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A survey of students' and junior doctors' confidence in diagnosing in skin of colour

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ABSTRACT

INTRODUCTION. To combat ethnic inequalities in health, medical students should be prepared to treat all patients. Denmark has become an increasingly diverse society and therefore needs a medical curriculum that reflects the change in population composition. This study aimed to assess if the dermatology curriculum in Denmark prepared medical students to diagnose dermatological diseases in patients with skin of colour (SoC).

METHODS. From 20 September to 12 October 2022, a survey was distributed to medical students and junior doctors who had completed the dermatology curriculum at one of the medical schools in Denmark between 2010-2022. The participants were recruited mainly via Facebook. The statistical data were analysed in STATA, and free-text responses were analysed using thematic analysis.

RESULTS. A total of 592 medical students (n = 285) and junior doctors (n = 307) completed the survey. In SoC, 43.9% and 32.6% felt confident to a poor or very poor degree in diagnosing dermatological diseases versus 5.9% and 2.5% in white skin. Among others, the respondents suggested to increase visual examples in the curriculum and integrate SoC in exams to increase their confidence level when diagnosing in SoC.

CONCLUSION. Danish medical students and junior doctors are significantly less confident when diagnosing dermatological diseases in SoC than in white skin. Revision of the dermatology curriculum is needed to increase the students' confidence level and knowledge of SoC to prepare them to treat all patients, ultimately reducing ethnic inequalities in health.

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Denmark has become increasingly diverse as a result of immigration. As of 2022, non-Western immigrants and their descendants constitute 9.7% (n = 574,641) of the Danish population [1]. Although people of colour are affected by skin cancer at a much lower incidence than the white population, they are more likely to have greater morbidity and mortality from skin cancer due to, e.g., delayed diagnoses [2-5]. While these studies are from the US, similar dynamics are likely to be found in Denmark where studies point to significant health inequalities among ethnic minorities [6, 7], including delay in diagnosis. In addition, health professionals feel unsure and unprepared when delivering healthcare to migrants and ethnic minorities [8, 9]. The dermatology curriculum should ensure that medical students are prepared to treat all patients in Danish healthcare, ultimately reducing ethnic inequalities in health. To our knowledge, medical students' confidence level when

diagnosing dermatological diseases in skin of colour (SoC) has not been investigated in a European context. However, a Canadian study found that medical students were less confident in diagnosing dermatological diseases in SoC [10].

The purpose of this study was to elucidate if the dermatology curriculum in Denmark reflects the diversity of the population and prepares medical students to diagnose dermatological diseases in patients with SoC.

The study was conducted with medical students from all four medical schools in Denmark.

All four schools teach dermatology as part of their master's programmes at either the third or sixth and final semester of medical school. The education form for all medical schools is a combination of lectures (some online) and a case-based flipped classroom approach in which some schools also include patients in the class. However, the distribution of the two differs between schools as does the time allocated for the course. The schools have allocated 24-50 hours (excluding independent reading) to teach students the dermatology curriculum.

METHODS

This was a descriptive cross-sectional survey study conducted among medical students and junior doctors from all four medical university schools in Denmark; University of Copenhagen (total number of master students: 1,733), Aarhus University (1,391), University of Southern Denmark (948) and Aalborg University (425) [11-13]. The study is based on a questionnaire distributed from 20th September to 12 October 2022.

Study population

The study population was medical students and junior doctors who completed the dermatology curriculum at one of the four medical university schools in Denmark during the 2010-2022 period.

Survey design

The survey consisted of 16 questions focusing on the students' personal experiences with the dermatology curriculum. Before being implemented, the survey was commented upon by all authors including three dermatology professors. Their contributions were incorporated before two medical students were invited to participate in cognitive interviews to pilot test the survey. Based on the students' feedback, the survey was further revised. Besides questions about participant characteristics, the survey presented the respondents to a series of statements about the dermatological curriculum which were answered on an five- or six-point Likert scale. Among others, the respondents were asked to rate their agreement on the following statement: "To which degree do you feel confident in diagnosing dermatological diseases in SoC" on a six-point Likert scale ranging from: "to a very high degree" to "to a very poor degree" with the possibility of answering "I do not remember". The respondents who answered "to a certain degree" to "to a very poor degree" were asked an additional free-text question encouraging them to provide their own suggestions for how students may become more confident in diagnosing dermatological diseases in SoC.

Data collection and analysis

The survey was distributed online on Facebook and LinkedIn and was advertised in a local student magazine at the University of Copenhagen. All four universities have a Facebook group for their medical students. The survey was published on each of the Facebook groups and on a Facebook group for soon-to-be junior doctors. This recruitment strategy was chosen as it was not possible to reach the students via their student e-mail due to the General Data Protection Regulation (GDPR). The respondents gave informed consent before answering the survey and all responses were anonymised.

