use of chemical peel in dermatology and cosmetology dates back to several decades ago, in Egyptian history [4,6]. Till date, its usefulness and relevance in dermatology have been appreciated, however some untoward effects have been reported [5]. However, these negative effects have been pinned on the type of chemical peel being applied. For instance, phenol, which is used in deep peels, have a negative effect on the heart, leading to arrhythmias [3,5]. Other side effects include hypo-pigmentation, hyperpigmentation, scarring and keloids [3].

In spite of the widespread use of chemical peeling, studies relating to its indications, outcome and side-effects are scanty in resource-constrained settings. Dermatologists practicing in settings such as Nigeria, need to be informed of patients' responses to chemical peel in a bid to promote quality care and optimize outcomes. Therefore, this study aimed to assess the indications, outcome and side-effects of chemical peel among patients at a private dermatology clinic in Nigeria.

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted in Port Harcourt, the capital of Rivers State, South-South geopolitical zone of Nigeria.

2.2 Study Design and Study Population

A retrospective study involving patients diagnosed with dermatological disorders who underwent chemical peel was employed.

2.3 Sample Size Calculation and Sampling

The Cochrane's formula was employed using the 95% confidence level, proportion of pigmentary disorders from Nigerian study of 1.2% [7], error limit of 5% and 20% non-response rate to obtain a sample size of 27.Patients who met the eligibility criteria were selected consecutively from the private dermatology clinic.

2.4 Data Collection

Data were collected using a pro forma comprising of age, sex, type of chemical peel, frequency of use, indication (diagnosis), treatment outcome (tolerance and clinical improvement) and side-effects. The tool was face- and content-validated by research experts.

2.5 Statistical Analysis

Data entry and cleaning were done using Microsoft Excel and then exported to IBM Statistical Package of Social Sciences (SPSS) version 20 for statistical analysis. Frequencies and proportions were used to summarize nominal data, while numerical data were summarized using means ± standard deviation, median and range. Chi square continuity test was used to determine significant differences in proportions. The differences in means were compared using student t-test. Statistical significance was set at $P<0.05$.

3. RESULTS

3.1 Socio-Demographic Information

A total of twenty-seven patients who underwent chemical peeling were involved in the study. The study had 7 (25.9%) males, and 20 (74.1%) females, yielding a male to female ratio of 1:2.9. The mean age ±SD of male and female patients were 35.3±12.3 years and 34.5 ±12.7 years respectively (t=0.151; p=0.881)

3.2 Chemical Peel among Patients

Fig. 1 shows the distribution of chemical peel among the patients in the study. Most of the patients underwent superficial chemical peel (81.5%; n=22). Among the superficial peel, mandelic peel, salicylic peel and glycolic peel were commonly used as shown in Fig. 1. Five of the patients (18.5%) received medium depth, and none (0%) received deep chemical peel. All the patients received sun screen.

The most frequent indication among the patients in the study was Acne Vulgaris (55.6%), followed by Melasma (14.8%). Table 1 shows the indication for chemical peeling in the study.

3.3 Treatment Outcome

For the treatment outcome on tolerability, all the patients (100%) tolerated the chemical peel they received. Concerning the treatment outcome on clinical improvement, majority (88.9%) of the patients in the study showed clinical improvement as shown in Fig. 2.

