Original Article

# Identifying the Core Content of a Dermatology Module for Malaysian Medical Undergraduate Curriculum Using a Modified Delphi Method

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## Abstract

***Background:*** **Dermatology is a minor module in internal medicine undergraduate curriculum. Limited time is allocated for its teaching. Most graduates are inadequately prepared to diagnose and manage skin diseases. We aimed to identify the core content of a more effective dermatology module.**

***Methods:*** **A modified Delphi method was used to reach a consensus. A questionnaire was developed by a selected panel and sent to 20 dermatologists, family physicians and general practitioners (GPs), respectively. They were asked to rate diseases according to importance. The participants then answered the questionnaire again with results of the first round made available to them. The final module content was identified based on the panel's collective opinions.**

***Results:*** **Eleven topics had mode and median values of 1 with an agreement level of more than 70%. They were as follows: (1) skin structure and function; (2) infections and infestations; (3) the skin in systemic diseases; (4) dermatology emergencies; (5) drug eruptions; (6) psoriasis; (7) eczema; (8) sexually transmitted infections; (9) leprosy; (10) acne; and (11) clinical skills and diagnostic procedures. A total of 56 diseases were identified as important.**

***Conclusion:*** **Results of this study reflect the importance of understanding the influence of regional factors on common and important skin diseases. These topics may be used to develop a more effective dermatology module for the Malaysian undergraduate medical curriculum.**

***Keywords:*** *medical students, skin diseases, medical education, dermatology, Delphi technique*

## Introduction

Dermatology is considered a medical subspecialty and taught as a component of Internal Medicine in undergraduate curricula. Traditionally, dermatology has been deemed less important than, for instance, cardiology; therefore limited time is allocated for teaching this module. Dermatology is formally taught in only a few local universities, depending on the content of the internal medicine programme. Among those institutions, the module content varies from one academic programme to another. In the United States, 33 medical schools do not have any undergraduate dermatology programs, while more than half dedicate less than 10 hours to a dermatology module (1). In the United Kingdom, according to a 2000 survey, 19 of 24 medical schools have an integrated dermatology curriculum (2) but with varying content. In our country, most medical academic programmes are developed using the British, Australian or American models.

Despite being perceived as a minor subject, several studies have highlighted the importance of dermatology knowledge, particularly in general practice where dermatological diseases are common. According to Kerr et al. (3), 3% to 20% of primary care consultations in a two-week period were due to skin diseases, of which 22.5% were eczema and 20.3% were infections. In the United Kingdom, up to 71% of general practitioners surveyed thought it important that dermatology be included in both undergraduate and post graduate training (4). Furthermore,

 

about two thirds of primary care physicians felt that their undergraduate education did not sufficiently prepare them to diagnose common skin diseases (5). Additionally, only about half of those who undertook a dermatology module felt adequately prepared to make a diagnosis, and just 42% felt able to treat common skin conditions (5).

In 2006, the British Association of Dermatologists (BAD) recommended an evidence-based core undergraduate dermatology curriculum (6). Of the 29 medical schools audited in the U.K. three years later, seminars and lectures ranged from 0 to 39 hours, and the number of clinic sessions ranged from 0 to 18 (7). Most curricula did include essential clinical skills, background knowledge, skin failure and emergency dermatology. The Canadian curricula were surveyed in 1983, 1987 and 1996. The average instruction duration assigned for dermatology improved from 13.5 hours to 20.5 hours between 1996 and 2008 (7). In 2011, a mean of 20.5 (17.2) hours (range 4 to 80) was allocated for dermatology (7).

The relevance of a module's core content to the local setting for a clinical practice is an important design consideration. The module should be tailored to particular aspects of the Asian population, including our tropical climate and skin colour. A well-planned module not only prepares graduates for clinical practice in a tropical country, but is also applicable worldwide.

The objective of this study was to identify the core content of a Malaysian dermatology medical undergraduate module that would more adequately prepare graduates to diagnose and treat skin diseases.

## Materials and Methods

This was a cross-sectional study using a modified Delphi method. The Delphi method provides a systematic approach to identify, prioritise and achieve a consensus. It allows contributions of expertise, represents a collective judgment, gives an opportunity to revise views, is anonymous and avoids direct confrontation (8). There are variations in the Delphi method, but essentially, a moderator assembles a panel of experts, presents them with a set of questionnaires that they are asked to respond to, then the opinions of each expert are collected and analysed. The experts then review the results of the analyses and are given the opportunity to revise their opinions. The revised opinions are again analysed, and the final results are produced.

