Received: 29 May 2025 | Accepted: 29 August 2025

DOI: 10.1111/jdv.70066

JOURNAL OF THE EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

ORIGINAL ARTICLE

Delphi consensus on melasma management by international experts and pigmentary disorders society

Rashmi Sarkar[1] | Seemal R. Desai[2,3] | Surabhi Sinha[1] | Sunil Dogra[4] | María-Ivonne Arellano-Mendoza[5] | Pallavi Ailawadi[6] | Sanjeev Aurangabadkar[7] | Edileia Bagatin[8] | Shyamanta Barua[9] | Mala Bhalla[10] | Daniel Cassiano[8] | Tania Cestari[11] | Anupam Das[12] | Johannes Dayrit[13] | Ncoza Dlova[14] | Cheng-Che E. Lan[15] | Nada Elbuluk[16] | Ana Cláudia Espósito[17] | Evangeline Handog[18] | Soumya Jagadeesan[19] | Saloni Katoch[20] | Muthu Sendhil Kumaran[4] | Prasad Kumarasinghe[21] | Maria Juliet Macarayo[22] | Helio A. Miot[23] | Venkataram Mysore[24] | Vignesh Narayan R[25] | Sang Ho Oh[26] | Thierry Passeron[27] | Mauro Picardo[28] | Indrashis Podder[29] | Soumya Sachdeva[30] | Aseem Sharma[31] | Richa Sharma[32] | Vijay Somani[33] | Bhavesh Swarnkar[34] | Susan Taylor[35] | Devinder Mohan Thappa[36] | Keshavamurthy Vinay[4] | Henry W. Lim[37]

Correspondence
Rashmi Sarkar, Department of Dermatology, Lady Hardinge Medical College & Associated SSK and KSC Hospitals, Shaheed Bhagat Singh Marg, Lady Hardinge Medical College, DIZ Area, Connaught Place, New Delhi, Delhi 110001, India.
Email: rashmisarkar@gmail.com

Funding information
Galderma India Pvt Ltd

Abstract

Background: Melasma, an acquired hyperpigmentation disorder, affects individuals of all ethnicities. Its multifactorial aetiology, high recurrence rates and psychosocial impact complicate management and necessitate comprehensive, evidence-based recommendations.

Objectives: The objective was to develop an international consensus on the diagnosis and management of melasma by synthesizing expert opinions and the latest scientific evidence.

Methods:

For affiliations refer to page 10.

use of hydroquinone-based triple combination creams as the gold standard, and alternatives such as topical azelaic acid, kojic acid and oral tranexamic acid. Adjunctive procedural therapies, such as chemical peels and microneedling, were suggested to enhance topical efficacy, while lasers were reserved for refractory cases.
Conclusion: These recommendations aim to improve the outcomes of melasma patients globally by integrating expert opinion and evidence-based strategies. Future research should focus on evaluating emerging therapies and optimizing long-term maintenance strategies.

KEYWORDS
consensus, dermatology, disease management, hyperpigmentation, melanosis

INTRODUCTION

Melasma is an acquired disorder of hyperpigmentation that affects individuals across all ethnicities, although its prevalence is particularly pronounced in darker skin types and photoexposed populations.[1] While the condition can occur in men, at least 90% of cases are seen in women, underscoring sex-based predisposition.[2] Beyond its physical manifestation, melasma considerably impacts emotional and psychological well-being, often leading to deterioration in the quality of life.[3]

Despite its widespread prevalence and psychosocial impact, melasma is often perceived as a mere cosmetic defect, leading to underdiagnosis and treatment.[4] The pathogenesis of melasma is multifactorial, involving various clinical and histological features that reflect the interplay of several underlying mechanisms. Common triggers include prolonged sun exposure, genetic predisposition, hormonal fluctuations during pregnancy or therapy and the use of medications, such as oral contraceptives, hormone replacement therapy and antiepileptic drugs.[2] The overlapping features with other hyperpigmentation disorders complicate diagnosis, potentially delaying appropriate treatment. This highlights the importance of differentiating melasma from other hyperpigmentation disorders.[5]

The chronic nature and high recurrence rates of melasma require a comprehensive and long-term approach. Treatment options include photoprotection, topical skin-lightening agents, chemical peels, lasers or energy-based devices and systemic therapies. However, the variable response to these modalities and the lack of prospective randomized trials for many therapeutic approaches complicate the choice of the most effective regimen.[6] Moreover, recent insights into vascular, inflammatory and barrier-defect mechanisms have shifted therapeutic targets beyond melanogenesis alone, which need to be reflected in recommendations. The variability underscores the necessity for ongoing research and updated clinical recommendations, which can provide a structured approach. An updated, internationally applicable consensus based on the appraisal of recent evidence and the collective experience of pigmentary disorders experts remains essential to harmonize diagnosis, stratify first- and second-line choices and integrate adjunctive procedures within a practical therapeutic ladder. This consensus brought together an international panel of experts in collaboration with the Pigmentary Disorders Society (PDS) to address the need for updated, comprehensive and evidence-based recommendations for managing melasma. In light of recent evidence, this was an extension of the previous consensus published by PDS with an extended geographical coverage and a larger panel.[7] The objectives were to analyse current clinical practices, evaluate existing recommendations and develop a consensus-based framework to optimize diagnosis and treatment strategies. By identifying best practices and highlighting evidence gaps, this consensus aims to step toward standardizing care, improving patient outcomes and providing a clear research agenda for future prospective trials.