The survey responses were obtained through SurveyXact, an online survey tool for creating surveys and collecting quantitative data. All statistical analyses were done in STATA Statistical Software (Stata Corp LP, College Station, TX). In STATA, the partially completed responses (n = 657) were removed to ensure the reliability of the data.

The free-text responses were analysed using thematic analysis and quotations that either elaborated or nuanced the themes are described in the following section.

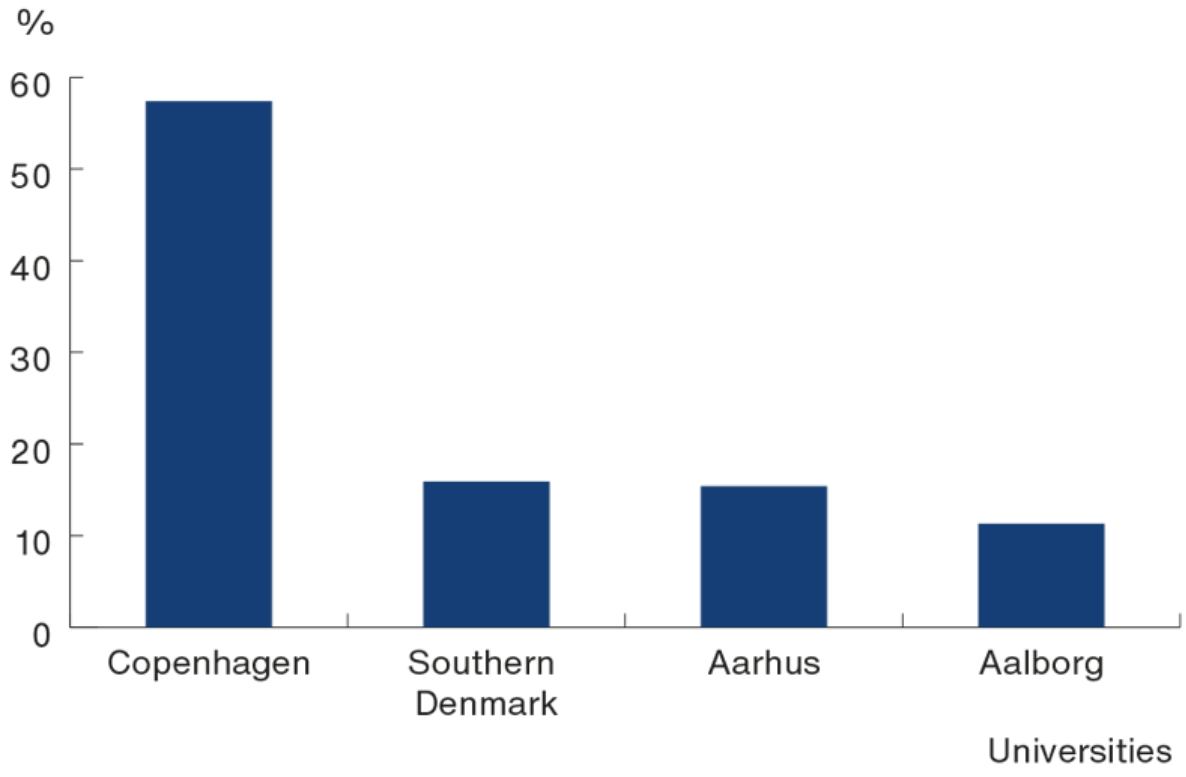
Trial registration: not relevant

RESULTS

Participant characteristics

A total of 592 individuals answered the survey: 285 (48.1%) medical students and 307 (51.9%) junior doctors. A total of 57.4% of the respondents were from the University of Copenhagen, 15.9% from the University of Southern Denmark, 15.4% from Aarhus University and 11.3% were from Aalborg University, see **Figure 1**. A total of 89.0% of the respondents completed the dermatology curriculum between 2018 and 2022; and 71.3% of the respondents described their ethnicity as Danish or ethnic Danish.

FIGURE 1 "At which university did you complete the Dermatology curriculum?"



It has not been possible to determine a response rate as the total sample group is unknown because of the recruitment strategy.

General satisfaction with the dermatology course

When asked how satisfied the respondents were with the teaching on the dermatology course, 27.5% of the respondents were very satisfied, 42.9% were satisfied, 22.0% were adequately satisfied, 5.2% were not satisfied and 2.4% did not remember.