This study modified the Delphi method in terms of the selection of panel members and the number of iterations. Development of the questionnaire used in the study has been previously described (9). A questionnaire containing lists of dermatological conditions to be included in the curriculum was developed by one family physician and three dermatologists (two from an academic institution and one from the Ministry of Health). The list was compiled based on the BAD recommendations for a medical undergraduate curriculum (6), standard dermatology textbooks (10,11), published literature on the subject (1,4,12,13) and personal clinical experience. Section 1 of the questionnaire lists 20 topics according to the classification of dermatological diseases and common dermatological diseases. Section 2 expands each classification by listing specific diseases or conditions. From 4 to 15 diseases are identified under each classification. This provides a total of 175 options to be graded by each participant. The questionnaire was sent via email or post to 20 members of the Dermatological Society of Malaysia, 20 family physicians and 20 general practitioners who are members of the Academy of Family Physicians of Malaysia. All the members of the Dermatological Society of Malaysia are qualified dermatologists, while members of the Academy of Family Physicians of Malaysia consist of family physicians and general practitioners. Dermatologists, family physicians and general practitioners were chosen as the responders in this study since they are the key healthcare professionals managing most dermatological cases.

Participants were asked to rate the importance of each disease or condition as part of the curriculum content based on a 5-point Likert scale (1 = Very important, 2 = Fairly important, 3 = Undecided, 4 = Fairly unimportant, 5 = Not important). They were given six weeks to return the completed survey.

Responses from this survey were classified as Round 1. The responses were analysed, and a summary of the results were prepared. The results from Round 1 along with the same survey questions were sent again to the respondents. They were asked to look at the results and answer the survey a second time (Round 2). They were allowed to change or keep their previous answers after considering the group's collective opinion from Round 1. Results from Round 2 were then analysed.

*Sample size calculation*

The Delphi group size does not generate statistical power; rather, the size generates a group dynamic in order to achieve consensus among experts. The literature recommends 10–18 experts on a Delphi panel (13). We decided to enrol a group consisting of 20 dermatologists, 20 family physicians and 20 general practitioners—a slightly larger group size to account for drop-outs.

*Inclusion criteria*

1. Dermatologists who are members of the Dermatological Society of Malaysia and registered with the National Specialist Registry.
2. Family physicians who are members of the Academy of Family Physicians of Malaysia and registered with the National Specialist Registry.
3. General practitioners.

*Exclusion criteria*

1. Non-practicing members of the Dermatological Society of Malaysia or Academy of Family Physicians of Malaysia.

*Statistical analysis*

Statistical analyses were performed for both Round 1 and Round 2. Mode and median values of each topic were calculated. Mode values that are the same as the median values indicate that the results are a valid representation of the group's view. The level of agreement was determined by calculating the percentage of respondents that choose each scale. Topics designated by the mode "very important" (Likert scale of 1), median 1 and level of agreement more than 70% will be included in the module recommendation.

## Results

In Round 1, 15 (75%) dermatologists, 12 (60%) family physicians and 12 (60%) general practitioners responded. In Round 2, 8 (53%) dermatologists, 5 (42%) family physicians and 7 (46%) general practitioners responded. In the general classification list of skin diseases, the mode and median values were the same in 16 out of 18 topics in Round 1. In 10 of the topics, the mode and median values were one. Six topics were marked as "very important" (Likert scale of 1) by more than 70% of respondents: Skin Structure and Function, Infections and Infestations, Dermatology Emergencies, Drug Eruptions, Psoriasis and Eczema. Agreement Levels of more than 50% were seen in three topics: the Skin in Systemic Diseases, Sexually Transmitted Infections and Acne. In Round 2, the mode and median values were the same in 17 topics, and more than 70% of respondents marked 11 topics as "very important": Skin Structure and Function, Infections and Infestations, the Skin in Systemic Diseases, Dermatology Emergencies, Drug Eruptions, Psoriasis, Eczema, Sexually Transmitted Infections, Leprosy, Acne and Clinical Skills and Diagnostic Procedures. The levels of agreement for "very important" in the rest of the topics were less than 30%. The mode and median values were 1 in 11 topics compared with 10 topics in Round 1. The mode for leprosy was 1 with a median of 2 in Round 1; but in Round 2, both mode and median values were 1.