Why was the study undertaken?

- To develop comprehensive, evidence-based recommendations for melasma management by synthesizing expert opinions and scientific literature, addressing the lack of standardized global guidelines for this complex, recurrent pigmentary disorder.

What does this study add?

- It presents the first international consensus on melasma management using a modified Delphi method, incorporating input from 40 dermatologists across 11 countries. Key recommendations were drafted after a thorough review of the literature and discussion among experts.

What are the implications of this study for disease understanding and/or clinical care?

- The study provides a globally relevant, practical framework for melasma diagnosis and treatment, emphasizing photoprotection, evidence-based topical and oral therapies and cautious use of procedures—guiding clinicians and informing future research directions.

METHODS

This study was conducted to develop international consensus-based recommendations for managing melasma, focusing on recent advancements in the field. A modified Delphi approach was employed. Figure 1 shows an overview of the workflow. While this study was not prospectively registered, it adhered to a transparent process in alignment with established consensus development practices.

The Core Group and selection of members for voting

The core group comprised two senior members from the PDS with extensive experience in dermatology and melasma research. Their responsibilities included designing, moderating and overseeing the consensus process. A diverse panel of 20 members from PDS, along with 18 international dermatology experts (38 total) from various clinical and geographic backgrounds, was invited to participate in the process (Table S1). These experts were selected based on their contributions to melasma research, clinical experience and publications on this topic of interest. The core group did not participate in the voting to avoid potential bias.

Literature search

A search of the PubMed database was conducted to identify studies published between 2014 and 2024. The search strategy included structured queries focused on topics such as melasma management, diagnosis and treatment (as outlined in Table S2). Studies were screened for inclusion based on methodological rigor, prioritizing randomized controlled trials (RCTs), systematic reviews, cohort studies and meta-analyses. Articles meeting these criteria were graded using the Oxford level of evidence framework (2009). A summary of the literature search was shared with the expert panel as a pre-read.

Review of evidence and formulation of consensus statements

The literature review helped identify evidence-based practices and knowledge gaps in melasma management. Broad domains, such as diagnosis, treatment options and maintenance strategies, were determined. Consensus statements were drafted, which underwent several revisions based on expert feedback.

Administering the questionnaire, gathering responses and aggregating results

A questionnaire was developed to collect expert opinions and administered to the panel using an online survey platform. Responses were gathered anonymously on a 5-point Likert scale (strongly agree, agree, neither agree nor disagree, disagree and strongly disagree). Responses were quantified based on predefined levels: high agreement (≥75% of respondents voted agree/strongly agree or disagree/strongly disagree), moderate agreement (55%–74%)

