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The organization of breast health and diseases topics in undergraduate medical education programs: a model proposal

Beyza Ozcinar[1*] and Ayse Hilal Bati[2]

Abstract

Background In Türkiye, over 100 medical faculties implement integrated medical education, but integration levels vary and are often at initial stages of the integration ladder. Istanbul University Istanbul Faculty of Medicine (IU-ITF), as the first medical faculty in Türkiye, has been a pioneer and leader in many aspects. As faculty of IU-ITF, we have identified certain shortcomings in our program and are committed to improving it. This study aims to analyse how breast health and diseases are integrated into the undergraduate medical education (UGME) program at IU-ITF, identifying its strengths and weaknesses. Additionally, it seeks to evaluate the program's alignment with the National Core Education Program (UÇEP) and propose a new model for integrating "breast health and diseases" into medical education. This model will also be adaptable to other organ systems, serving as a template for incorporating similar topics that address significant and priority health concerns into educational programs.

Methods This descriptive cross-sectional study was conducted in three stages: [] analysis of the IU-ITF UGME program using a literature-based framework [], an online survey assessing intern physicians' self-competency in breast health and diseases, and [] a faculty workshop to gather feedback and propose amendments for improvement.

Results Program analysis revealed the absence of structured breast examination skills training, multidisciplinary integrated sessions, and problem-based learning (PBL) sessions, as well as a lack of objective structured practical exams for breast examination. Interns highlighted the need for greater emphasis on symptoms, treatment approaches, practical application of theoretical knowledge and the need for more integrated sessions. The workshop concluded that, breast health and diseases are addressed at a post graduate medical education level, surpassing the UÇEP 2020 guidelines. Students have limited exposure to patients with benign breast conditions, primary care education is insufficient, and structured training in breast examination skills is lacking.

Conclusions Challenges such as high student numbers, inadequate educational environments, low motivation, cultural and religious taboos limiting male participation, and resistance from some faculty members are common barriers. Addressing these issues will enhance medical education, ensuring future healthcare professionals are better equipped to manage breast health and diseases effectively.

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Keywords Undergraduate medical education, Integrated education model, Breast health and diseases, A model proposal, UÇEP

Background

The main purpose of medical education is to train "good doctors" who can improve community health and direct changes in the health field [1]. The educational programs of Medical Faculties should be designed in a manner that equips graduates to fulfill their roles and responsibilities in society, develop competencies and skills to achieve graduation goals linked to their societal roles [1]. Competencies and skills should include the qualities of a five-star doctor as defined by the World Health Organization, which are 1- Service provider, 2- Decision maker, 3- Communicator, 4- Community leader, and 5- Manager [2]. In order to meet these responsibilities, doctors must be well-informed about society's health issues, particularly priority health concerns. Therefore, physicians are expected to merge science and social advancements, integrate medical practices, and possess the knowledge, skills, and attitudes necessary to address society's health problems with high-quality health services.

In Türkiye, as well as worldwide, women's health issues are considered priority health concerns. Breast health and diseases are notable issues that physicians frequently encounter in their professional lives. One of the most significant health issues affecting women's health and commonly observed in society is breast cancer. In Turkish society, approximately one in every 11–12 women will develop breast cancer in their lifetime. Additionally, around 25,000 women are diagnosed with breast cancer in Türkiye annually, and globally, breast cancer is the leading cause of cancer-related deaths among women [3, 4]. While breast cancer may not be preventable, early detection is possible through screening, and if diagnosed early, the disease can be successfully treated in 95–100% of cases [4]. According to the National Core Education Program (UÇEP) 2020 (It is the National Core Education Program developed to improve medical education and establish basic standards in medical education in Türkiye), graduates from medical faculties should be capable of providing differential diagnosis (pre-T) and prevention (K) for breast diseases and tumors. This involves making a preliminary diagnosis in non-emergency situations, conducting necessary procedures, and directing the patient to a specialist. They should also be able to implement preventive measures at primary, secondary, and tertiary prevention levels. Additionally, they should be able to perform breast and axillary region examinations in common, uncomplicated cases/patients, and educate patients on self-breast examinations even in complex cases [5].