Tables 1–3 show the results for the contents of each topic that achieved a level of agreement of more than 70% with mode and median values of 1. For Skin Structure and Function, anatomy, physiology, functions and pathophysiology of the skin were rated as "very important". Histopathology of common skin diseases were rated as median and mode 2 with a level of agreement of 25%. Modes of 1 with levels of agreement >70% for "very important" were seen in 20 out of 28 diseases listed in infections and infestations. The levels of agreement for the other diseases were <30%, except for ecthyma (Table 1).

In the Skin and Systemic diseases, four diseases had a mode and median of 1 and levels of agreement >70%: cutaneous lupus erythematosus, dermatomyositis, scleroderma and diabetes mellitus. The levels of agreement for the rest of the diseases (Bechet's syndrome, sarcoidosis, skin signs of viral hepatitis systemic vasculitides, internal malignancy/paraneoplastic conditions, dermatitis herpetiformis and amyloidosis) were less than 50%.

In Dermatology Emergencies, acute erythroderma, staphylococcus scalded skin syndrome, urticaria, angioedema, anaphylaxis, Stevens-Johnson syndrome and toxic epidermal necrolysis were identified as the conditions to be included in the dermatology module. Eczema herpeticum and psoriasis von Zumbusch achieved a level of agreement of 65% and 45%, respectively. Exanthematous drug eruption, drug-induced hypersensitivity syndrome, fixed drug eruption and erythema multiform had mode values of 1,

**Table 1:** The mode and median values of each topic and the percentage of respondents that chose "very important" for the contents of Infections and infestations

| Topic | Round 1 | | Round 2 | |
|---|---|---|---|---|
| **Infection and infestations** | **Mode, median** | **Very important (%)** | **Mode, median** | **Very important (%)** |
| Erythrasma | 2, 2 | 30.8 | 2, 2 | 5.0 |
| Impetigo | 1,1 | 92.3 | 1, 1 | 100.0 |
| Ecthyma | 1, 2 | 43.2 | 1, 1 | 65.0 |
| Folliculitis | 1, 1 | 82.1 | 1, 1 | 85.0 |
| Abscess, furuncle, carbuncle | 1, 1 | 87.2 | 1, 1 | 90.0 |
| Erysipelas | 1, 2 | 47.4 | 1, 1 | 70.0 |
| Cellulitis | 1, 1 | 87.9 | 1, 1 | 90.0 |
| Necrotizing fasciitis | 2, 2 | 46.3 | 2, 2 | 30.0 |
| Mycobacterium infection | 2, 2 | 34.2 | 2, 2 | 20.0 |
| Tinea pedis and manuum | 1, 1 | 92.3 | 1, 1 | 100.0 |
| Tinea corporis, cruris | 1, 1 | 92.3 | 1, 1 | 92.3 |
| Tinea capitits, kerion | 1, 1 | 89.7 | 1, 1 | 95.0 |
| Pityriasis versicolor | 1, 1 | 87.2 | 1, 1 | 100.0 |
| Cutaneous candidiasis | 1, 1 | 76.9 | 1, 1 | 100.0 |
| Onychomycosis | 1, 1 | 69.2 | 1, 1 | 75.0 |
| Subcutaneous mycoses | 2, 2 | 25.6 | 2, 2 | 20.0 |
| Invasive mycoses | 2, 2 | 17.9 | 2, 2 | 10.5 |
| Molluscum contagiosum | 1, 1 | 74.4 | 1, 1 | 95.0 |
| Viral exanthems | 1, 1 | 82.1 | 1, 1 | 100.0 |
| Hand, foot and mouth disease | 1, 1 | 84.6 | 1, 1 | 90.0 |
| Herpes labialis | 1, 1 | 71.8 | 1, 1 | 90.0 |
| Varicella zoster | 1, 1 | 94.9 | 1, 1 | 100.0 |
| Herpes zoster | 1, 1 | 94.9 | 1, 1 | 100.0 |
| Verruca vulgaris | 1, 1 | 53.8 | 1, 1 | 75.0 |
| Pediculosis | 1, 1 | 65.8 | 1, 1 | 80.0 |
| Scabies | 1, 1 | 94.7 | 1, 1 | 90.0 |
| Cutaneous larva migrans | 1, 2 | 43.6 | 2, 2 | 35.0 |
| Insect bite reactions | 1, 1 | 61.5 | 1, 1 | 75.0 |

and the levels of agreement were 90% (Table 2). Atopic and seborrheic eczemas were rated as "very important" by all the respondents in Round 2. Other types of eczema with levels of agreement of more than 70% were discoid eczema, hand and feet eczema, stasis eczema, allergic and irritant contact dermatitis and photodermatitis (Table 2).