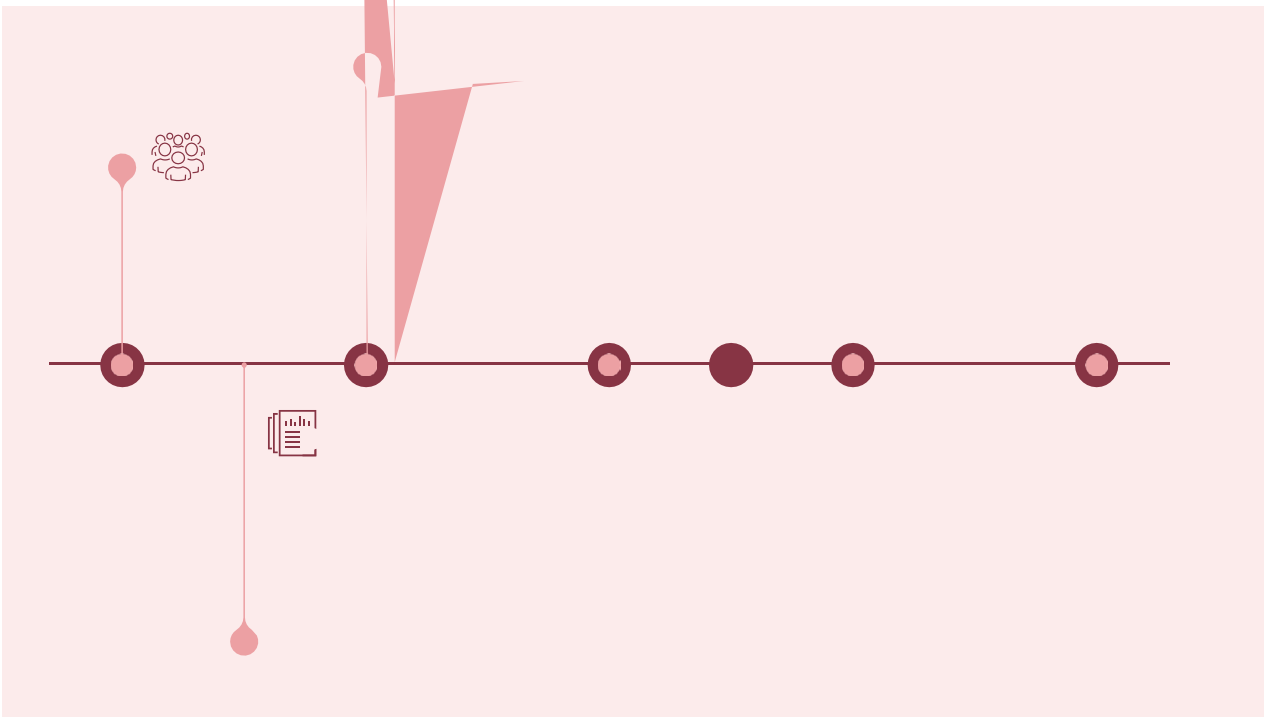

FIGURE 1 Overview of the workflow for the consensus-building process.

and low agreement (<55%). Statements were retained, revised or removed based on feedback. Consensus statements that did not receive high or moderate agreement and had a substantial number of 'neither agree nor disagree' responses were identified as areas where evidence remains inconclusive, highlighting the need for further research. The study materials and survey instruments were designed to be clear and focused. Separate piloting prior to dissemination was not conducted.

Consensus development process

The consensus development process followed a modified Delphi methodology involving voting and discussions. The first round involved voting on the initial set of consensus statements. A virtual meeting was then convened to discuss

TABLE 1 Finalized consensus statements.

Sl. no.	Finalized consensus statement	Level of evidence	Finalized in round	Final level of consensus
Diagnostic and monitoring tools				
1	Wood's lamp remains a favoured method for determining the extent and severity of melasma	5	3	High
2	Dermoscopic examination is an accepted non-invasive tool that can facilitate the differential diagnosis of melasma from similar conditions	2b, 5	2	High
3	Treatment monitoring with reflectance confocal microscopy enables the objectification of pigment variations after treatment and the identification of prognostic factors for different treatment modalities	2a	2	Moderate
4	Occasionally, melasma may appear like another hyperpigmentary condition. In such cases, a skin biopsy with histopathological examination is needed to confirm the diagnosis	5	1	High
Photoprotection				
5	The characteristics of an ideal sunscreen should include broad-spectrum coverage with protection against UVA, UVB and visible light, an optimal sun protection factor and cosmetic acceptability	4, 5	3	High
6	The addition of active ingredients such as antioxidants, depigmenting and moisturizing agents to sunscreen can increase its efficacy in managing melasma and enhance the skin's tolerability to topical treatments	5	2	Moderate
Topical agents				
7	Triple combination therapy (hydroquinone, tretinoin and fluocinolone acetonide) is the gold standard for the management of melasma and may be used as a first-line option	1b, 1a	2	High
8	Unsupervised use of triple combination therapy is not recommended, and proper precaution should be used	5, 5	2	High
9	The duration of intensive daily treatment with triple combination cream (TCC) can be up to 12 weeks. However, treatment variations may be patient-dependent	2b	2	High
10	The twice-weekly regimen of triple combination cream is effective for melasma and can be followed by tapering to other topical agents after the initial period of treatment	1b	1	High
11	Azelaic acid can serve as an effective treatment option for melasma patients with concerns about the adverse effects of hydroquinone	1a	1	High
12	Antioxidants such as topical vitamin C can be beneficial in managing melasma	1a	1	High
13	Combinations with ingredients such as kojic acid, arbutin, vitamin E and other botanical ingredients may be used as additional options	2b	3	High
Oral agents				
14	Oral tranexamic acid is effective in the management of melasma	2b, 5	3	High
15	Oral antioxidants, in combination with other appropriate treatment modalities, can serve as an option for the management of melasma	1b, 2b, 4	3	High
Chemical peels				
16	Glycolic acid is the most studied peel and shows superior outcomes compared to others. Other options include salicylic acid peels, retinoic acid peels, trichloroacetic acid (TCA) peels (low concentration) and Jessner's peels	2a	2	High
17	Glycolic acid and salicylic–mandelic acid peels have comparable efficacy and are well tolerated	1b	2	Moderate
18	Some of the refractory melasma can be treated by using a combination of a depigmenting agent (4% hydroquinone/TCC) and a peeling agent	4, 1b, 1b	1	High
19	Combination peels may be used as an additional option for the treatment and maintenance of melasma	2b	2	High
Energy-based devices and procedural treatments				
20	A low-fluence Q-switched Nd:YAG laser can be a suitable option for refractory cases of melasma	2a, 5	2	High
21	Vascular abnormalities have been implicated in melasma. There is promising evidence supporting the use of tranexamic acid and laser/light therapies to target the vascular component of melasma	2a	2	High

in melasma include inappropriate activation of melanocytes, aggregation of melanin and melanosomes in both the dermis and epidermis, increased mast cell count and solar elastosis, altered basement membrane integrity and increased vascularization.[2] Understanding these pathophysiological mechanisms is critical for selecting appropriate treatment modalities.