In Türkiye, there are over 100 medical faculties, the majority of which have adopted an integrated medical education system. This approach aims to provide a cohesive learning experience by combining basic sciences with clinical practice from the early stages of education. However, the degree of integration across these faculties varies significantly, with most still in the initial steps of the integration ladder. Many programs struggle with creating a seamless program that bridges theoretical knowledge and practical application effectively, reflecting the challenges inherent in transitioning to a fully integrated model. IU-ITF as the first medical faculty in Türkiye, has been a pioneer and leader in many aspects. As faculty of IU-ITF, we have critically evaluated certain shortcomings in our program and are committed to improving it.

The approach of faculties towards such a critical public health issue, as well as their inclusion of breast health and diseases in their educational programs, and the effectiveness in achieving educational goals with graduates, are vital. Thus, assessing how existing undergraduate medical education programs address breast health and diseases, and conducting studies to determine the integration of these topics in an integrated education program is necessary.

This study aimed to assess how breast health and diseases topics are addressed in the Istanbul University Faculty of Medicine Integrated Medical Education (UGME) program, determine their alignment with UCEP 2020, and propose a placement model covering the recommended topics and learning levels of UCEP 2020. This model is anticipated to be applicable to other organ-systems as well, serving as a template for integrating similar topics addressing significant and priority health concerns into educational programs.

Methods

This descriptive cross-sectional study employing a mixed-methods approach was conducted at Istanbul University, Istanbul Faculty of Medicine between 01.06.2020 to 01.06.2022. The study was divided into three stages (Fig. 1).

Analysis of the IU-ITF UGME program

Program analysis was conducted using a literature-based analysis framework (Supplement 1) to see the outline of the whole program, then how breast health and diseases topics were integrated into the IU-ITF UGME program and What were the teaching and assessment methods used in breast health and diseases topics in the program.

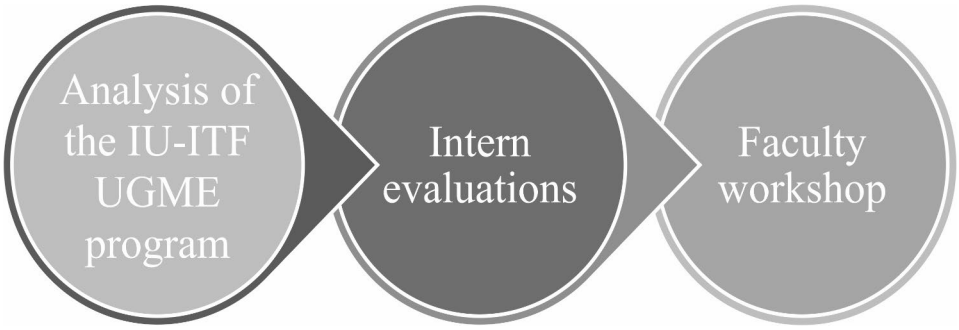

Fig. 1 The method scheme of the study

Intern evaluations

The total number of intern doctors (last year students of medical faculty) was 523 in the 2020–2021 academic year. A survey previously did not published anywhere with 22 questions was sent to all interns via e-mail (Supplement 2). Between June 21st and August 7th, 2021, a total of 244 (47%) interns out of 523 completed the online survey administered to evaluate the self-competency regarding the competencies needed according to UCEP 2020 [5].

Faculty workshop

All faculty members were invited for workshop via e-mail through Dean's office and especially faculty members who were giving lectures related to breast health and diseases topics were listed from the program and invited as a second time via phone-call. On April the 1st, 2022, faculty workshop was performed with the participation of 20 faculty members from 17 departments and one student affairs officer.

Initially, information was given about the results obtained from the program analysis and intern surveys. Then, a SWOT analysis was conducted with active participation about the levels and how breast health and diseases issues were addressed in the training program, teaching methods and measurement and evaluation methods. Finally, group studies were carried out using previously prepared questions, and the answers prepared by the groups by discussing within themselves were shared and discussed with the whole group.