A total of 45.9% of the respondents were very satisfied or satisfied with the recommended textbooks [14, 15], 26.9% were adequately satisfied, 7.3% were not satisfied, whereas 19.9% did not study the textbook or did not remember.

After finishing the course, 45.3% felt, to a very high or high degree, that they were prepared to diagnose the most common dermatological diseases; 44.4% felt prepared to a certain degree, whereas 8.8% felt prepared to a poor or very poor degree to diagnose the most common dermatological diseases. Finally, 1.5% did not remember.

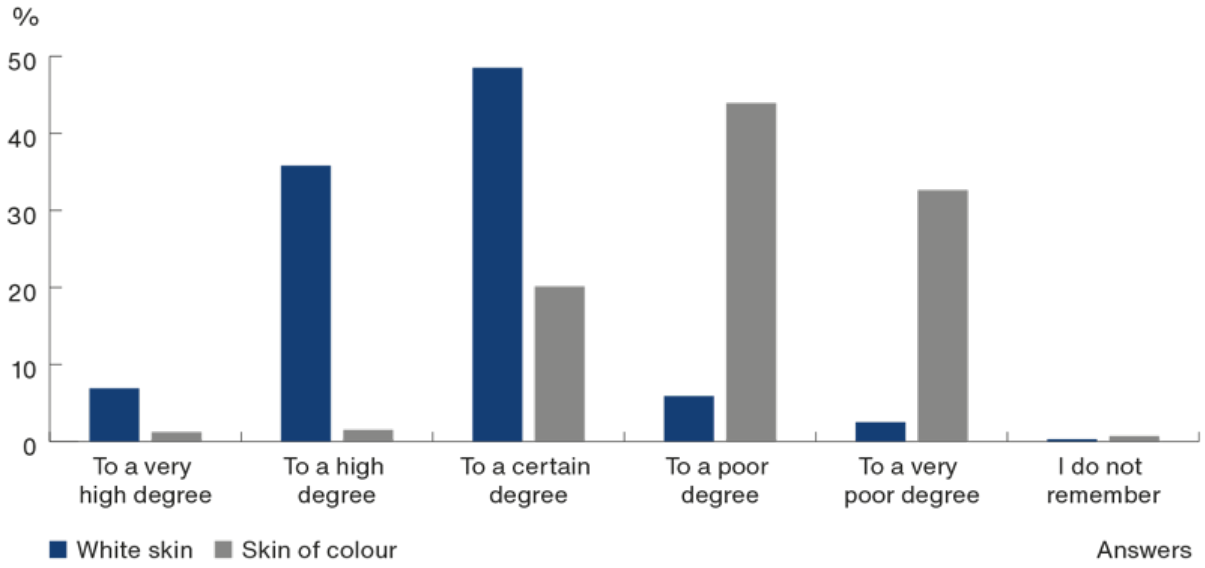
Diversity and self-rated confidence

The respondents were asked to which degree they were made aware in class that dermatological diseases may appear differently in SoC than in white skin: 20.4% answered to a very high or high degree, 24.8% to a certain degree, 48.0% answered to a poor or very poor degree and 6.8% did not remember.

When asked to which degree diversity in skin colour was a topic for the course, 6.1% answered to a very high or high degree, 16.1% to a certain degree, whereas 70.3% answered to a poor or very poor degree and 7.6% did not remember.

The respondents were asked to rate their confidence in diagnosing dermatological diseases in white skin and SoC. In white skin, 6.9% and 35.8% felt confident to a very high or high degree in diagnosing dermatological diseases, 48.5% felt confident to a certain degree, whereas 5.9% and 2.5% felt confident to a poor or very poor degree. Finally, 0.3% did not remember. In SoC, 1.2% and 1.5% felt confident to a very high or high degree in diagnosing dermatological diseases, 20.1% felt confident to a certain degree, whereas 43.9% and 32.6% felt confident to a poor or very poor degree. Finally, 0.7% did not remember, see **Figure 2**. A total of 404 of the respondents answered the additional free-text question in which they were asked to give suggestions as to how they could come to feel more confident in diagnosing dermatological diseases in SoC. The analysis of the responses highlighted one major and one minor theme: a need for more pictures in the curriculum and challenges associated with changing the curriculum. A total of 85.1% (n = 344) of the responses included the word “picture”, “cases” or “examples”, making it the most prevalent theme.

FIGURE 2 "To which degree do you feel confident in diagnosing dermatological diseases on either white skin or skin of colour?"