Diagnosis and monitoring (Statements 1–4 in Table 1)

The diagnosis of melasma can be challenging due to its clinical resemblance to other hyperpigmentation disorders. The panel agreed that Wood's lamp remains a favoured method for determining the extent and severity of melasma, but the constraints in accurately determining melanin depth may limit its use.[8] Although the utility of dermoscopy in the determination of depth has been contested, the expert panel felt that it is an accepted and non-invasive tool that can facilitate the differential diagnosis.[9,10] Though some authors suggest considering the intradermal component of melasma during diagnosis and treatment planning,[11] the panel discussion highlighted that therapeutic choice depends not so much on the depth as on the severity of melasma. The limited availability of reflectance confocal microscopy outside of research establishments was pointed out. However, its utility, when available, was acknowledged. A skin biopsy may be needed to confirm melasma in cases with close differential diagnosis. Histopathological findings typically show epidermal hyperpigmentation with hypertrophied melanocytes, increased melanin and mature melanosomes. The dermis can exhibit melanin-laden macrophages along with mononuclear infiltrates, increased vascularity, mast cells and elastosis.[12]

Treatment

Photoprotection (Statements 5, 6 in Table 1)

Photoprotection remains the cornerstone of melasma management, as high-energy visible light and ultraviolet radiation are significant contributors to its pathogenesis.[13] However, poor adherence to photoprotection, more so among high-risk groups, remains a challenge.[13,14] Cosmetic elegance and tone compatibility have been in-

(TCCs). It is often combined with other agents to enhance efficacy but requires close supervision due to rare yet significant risks like exogenous ochronosis. Hydroquinone can be applied evenly over the affected areas and used concurrently with sunscreen to protect from damaging UV light, which increases pigmentation. If there are no results after 3 months, hydroquinone should be discontinued. It is prudent to stop hydroquinone-containing creams for a few months before restarting to decrease the risk of side effects. It can also be used during weekends only or three times a week for more extended maintenance therapy with minimal complications. TCC, incorporating hydroquinone (4%), tretinoin (0.05%) and fluocinolone acetonide (0.01%), is regarded as the gold standard for melasma treatment and remains a first-line therapy. Although 4% is the standard, the use of TCC with a lower concentration of hydroquinone (2%) has also been reported. TCC formulations using different corticosteroids have shown efficacy. However, it has been indicated that fluorinated steroids (e.g., fluocinolone acetonide) are more effective and safer than non-fluorinated steroids.[27] TCC containing fluocinolone acetonide 0.01% has been shown to be as effective as mometasone furoate 0.1% with fewer side effects.[28] Treatment typically lasts up to 12 weeks, followed by a maintenance regimen, though the duration may vary. A twice-weekly regimen after intensive treatment and tapering to other topicals was suggested.[29] The expert panel emphasized that the TCC should only be used under clinical supervision, and proper precautions should be taken. Although TCC is recommended as first-line treatment, the expert panel agreed on azelaic acid as an option for those with concerns about adverse effects. Azelaic acid exhibits anti-inflammatory properties, making it a promising alternative to treatments that primarily target melanin production without addressing inflammation.[30] Azelaic acid-containing creams at concentrations of 15%–20%, twice daily for 6 months, have been recommended.[31] There was high consensus on the use of topical antioxidants, such as vitamin C, for melasma management. The benefits of topical vitamin C in the management of melasma and photoaging have been reported.[32] Such a dual role is noteworthy in light of evidence on pathophysiology suggesting melasma as a photoaging disorder.[33] For reasonable results, it has been suggested that a vitamin C concentration higher than 8% is required. Concentrations aboi (r7i)6.o (t)-1.9 (e) mentasonis re ma6.7 (o)4 (o)46.9 (a)-33.3 (l v)-31.4 (i)7.(o)4.8 (l-r t)-8 (

Chemical peels (Statements 16–19 in Table 1)

Chemical peels increase epidermal exfoliation and also target the dermal component of melasma by inducing phagocytosis of melanin granules. The expert panel agreed that, among other peels, glycolic acid is the most studied and shows superior outcomes.[52] This recommendation augments the previous Latin American consensus, which suggests a lack of clear evidence of superiority, but is in line with the Chinese consensus that supports the effectiveness of alpha hydroxy acid peels.[31,40] Serial glycolic acid peels enhance the efficacy of the topical regimen with a more rapid initial response and overall lightening of the skin.

In trials, glycolic acid has most commonly been used at 30%–50% concentrations, with higher strengths (up to 70%) also reported.[53–56] Higher concentrations may be suited for spot peels only under expert supervision. The utility of other options, such as salicylic acid (20%–30%),[54] retinoic acid (1%–10%),[57,58] trichloroacetic acid (low concentration of 10%–35%)[59] and Jessner's peels, was also acknowledged. Combining depigmenting agents such as 4% hydroquinone or TCC with chemical peels can enhance treatment outcomes for refractory melasma. Chemical peels promote controlled exfoliation, facilitating deeper penetration of topical agents and improving skin texture.[60,61] However, it has been recommended that medium-depth peels should be avoided.[31] The panel was also in favour of combination peels as an additional option for the treatment and maintenance of melasma. The agreement was moderate regarding whether glycolic acid and salicylic–mandelic acid peels have comparable efficacy. Some evidence reports that glycolic acid and salicylic–mandelic acid (20% salicylic/10% mandelic acid) peels are equally effective and provide better outcomes than phytic acid combination peels.[62] However, the scarcity of studies with head-to-head comparisons of different peels was pointed out.