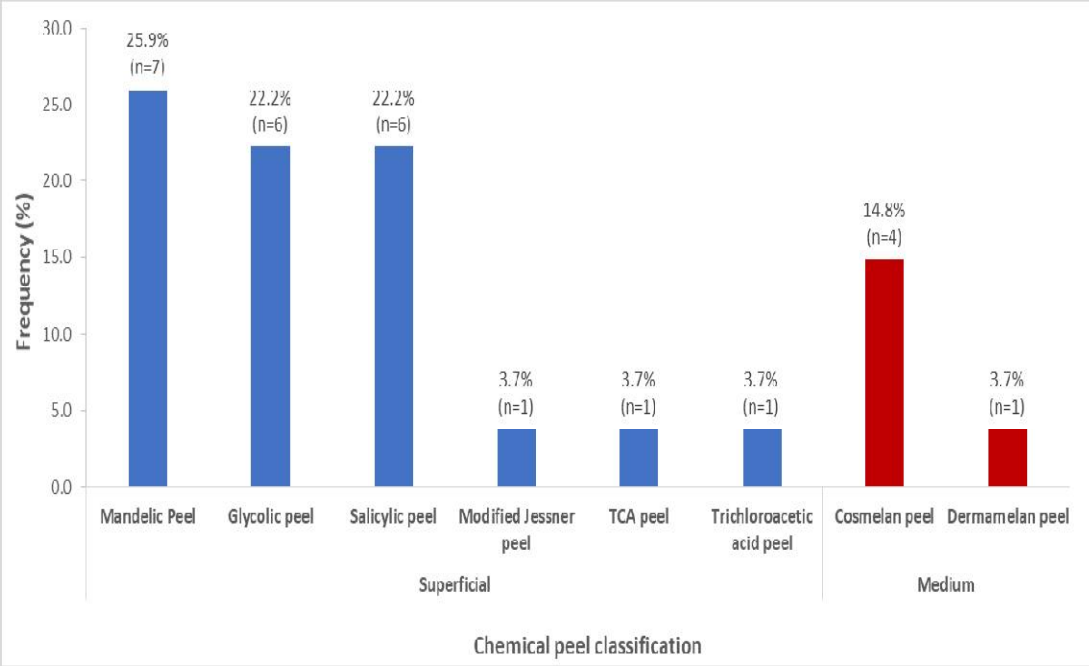

Fig. 1. Indication for chemical peel

Table 1. Indication for chemical peel in the study

Indication for chemical peel	Frequency	Percentage %
Acne vulgaris	15	55.6
Melasma	4	14.8
Hyperpigmentation	2	7.4
Lentigines	2	7.4
Perioral dermatitis	1	3.7
Papulo-pustular acne	1	3.7
Nodulocystic acne	1	3.7
Striae	1	3.7
Total	27	100.0

Acne vulgaris, hyperpigmentation. Lentigenes, perioral dermatitis,papulopustular acne, nodulocystic acne and striae were all treated with superficial peels, while melasma was treated with medium peels