The respondents emphasised a desire to learn about pattern recognition to apply their knowledge to a broad range of skin colours. One of the respondents stated that "*dermatological diseases are very much based on patterns and pattern recognition. You should have examples showing how the different patterns look on many different skin tones so you get better at recognising patterns rather than just knowing how it appears in white skin"*. The respondents suggested simple adjustments such as side-by-side comparisons of dermatological diseases in the lectures and textbooks. Several students had taken it upon themselves to educate themselves on the subject *"... if it is not presented in the textbooks, the professors should give examples in class. I took it upon myself to find another book [Mind the Gap] to fill the gaps in my knowledge ... the book is not comprehensive, but it gives me knowledge"*. The respondents emphasised the importance of including cases with SoC in the exams to create an incentive to study the subject. A minor part of the respondents had reservations about changing the curriculum. Thus, 0.5% (n = 2) of the respondents meant that the current curriculum reflected the demographics of Denmark, whereas 0.2% (n = 1) highlighted that the current curriculum is already extensive and difficult.

DISCUSSION

This study found that, in general, Danish medical students and junior doctors were satisfied with the dermatology course and found that they were prepared to diagnose the most common dermatological diseases. However, the respondents were significantly less confident in diagnosing dermatological diseases in SoC than in white skin, and they did not find diversity in skin colour to be a topic of priority in the curriculum.

Further research is needed to reveal any associations between medical students' and junior doctors' ethnicity and their confidence in diagnosing dermatological diseases in SoC as these associations are beyond the scope of this paper.

Skin of colour in an international context

The findings of our study are supported by a Canadian study, which similarly found medical students to be significantly less confident when diagnosing dermatological manifestations in SoC than in white skin [10]. To

become more confident in diagnosing dermatological diseases in SoC, the respondents highlighted a great need for visual examples. Studies from the US support the respondents' desire as exposure to dermatological disease in SoC and education in medical school was shown to increase the confidence level among medical students [16, 17]. The students often find visual examples in textbooks. However, the two textbooks recommended in Denmark are the least representative among the recommended textbooks in Scandinavia with only 0.9% (n = 6) and 1.3% (n = 3) of the pictures visualised on darker skin, respectively (Fitzpatrick V-VI). Noticeably, the textbooks predominantly represented dark skin on certain diagnoses such as vitiligo and leprosy and not on common conditions, e.g., acne vulgaris, lichen planus and psoriasis [18].

Strengths and limitations

This study has several limitations. Firstly, the recruitment method used is associated with a risk of selection bias. The students and junior doctors who chose to answer the survey may have a certain interest in the subject. Furthermore, since the survey was mainly distributed through social media, it was not possible to clarify how many eligible participants were reached. Secondly, "skin of colour" is a broad term and there is considerable diversity as to the definition of SoC. However, we found the term to be the most suitable and understandable. Thirdly, the study was based on the respondents' self-perceived confidence when diagnosing in SoC and not on actual diagnostic accuracy. As from early 2022, the University of Copenhagen has initiated several initiatives including a self-study PowerPoint with photos of common dermatological diseases in SoC presented side-by-side with the same disease in white skin to promote diagnostic accuracy in SoC.

The strength of the study was that 89.0% of the respondents had completed the dermatology curriculum in recent years (2018-2022), thereby decreasing recollection bias. However, some level of recollection bias cannot be excluded. Secondly, the study had a great number of participants and representation from all four Danish medical schools. The dermatology course is taught already on the third semester of the medical master's programme at Aalborg University and the University of Copenhagen. Thus, more students from these schools were eligible for answering the survey. Combined with the large size of the University of Copenhagen, this explains the relatively high representation from these schools.

Recommendations

It is of concern that the medical students and junior doctors in our study were far less confident when diagnosing dermatological diseases in SoC than in white skin as this may result in a fear of treating patients with SoC and/or in incorrect or delayed treatment and ultimately increased morbidity and mortality, which adds to existing health inequalities among ethnic minorities in Denmark.

Based on our findings, our recommendation is that the universities – at the institutional level - integrate SoC in the dermatology curriculum, increase visual examples in the dermatology curriculum, including side-by-side comparison, and incorporate SoC in the exams. The resources needed, i.e. visual examples, are available. It should not be the responsibility of the individual student to educate themselves on this topic. All the above recommendations are uncomplicated, easy to implement and cost effective.

CONCLUSION

Danish medical students and junior doctors are significantly less confident when diagnosing dermatological diseases in SoC than in white skin. Interventions are needed to increase their confidence level and knowledge on the subject to combat ethnic inequality in health. Course directors and study boards should use the results of our study as an inspiration to develop a curriculum that reflects a diverse society.

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Conflicts of interest Potential conflicts of interest have been declared. Disclosure forms provided by the authors are available with the article at ugeskriftet.dk/dmj

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