Laser or energy-based devices and procedural treatments (Statements 20–24 in Table 1)

Laser treatment of melasma is at best a third-line therapy. Q-switched Nd:YAG laser (1064 nm) in toning mode is preferred for its selective melanin targeting with minimal complications.[63,64] Laser or energy-based devices, including Q-switched Nd:YAG lasers, picosecond lasers, intense pulsed light (IPL), pulsed dye laser (PDL) and radiofrequency, show efficacy but carry risks of relapse and adverse effects.[6] Though effective, the panel expressed that laser therapies require careful patient selection and are best reserved for refractory cases.[63–66] The expert consensus emphasized laser therapy as an adjunct rather than monotherapy, supported by meta-analysis data.[65] The potential of lasers to improve the delivery of topical agents to the target site has been reported.[65,67] There was high consensus that TA can be combined with laser/light therapies to treat the vascular component of melasma.[68]

Microneedling improves transcutaneous drug delivery and can be considered a step-up option before invasive procedures.[69] The discussion highlighted that microneedling promotes collagen production and remodelling of the dermal matrix and can serve as an additional procedural option. Evidence from an RCT suggests that both microneedling and TA improve the performance of TCC, with microneedling providing sustained remission.[70] Studies have shown that microneedling with 5% TA is effective.[45] The findings from a systematic review and meta-analysis also suggest that among various routes of TA delivery, intradermal injection and microneedling can be effective alternatives for melasma treatment.[71] However, the expert panel expressed the need for more studies confirming improvements in transcutaneous drug delivery, and the statement reached a moderate consensus. Several studies and RCTs suggest that 4 RC26.5 (n)4.8 (e e)-7.2 8d7 0 .8 (e)-fTp(7a)-16.8

include glutathione in this consensus, but clinicians should be prepared to counsel patients on its uncertain effectiveness and IV-related safety concerns.

Adjunct therapies and skincare (Statement 26 in Table 1)

Cosmeceuticals enriched with bio-actives, plant extracts, and hydrating agents can improve tolerability and compliance.[22,83] Skin care products often contain ingredients that help repair the skin barrier, which is crucial as impairment of the skin barrier can exacerbate melasma. When combined with treatments such as chemical peels or lasers, they can enhance efficacy and patient satisfaction. Moisturizers help restore the compromised skin barrier in melasma. While transdermal epidermal water loss in melasma lesions is similar to the surrounding skin, the barrier recovery rate in lesional skin is significantly slower, leading to reduced moisturizing capabilities and forming a vicious cycle.[22] Moisturizers reduce dryness and irritation from melasma treatments, minimizing post-inflammatory hyperpigmentation.[84]

A high consensus was observed on the use of combinations with botanical ingredients. Botanical ingredients have shown promising results in clinical studies.[83,85] Ingredients such as *Serratula quinquefolia*, *Rumex occidentalis*, *Artocarpus lakoocha*, licorice and tetrahydrocurcumin can potentially elicit positive responses in melasma.[83,86–89] These natural agents often possess multiple mechanisms of action, which collectively reduce hyperpigmentation while maintaining good tolerability. Incorporating these ingredients into combination therapies can allow for a more holistic approach to melasma management.

Limitations

The literature review relied only on PubMed with English language as a filter, which may have resulted in the exclusion of a few other relevant studies indexed in Embase, Scopus, Web of Science or regional databases. The modified Delphi approach ensured systematic refinement, but some recommendations lacked high-quality RCT evidence, making them reliant on lower levels of evidence. Additionally, not all experts may have had direct experience with every treatment modality included, which could have influenced the responses. Also, some statements received a proportion of 'neither agree nor disagree' responses, highlighting areas of ongoing uncertainty that need further research.

CONCLUSION

Melasma remains challenging due to its multifactorial pathogenesis and high recurrence rates. This consensus highlights the importance of a comprehensive approach to management, emphasizing photoprotection, topical therapies, oral therapies and adjunctive treatments. The recommendations also underscore the importance of addressing patient compliance through cosmetically acceptable formulations and education on proper skin care. This consensus provides a standardized framework for the diagnosis and