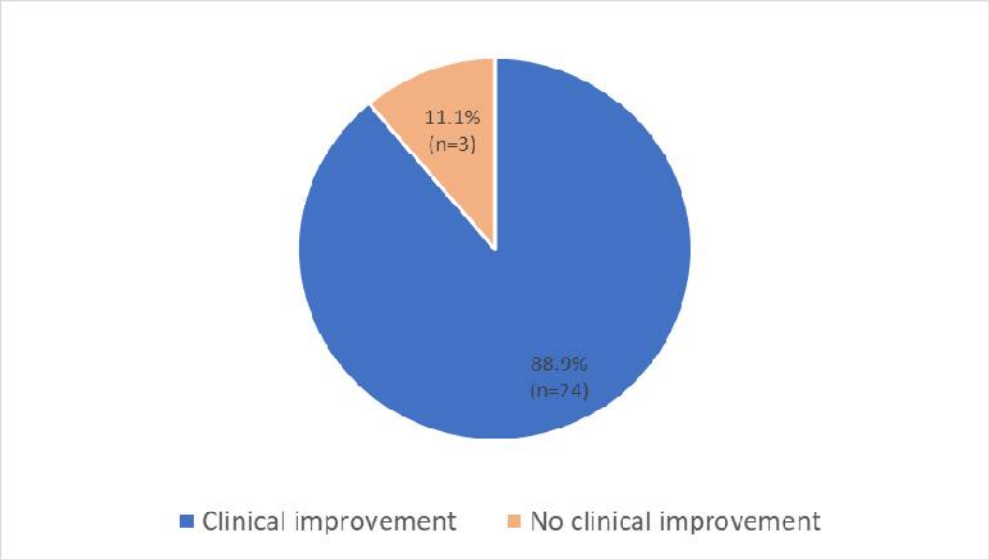

Fig. 2. Clinical improvement status among patients in the study

The comparison of treatment outcome on clinical improvement by age, sex and category of chemical peel is presented in Table 2. There was no significant difference in the age of patient and clinical improvement status. A higher proportion of the females (95.0%) reported clinical improvement in comparison to the males (71.4%), but this difference was not statistically significant (p=0.313). All the patients that received medium depth chemical peeling all reported clinical improvement (100.0%) whereas 86.4% of those who received superficial category had clinical improvement (p=0.930).

3.4 Side-Effects

Two of the patients reported side-effects (7.4%) in the study. There was one case of dryness and another case of hyperpigmentation. Both cases were patients who received mandelic peel.

4. DISCUSSION

The findings of this study showed that superficial chemical peel was the most prevalent method among the patients in the study. Also, acne vulgaris was the most common indication for chemical peel. Concerning the treatment outcome, it was noted that all the patients in the study reported that the chemical peel applied was well-tolerated. More than three-quarters of the patients reported clinical improvement following the application of the chemical peel. Notably, two of the patients reported dryness and hyperpigmentation.

Chemical peel in acne treatmentis well established. The study noted that the dermatological disorder with the highest proportion of patients receiving chemical peel was acne. This is unsurprising, as studies have noted acne as among the top ten presenting complaints in dermatology clinics [8,9]. Also, several studies have noted success with chemical peel among patients with acne [10,11,12]. Although, some of these studies [10,11] sought to compare which of the chemical peels is comparatively better to others. The index study noted that irrespective of the type of chemical peel selected by the dermatologist for the acne cases, they were all well tolerated. A possibility could be that the appropriate chemical peel was selected for each of the patient in order to yield clinical improvement outcome. Notably, it has been emphasized that a detailed medical history is vital prior to the selection of the chemical peel for the patient [4].

The limiting of chemical peel to superficial and medium-depth in present study is in line with a research, which noted that the deep chemical peel should be seldom used due to the extensive scarring, and high risk of dyschromia [13]. The study being carried out among the black race could further preclude the use of the deep chemical peel, as several negative sequelae have been documented in their use among black population [13]. This therefore uncovers the need for further research in the form of systematic reviews and meta-analysis on theireffects on black population.

In contrast to studies noting differences in the tolerance ability to the chemical peel among the populace, the index study noted that all the patients, without an exception, tolerated the chemical peel irrespective of the type. Also, concerning the findings on the side effects, the

Fig. 3. Modified Jessner peel (Pictures taken with consent)

Table 2. Comparison of treatment outcome by age, sex and category of chemical peel

Variables	Treatment Outcome		Test	p-value
	Clinical improvement	No clinical improvement		
Age (years)				
Mean age ± standard deviation	35.9±12.1	25.0±7.6	1.466*	0.155
Sex				
Male n (%)	5 (71.4)	2 (28.6)	1.019‡	0.313
Female n (%)	19 (95.0)	1 (5.0)		
Category of chemical peel				
Superficial n (%)	19 (86.4)	3 (13.6)	0.008‡	0.930
Medium Depth n (%)	5 (100.0)	0 (0.0)		

**Student t-test ‡ Chi square continuity correction*

study demonstrates that chemical peels is safe. Although, less than 10% of the patients reported side effects in the study, the finding of almost 90% showing clinical improvement further reiterates the benefit of chemical peels among the population in the index study. Nonetheless, some studies have reported a myriad of side effects associated with chemical peels [14,15]. The dissimilarities in the study population and use of deep peel in these studies could explain the differences in findings with index study.