In sexually transmitted infections, syphilis, gonorrhoea, genital herpes, genital warts and Chlamydia trachomatis infection were designated "very important" with mode and median values of 1. The levels of agreement for these infections were 100%, except Chlamydia (80%) (Table 2).

All respondents in Round 2 agreed that taking dermatological histories, physical examinations and identification and description of cutaneous lesions were "very important" topics. The level of agreement for counselling was 90%; skin scraping for fungal culture, 80%; and the agreement level for tape testing was 65% (Table 3). Only 5% of respondents thought the Tzanck smear and slit-skin smear was "very important".

**Table 2:** The mode and median values of each topic, and the percentage of respondents that chose very important for the contents of Drug eruptions, Eczema and Sexually transmitted infections

| Topic | Round 1 | | Round 2 | |
|---|---|---|---|---|
| **Diseases** | **Mode, median** | **Very important (%)** | **Mode, median** | **Very important (%)** |
| Exanthematous drug eruption | 1, 1 | 74.4 | 1, 1 | 90.0 |
| Drug induced hypersensitivity syndrome | 1, 1 | 71.8 | 1, 1 | 90.0 |
| Acute generalised exanthematous pustulosis | 1, 2 | 44.7 | 1, 2 | 45.0 |
| Fixed drug eruption | 1, 1 | 69.2 | 1, 1 | 90.0 |
| Erythema multiforme | 1, 1 | 66.7 | 1, 1 | 90.0 |
| Drug induced lupus | 2, 2 | 39.5 | 2, 2 | 20.0 |
| Drug induced vasculitis | 2, 2 | 33.3 | 2, 2 | 25.0 |
| Drug induced photosensitivity | 2, 2 | 41.0 | 2, 2 | 35.0 |
| Atopic eczema | 1, 1 | 94.9 | 1, 1 | 100.0 |
| Seborrhoiec eczema | 1, 1 | 84.6 | 1, 1 | 100.0 |
| Discoid eczema | 1, 1 | 61.5 | 1, 1 | 90.0 |
| Hand and feet eczema | 1, 1 | 82.1 | 1, 1 | 95.0 |
| Asteatotic/craquele | 2, 2 | 28.2 | 2, 2 | 25.0 |
| Stasis eczema | 1, 1 | 59.0 | 1, 1 | 75.0 |
| Juvenile plantar | 2, 2 | 15.6 | 2, 2 | 0.0 |
| Allergic contact dermatitis | 1, 1 | 92.3 | 1, 1 | 95.0 |
| Irritant contact dermatitis | 1, 1 | 38.7 | 1, 1 | 90.0 |
| Photodermatitis | 1, 1 | 61.5 | 1, 1 | 85.0 |
| Phytodermatitis | 2, 2 | 26.3 | 2, 2 | 10.0 |
| Photophytodermatitis | 2, 2 | 23.1 | 2, 2 | 5.0 |
| Syphillis | 1, 1 | 89.7 | 1, 1 | 100.0 |
| Gonorrhoea | 1, 1 | 89.7 | 1, 1 | 100.0 |
| Genital herpes | 1, 1 | 87.2 | 1, 1 | 100.0 |
| Genital warts | 1, 1 | 84.6 | 1, 1 | 100.0 |
| Chlamydia trachomatis infection | 1, 1 | 66.7 | 1, 1 | 80.0 |
| Lymphogranuloma venereum | 1, 2 | 43.6 | 2, 2 | 35.0 |
| Chancroid | 1, 2 | 43.6 | 2, 2 | 45.0 |
| Granuloma Inguinale | 1, 2 | 43.6 | 2, 2 | 35.0 |

In general, the mode and median values in Round 1 are similar to the results seen in Round 2. The percentage of respondents agreeing to "very important" increased in Round 2 for diseases with a mode of 1. For diseases with a mode or median of 2 or more, the percentage of respondents who marked "very important" decreased in Round 2.