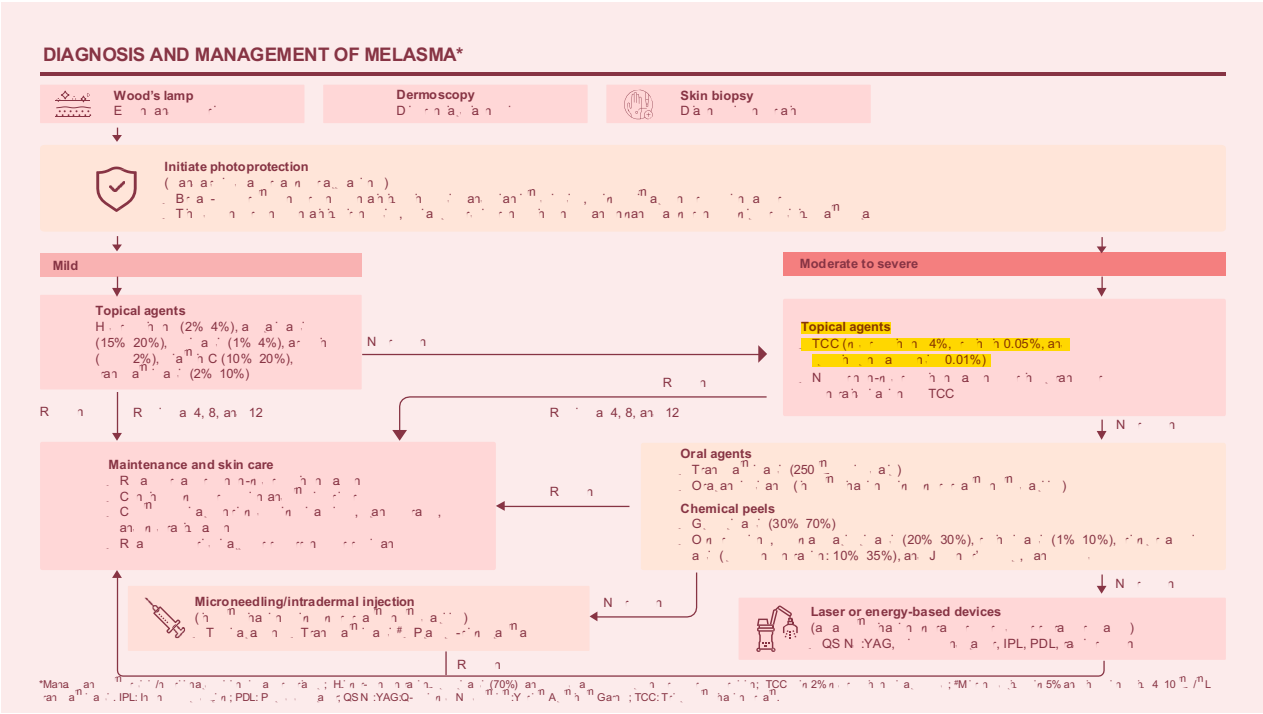

FIGURE 3 Simplified treatment algorithm for melasma summarizing the outcomes of panel discussions. IPL, intense pulsed light; PDL, pulsed dye laser; QS Nd:YAG: Q-switched Neodymium:Yttrium Aluminium Garnet; TCC, triple combination cream.

management of melasma, drawing on the latest evidence and expert opinions. By integrating these guidelines, dermatologists can optimize outcomes and improve patients' quality of life. A simplified algorithm summarizing the outcomes from the panel discussion is presented in Figure 3. Future research is needed to validate therapies and reduce recurrence.

AUTHOR CONTRIBUTIONS

All authors made substantial contributions to the conception or design of the work and participated in the critical review and editing of the manuscript for important intellectual content. Additionally, data curation and formal analysis were conducted by Dr. Rashmi Sarkar and Dr. Seemal R. Desai. All authors approved the final version of the manuscript to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the

ste t1.8 (l)-ymaestiat ed bnd resy o.8 (l)5.49 (e)8.8 (e)-7.6 (d)-0.15 (w]TJ/T1

Honoraria), Estée Lauder (Advisory Board Honoraria), Evolus, Inc. (Advisory Board Honoraria), Galderma Laboratories, L.P. (Advisory Board Honoraria), GloGetter (Consultant Stock Options), HMP Global (Speaker for CME credit Honoraria), Hugel America, Inc. (Advisory Board Honoraria), Incyte (Advisory Board Honoraria), Johnson & Johnson Innovative Medicine (Advisory Board Honoraria), LearnSkin (Speaker for CME credit Honoraria), L'Oréal USA (Advisory Board Honoraria), Medscape/WebMD (Speaker for CME credit Honoraria; Advisory Board Honoraria), MJH LifeSciences (Speaker for CME credit Honoraria), Pfizer (Advisory Board Honoraria), Piction Health (Consultant Stock Options), Sanofi (Consultant Honoraria), Scientist US (Advisory Board Honoraria), UCB (Advisory Board Honoraria) and Vichy Laboratoires (Advisory Board Honoraria). Dr. Susan Taylor also receives book royalties from McGraw-Hill and serves on the editorial boards of Practical Dermatology, Cutis and Archives in Dermatologic Research. She is a peer reviewer for the British Journal of Dermatology. Additionally, she has received investigator-initiated research grants from Allergan Aesthetics, Concert Pharmaceuticals/Sun Pharma, Croma-Pharma GmbH, Eli Lilly and Pfizer. Dr. Helio A. Miot – Advisory and speaker from Galderma, Kenvue, L'Oréal, Pfizer, Theraskin, and Beiersdorf. Investigator honoraria from AbbVie, Pierre-Fabre, Galderma, Theraskin. All authors disclosed relationships with pharmaceutical companies. Dr. Henry W Lim served as an investigator for Incyte, La Roche-Posay, Pfizer and PCORI; consultant for ISDIN, Beiersdorf, Ferndale, L'Oréal, Eli Lilly, Zerigo Health, Cantabria labs and Skinosive and as a speaker on general education sessions for La Roche-Posay, Cantabria labs, Pierre Fabre, NAOS, Uriage and Pfizer. These conflicts were transparently disclosed prior to study initiation and documented. The Delphi process was independently facilitated to ensure balanced input. All other authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analysed in this study.