Following the completion of the third stage of the study, recommendations were developed for an integrated placement model applicable to other organ systems. These recommendations outlined how breast health and diseases topics should be integrated into the undergraduate medical education program, including ideal learning environments, teaching methods, and assessment strategies.

Throughout the study, collaboration occurred with various stakeholders, including the Dean of Istanbul University, Istanbul Faculty of Medicine, faculty members, intern representatives, and student affairs officials. Ethical approval was obtained from the Istanbul Faculty of Medicine ethics committee, and necessary permissions were secured from the Dean's Office for the survey and workshop (Supplement 3). Informed consents were taken from all participants in the research from both faculty members and intern doctors.

Results

Analysis of the IU-ITF UGME program

Topics related to breast health and diseases are spread throughout the undergraduate medical education program, covering 6 terms in a disorganized manner. They are not involved under a single theme. Different disciplines address these topics during the same semester, indicating partial horizontal integration and vertical integration between basic sciences and clinical practice. The distribution of topics from simple to complex within the semesters implies a spiral configuration. However, the placement of topics among semesters and themes is quite scattered, making it challenging for students to establish a systematic understanding from simple to complex in their minds.

The program includes traditional lectures, lecture hall sessions, case presentations, laboratory practical sessions, theoretical and practical training in small groups, bedside clinical practice in small groups (including randomly non-structured breast examination skills training), supervised inpatient clinical practice, and outpatient clinical practice. Students are also given free time for self-directed learning activities. Although various teaching methods are used, it is noted that there are unequal opportunities provided for all students.

Breast examination skills training, simulated patient applications, multi-disciplinary integrated sessions, and problem-based learning (PBL) sessions are not part of this education program. Additionally, there is no structured practical exam for assessing breast examination skills.

The level of program integration in the first three terms is at the stage of temporal coordination. In this approach, each discipline retains responsibility for its

Table 1 The recommendations for an ideal "breast health and diseases" training program for interns

- Each student should have the opportunity to conduct breast examinations
- They should be able to examine patients under the supervision of faculty members
- Theoretical topics should be presented in a progressive manner, starting from benign diseases and progressing to cancer
- Emphasis should be placed on prevention in addition to diagnosis
- Each intern should rotate in all subspecialties of general surgery
- History taking and physical examination training should be reinforced through repetition
- Interns should be involved in all stages of patient care from diagnosis to treatment
- Emphasis should be placed on interpreting imaging methods used in diagnosis
- Equal opportunities should be provided for each student to practice breast examinations

own program. However, the scheduling of teaching topics within a course is coordinated through consultation with other disciplines. The timetable is designed to align related topics across disciplines, ensuring they are taught concurrently.

In the fourth and fifth terms, the program primarily comprises topic-based theoretical sessions supplemented by integrated sessions. Overall, the level of integration during this period reaches the stage of awareness. At the awareness stage, as in the isolation stage, teaching remains topic-based. However, mechanisms are in place to ensure that instructors are informed about the content covered in other courses within the program, promoting greater coherence and collaboration.

Intern evaluations

Interns reported learning about various aspects of breast diseases and tumors during their education and 65% ($n=159$) of intern doctors had knowledge at the differential diagnosis level (pre-T), and 37% ($n=91$) had knowledge at the prevention (K) level [5]. Survey results revealed that 155 interns (64%) feel confident in performing breast and axillary region examinations at level 3, while 109 (45%) believe they can teach self-breast examination at level 4. Interns expressed the need for more focus on symptoms, problems, treatment approaches, and algorithmic approaches in tackling breast health issues. They emphasized the importance of practical application of theoretical knowledge and the need for more integrated sessions.