## Discussion

The Delphi method is a recognised research tool used to obtain a consensus from a group of people who are usually experts in their field (8). In this study, the experts in dermatology were the dermatologists. Family physicians and general practitioners were included because they provide primary care and decide if a patient

**Table 3:** The mode and median values of each topic, and the percentage of respondents that chose "very important" for the contents of Clinical skills and diagnostic procedures

| Topic | Round 1 | | Round 2 | |
|---|---|---|---|---|
| **Clinical skills and diagnostic procedures** | **Mode, median** | **Very important (%)** | **Mode, median** | **Very important (%)** |
| Dermatology history taking | 1, 1 | 97.4 | 1, 1 | 100.0 |
| Dermatology physical examination | 1, 1 | 97.4 | 1, 1 | 100.0 |
| Identification and description of cutaneous lesions | 1, 1 | 94.6 | 1, 1 | 100.0 |
| Counselling | 1, 1 | 71.1 | 1, 1 | 90.0 |
| Tape test | 1, 1 | 56.8 | 1, 1 | 65.0 |
| Skin scraping for fungal culture | 1, 1 | 57.9 | 1, 1 | 80.0 |
| Microscopic examination with KOH | 1, 1 | 52.6 | 1, 1 | 75.0 |
| Tzanck smear | 2, 2 | 23.7 | 2, 2 | 5.0 |
| Slit skin smear | 2, 2 | 21.1 | 2, 2 | 5.0 |

requires a dermatology referral. Skin disease is a common complaint in general practice. Fien et al. (14) reported 72.2% of patients' chief complaint involved skin symptoms and signs, although only 21% of patients had a skin problem. Lowell et al. (15) found that 36.5% of patients at a primary care centre reported at least one skin problem, and it was the presenting complaint for 58.7% of the patients. About 37% of patients were referred to a dermatologist, demonstrating that family physicians and general practitioners encounter a considerable number of patients with skin diseases and are able to identify which skin diseases are common and which pose a serious risk to the patient. Furthermore, since most family physicians supervise junior medical officers in Government Health Clinics, they would be able to provide feedback on the knowledge and clinical skills that might be deficient in young doctors. Family physicians and GPs could also recommend which courses to focus on in order to build a new undergraduate curriculum.

At least 12 (60%) of those approached for the study responded in Round 1. This is adequate; the recommended number for a Delphi study is 10–18. In Round 2, the number of respondents dropped by about 50%. This is a limitation in interpreting the results of this study. However, the results in Round 1 were similar to Round 2, and the levels of agreement were higher in Round 2. These results most likely are reflective of the group's original opinions.

Responses from dermatologists were compared to responses from family physicians and general practitioners. Their opinions on the various topics were found to be comparable in modes and medians, with slight differences in the levels of agreement.

Topics with the mode "very important" (1), median 1 and levels of agreement >70% are skin structure and function, infections and infestations, skin in systemic diseases, dermatology emergencies, drug eruptions, psoriasis, eczema, sexually transmitted infections, leprosy, acne and clinical skills and diagnostic procedures. The diseases under each of these topics with the mode "very important" (1), median 1 and levels of agreement >70% are outlined in the results, above. Altogether, 56 diseases were identified. The list consists mainly of common diseases, and diseases that are not common and must not be overlooked in the clinical setting and a few clinical and diagnostic skills. These diseases and skills will be included in the recommendation for a Malaysian dermatology module.

The British Association of Dermatologists (BAD) included 54 learning outcomes in their recommendations (6). The content of the BAD recommendation differs with the results of our study because skin cancer, sun damage, pressure sores, and therapeutics are included. Chronic leg ulcers, purpuric rashes, itching, a red swollen leg, a changing pigmented lesion and an enlarging cutaneous lesion are placed under the topic "common and important problems". Skin infections and infestations, including tinea and scabies, are not in the main recommendations, but are proposed as

supplementary learning outcomes. Leprosy does not feature in the BAD recommendation. Syphilis is included in supplementary learning outcomes. The differences in the BAD recommendations compared to our results reflect the influence of climate, ethnicity and socio-economy on the types of diseases common and important in this region.

The objectives of the dermatology undergraduate curriculum in India are outlined by the Medical Council of India (11). Skin scraping for identification of fungus, slit-skin smears for leprosy and investigations for sexually transmitted infections were specifically highlighted. The American Academy of Dermatology recommends a curriculum which was created by a group of experienced dermatology educators (16). There are 39 modules, including a special module on Paediatric dermatology. Dermatoses in pregnancy, erythema nodosum, erythroderma and HIV dermatology were listed as optional modules. Melanoma, basal cell carcinoma, benign skin lesions, evaluation of a pigmented lesion and actinic keratosis and squamous cell carcinoma are recommended as separate modules. The emphasis on skin cancer is not as important in our Asian population due to the lower prevalence of skin malignancy.

## Conclusion

Results of this study may be used as a guide for developing a dermatology module in the Malaysian medical undergraduate curriculum. It is hoped that this will improve dermatology teaching in our medical schools and improve the clinical skills of our graduates.

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## Conflict of Interest

None.

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