ETHICAL APPROVAL

No ethical approval was required because this Delphi-based study involved only expert opinions via questionnaire rounds. No patient data, human biological samples or clinical interventions were involved.

ETHICS STATEMENT

All participants were informed about the study's purpose and provided consent prior to initiating the Delphi process. All panellists received an email invitation and completed the questionnaire only after providing informed consent via a consent statement embedded at the beginning of the survey. In surveying professional experts, no personal or sensitive data were collected.

ORCID

Rashmi Sarkar

14. Agarwal SB, Godse K, Patil S, Nadkarni N. Knowledge and attitude of general population toward effects of sun exposure and use of sunscreens. Indian J Dermatol. 2018;63(4):285–91.
15. Song H, Beckles A, Salian P, Porter ML. Sunscreen recommendations for patients with skin of color in the popular press and in the dermatology clinic. Int J Womens Dermatol. 2021;7(2):165–70.
16. Zhou C, Lee C, Salas J, Luke J. Guide to tinted sunscreens in skin of color. Int J Dermatol. 2024;63(3):272–6.
17. Schneider SL, Lim HW. A review of inorganic UV filters zinc oxide and titanium dioxide. Photodermatol Photoimmunol Photomed. 2019;35(6):442–6.
18. Seité S, Deshayes P, Dréno B, Misery L, Reygagne P, Saiag P, et al. Interest of corrective makeup in the management of patients in dermatology. Clin Cosmet Investig Dermatol. 2012;5:123–8.
19. Brown A, Passeron T, Granger C, Gilaberte Y, Trullas C, Piquero-Casals J, et al. An evidence-driven classification of non-filtering ingredients for topical photoprotection. Br J Dermatol. 2025;192(6):1132–4.
20. Lim HW, Kohli I, Ruvolo E, Kolbe L, Hamzavi IH. Impact of visible light on skin health: the role of antioxidants and free radical quenchers in skin protection. J Am Acad Dermatol. 2022;86(3S):S27–S37.
21. Passeron T, Lim HW, Goh CL, Kang HY, Ly F, Morita A, et al. Photoprotection according to skin phototype and dermatoses: practical recommendations from an expert panel. J Eur Acad Dermatol Venereol. 2021;35(7):1460–9.
22. Lee DJ, Lee J, Ha J, Park KC, Ortonne JP, Kang HY. Defective barrier function in melasma skin. J Eur Acad Dermatol Venereol. 2012;26(12):1533–7.
23. Wang Y, Zhao J, Jiang L, Mu Y. The application of skin care product in melasma treatment. Clin Cosmet Investig Dermatol. 2021;14:1165–71.
24. Bronzina E, Clement A, Marie B, Fook Chong KT, Faure P, Passeron T. Efficacy and tolerability on melasma of a topical cosmetic product acting on melanocytes, fibroblasts and endothelial cells: a randomized comparative trial against 4% hydroquinone. J Eur Acad Dermatol Venereol. 2020;34(4):897–903.
25. Schwartz C, Jan A, Zito PM. Hydroquinone. Available from: https://www.ncbi.nlm.nih.gov/books/NBK539693/ (last accessed 29 January 2025).
26. Bhattar PA, Zawar VP, Godse KV, Patil SP, Nadkarni NJ, Gautam MM. Exogenous ochronosis. Indian J Dermatol. 2015;60(6):537–43.
27. Shankar K, Godse K, Aurangabadkar S, Lahiri K, Mysore V, Ganjoo A, et al. Evidence-based treatment for melasma: expert opinion and a review. Dermatol Ther (Heidelb). 2014;4(2):165–86.
28. Vadukul DP, Rathwa M, Varu DP, Apurva P, Sunidhi RG, Nipul VV, et al. Comparison of effectiveness and ADR profile of topical triple combination preparation containing fluocinolone acetonide 0.01% versus mometasone furoate 0.1% in treatment of melasma – a split face study. Eur J Cardiovasc Med. 2024;14(5):115–9.
29. Grimes PE, Bhawan J, Guevara IL, Colón LE, Johnson LA, Gottschalk RW, et al. Continuous therapy followed by a maintenance therapy regimen with a triple combination cream for melasma. J Am Acad Dermatol. 2010;62(6):962–7.
30. Albzea W, AlRashidi R, Alkandari D, Sadan M, Alkandari A, Alkanderi JJ, et al. Azelaic acid versus hydroquinone for managing patients with melasma: systematic review and meta-analysis of randomized controlled trials. Cureus. 2023;15(7):e41796.
31. Gao TW, Gu H, He L, Lei TC, Li M, Li TN, et al. Consensus on the diagnosis and treatment of melasma in China (2021 version)#. Int J Dermatol Venereol. 2021;4(3):133–9.
32. Correia G, Magina S. Efficacy of topical vitamin C in melasma and photoaging: a systematic review. J Cosmet Dermatol. 2023;22(7):1938–45.
33. Passeron T, Picardo M. Melasma, a photoaging disorder. Pigment Cell Melanoma Res. 2018;31(4):461–5.
34. Al-Niaimi F, Chiang NYZ. Topical vitamin C and the skin: mechanisms of action and clinical applications. J Clin Aesthet Dermatol. 2017;10(7):14–7.
35. Desai S, Chan L, Handog E, Djojoseputro L, Lim J, Ling R, et al. Optimizing melasma management with topical tranexamic acid: an expert consensus. J Drugs Dermatol. 2023;22(4):386–92.
36. Zhang L, Tan WQ, Fang QQ, Zhao WY, Zhao QM, Gao J, et al. Tranexamic acid for adults with melasma: a systematic review and meta-analysis. Biomed Res Int. 2018;2018:1683414.
37. Ferra OM, Marlyn GK, Herry EJP, Alexandro IC, Lidya T, Joan AT, et al. Comparative efficacy of topical 10% versus 5% tranexamic acid in treatment of women with melasma: a double-blind randomized controlled trial. Universa Med. 2024;43(2):213–9.
38. Konisky H, Balazic E, Jaller JA, Khanna U, Kobets K. Tranexamic acid in melasma: a focused review on drug administration routes. J Cosmet Dermatol. 2023;22:1197–206.
39. Saka S, Rao GRR, Komaram RB, Kotha S, Tatavarthi R, Chitturi LP. Efficacy of 10% 699 topical tranexamic acid in melasma – A randomized placebo-c [illegible] 957 (2)2-10 (25)0.3 (8)8 (,3)- (iJ0.144 T2 (22)6</A