Comparison of treatment outcomes by age and sex showed no significant differences. Hence, among the population studied, the occurrence of clinically improved state is not dependent on their demographic characteristics. However, the need for further studies comprising of larger population, involving comparison groups and follow-up are advocated.

5. CONCLUSION

Acne is the most common indication for chemical peel among patients attending the dermatology clinic in Port Harcourt. Chemical peel commonly used are superficial and medium-depth. Chemical peeling is safe with no patient reporting burns, and is effective, with approximately 9 in 10 patients observing clinical improvement.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The principles of ethics involving human research were upheld in this study. The Research and Ethics Committee approved the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. De J, Fuente L, Mohd-Zaharim N, Fraser E, Hannah S, Weber KE, et al. More than only skin deep: appearance self-concept predicts most of secondary school students' self-esteem; 2016.
2. Coleman W, Brody H. Advances in chemical peeling. Dermatologic Clin. 1997;15:19–26.
[Cited 2021 Apr 26]
Available:https://www.derm.theclinics.com/article/S0733-8635(05)70411-3/abstract
3. Rendon MI, Berson DS, Cohen JL, Roberts WE, Starker I, Wang B, et al. Evidence and Considerations in the Application of Chemical Peels in Skin Disorders and Aesthetic Resurfacing. J Clin Aesthetic Dermatol. 2010;3:32–43.
4. Salam A, Dadzie OE, Galadari H. Chemical peeling in ethnic skin: An update. British Journal of Dermatology. 2013;169: 82–90.
5. Vemula S, Maymone MBC, Secemsky EA, Widjajahakim R, Patzelt NM, Saade D, et al. Assessing the safety of superficial chemical peels in darker skin: A retrospective study; 2018.
Available:https://doi.org/10.1016/j.jaad.2018.02.064
6. Roberts WE. Chemical peeling in ethnic/dark skin. Dermatologic Therapy. 2004;17:196–205.

7. Onayemi O, Isezuo SA, Njoku CH. Prevalence of different skin conditions in an outpatients' setting in north-western Nigeria. Int J Dermatol [Internet]. 2005;44: 7–11.
Available:http://doi.wiley.com/10.1111/j.1365-4632.2004.02298.x
8. Niemeier V, Kupfer J, Gieler U. Acne vulgaris–psychosomatic aspects. Wiley Online Libr. 2006;4:1027–36.
[Cited 2021 Apr 26].
Available:www.blackwell-synergy.com/loi/ddg
9. Perkins AC, Cheng CE, Hillebrand GG, Miyamoto K, Kimball AB. Comparison of the epidemiology of acne vulgaris among Caucasian, Asian, Continental Indian and African American women. J Eur Acad Dermatology Venereol. 2011;25: 1054–60.
10. Kim SW, Moon SE, Kim JA, Eun HC. Glycolic acid versus Jessner's solution: Which is better for facial acne patients? A randomized prospective clinical trial of split-face model therapy. Dermatologic Surg. 1999;25:270–3.
11. Taub AF. Procedural treatments for acne vulgaris. Vol. 33, Dermatologic Surgery. 2007;1005–26.
12. Group W, Strauss JS, Krowchuk DP, Leyden JJ, Lucky AW, Shalita AR, et al. Guidelines of care for acne vulgaris management. J Am Acad Dermatol. 2007; 56:651–63.
Available:www.aad.org
13. PE G, Hunt SG. Considerations for cosmetic surgery in theblack population. Clin Plast Surg. 1993;20:27–34.
14. Vanaman M, Fabi S, Carruthers J. Complications in the cosmetic dermatology patient: a review and our experience (part 1). Dermatologic Surg. 2016;42:1–1.
Available:https://journals.lww.com/dermatologicsurgery/fulltext/2016/01000/complications_in_the_cosmetic_dermatology_patient_.1.aspx
15. Anitha B. Prevention of complications in chemical peeling. J Cutan Aesthetic Surg. 2010;3:1.
[Cited 2021 Apr 26].
Available:http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authty

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/68372