56. Kadu PP, Laul RA. 80% lactic acid peel versus 50% glycolic acid peel for melasma: a randomised clinical trial. Indian J Dermatol. 2025;70(3):152–6.
57. de Andrade ACDV, Coqueiro RDS, Pithon MM, Leite MF. Peeling with retinoic acid in microemulsion for treatment of melasma: a double-blind randomized controlled clinical study. J Cosmet Dermatol. 2024;23(2):479–85.
58. Khunger N, Sarkar R, Jain RK. Tretinoin peels versus glycolic acid peels in the treatment of melasma in dark-skinned patients. Dermatol Surg. 2004;30(5):756–60.
59. Sarkar R, Bansal S, Garg VK. Chemical peels for melasma in dark-skinned patients. J Cutan Aesthet Surg. 2012;5(4):247–53.
60. Mashiko T, Oka A, Osawa E, Koshima I. A deceptively simple solution for refractory melasma: glycolic acid peels and hydroquinone at home. Plast Reconstr Surg Glob Open. 2017;5(5):e1335.
61. Sarkar R, Kaur C, Bhalla M, Kanwar AJ. The combination of glycolic acid peels with a topical regimen in the treatment of melasma in dark-skinned patients: a comparative study. Dermatol Surg. 2002;28(9):828–32.
62. Sarkar R, Garg V, Bansal S, Sethi S, Gupta C. Comparative evaluation of efficacy and tolerability of glycolic acid, salicylic mandelic acid, and phytic acid combination peels in melasma. Dermatol Surg. 2016;42(3):384–91.
63. Cassiano DP, Espósito ACC, da Silva CN, Lima PB, Dias JAF, Hassun K, et al. Update on melasma—part II: treatment. Dermatol Ther (Heidelb). 2022;12(9):1989–2012.
64. Shah SD, Aurangabadkar SJ. Laser toning in melasma. J Cutan Aesthet Surg. 2019;12(2):76–84.
65. Ma W, Gao Q, Liu J, Zhong X, Xu T, Wu Q, et al. Efficacy and safety of laser-related therapy for melasma: a systematic review and network meta-analysis. J Cosmet Dermatol. 2023;22(11):2910–24.
66. Sarkar R, Aurangabadkar S, Salim T, Das A, Shah S, Majid I, et al. Lasers in melasma: a review with consensus recommendations by Indian pigmentary expert group. Indian J Dermatol. 2017;62(6):585–90.
67. Park SJ, Park JW, Seo SJ, Park KY. Evaluating the tolerance and efficacy of laser-assisted delivery of tranexamic acid, niacinamide, and kojic acid for melasma: a single center, prospective, split-face trial. Dermatol Ther. 2022;35(3):e15287.
68. Masub N, Nguyen JK, Austin E, Jagdeo J. The vascular component of melasma: a systematic review of laboratory, diagnostic, and therapeutic evidence. Dermatol Surg. 2020;46(12):1642–50.
69. Bailey AJM, Li HO- B: a44.5 (s)-16.1 (c8-10.6 ()-17.5 (s)-21.2 (3)-24.n(e)30.3o M)13Tspes-J3a3rsc8-10.6 ()-10 (b 3)-17.n 5 (, A)7 (u4 (a)-32.4 (g)-29.6 (7-21.2 (g-31.5 (i