There were also concerns raised regarding the adequacy of practical training, the lack of emphasis on approaching patients and their families, and the insufficient coverage of breast emergencies and urgent diagnoses and treatments in the program. The interns suggested more focus on teaching breast examination during puberty and pregnancy, as well as the importance of detailed examination of benign-malignant differentiation and algorithms for primary care practice. They also stressed the need for increased theoretical and practical training in various aspects of breast health. The recommendations for an ideal "Breast Health and Diseases" training program for interns are shown at Table 1.

Faculty workshop

During workshop, all faculty members were studied on following subjects and developed some recommendations:

The objectives and goals for breast health and diseases topics

- Defining the anatomy and histology of the breast and surrounding tissues
- Listing microorganisms that can cause breast infections and recommending treatments
- Describing changes in breast tissue during different stages like the menstrual cycle, pregnancy, and breastfeeding
- Identifying abnormal conditions in the breast
- Describing breast anomalies and variants
- Describing the developmental stages of the breast
- Conducting thorough breast and axillary examinations and explaining the process
- Describing the different stages of breast examination and characteristics of identified masses
- Diagnosing mastalgia and mastitis and providing treatment recommendations
- Offering counseling on breastfeeding
- Recognizing gynecomastia
- Explaining the approach to nipple discharge
- Listing imaging methods used in breast exams and their distinguishing features
- Describing risk factors for breast cancer
- Explaining breast cancer screening and conducting breast examinations
- Differentiating between benign and malignant lesions and providing recommendations
- Listing premalignant breast lesions and referring to a specialist if needed
- Differentiating suspicious lesions and referring to a specialist for further examination
- Listing biopsy methods used in breast examinations and their features
- Describing breast pathologies under main headings and defining prognostic criterias for breast cancer
- Listing methods for breast cancer treatment and referring patients to specialists as necessary
- Recognizing complications that may arise during breast cancer treatment and referring to a specialist
- Referring patients undergoing breast cancer treatment to psychological counseling
- Providing recommendations for arm exercises after breast cancer surgery and explaining measures for protection against lymphedema

How these topics should be integrated into the program?

1. Breast health and diseases are significant public health concerns in today's society. It is essential that they are incorporated into educational programs at different stages and periods.
2. Breast cancer awareness which greatly impacts women's health, should be included in elective courses that focus on education, screening, and disease management.
3. In Period 1, routine breast examinations, breast cancer, and reproductive health issues can be addressed.
4. During Period 2, breast health topics can be integrated into scenarios like genetic transmission and inquiring about family medical history.
5. In Period 3, students can receive theoretical and practical training on breast examinations.
6. Under the Surgical section in Period 4, training on breast examination skills and self-breast examinations can be provided. Students can practice on models in Period 4, and in Period 5, they can perform breast examinations on at least three patients.
7. During Period 5 and internships, students can participate in breast multi-disciplinary meetings to gain experience in radiology and pathology.
8. Specific programs can be prepared during Obstetrics and Gynecology, Pediatric Surgery, and Pediatrics training to observe conditions like mastalgia, mastitis, breastfeeding, puberty-related issues, cancer diagnosis, and treatment processes in Oncology training.
9. Physician-Patient communication, Physician-Family communication, communication with child and pregnant patients, managing emergencies, staying calm, and giving bad news topics can be included in the program as a vertical integration. Students will have the opportunity to apply these skills in outpatient clinics and emergency departments.

Suggested teaching methods

These are hall lectures to introduce the topic of breast health, with theoretical lectures on basic sciences such as anatomy, physiology, histology, and microbiology. Also, laboratory practical sessions on breast anatomy, histology, and microbiology can be included. In a small groups, epidemiology of breast diseases and data on routine breast examinations, breast cancer, and reproductive health-related problems. Clinical sciences integrated sessions can be planned in early periods with PBL sessions.

Practical sessions should be arranged in pre clinical periods to inquire about complaints and findings related to breast health and diseases using simulated patient applications. Then, theoretical methods for clinical management, taking anamnesis, and physical examination concerning breast health and diseases can be integrated both theoretically and through standardized skill applications on breast models. Skill training sessions for standardized breast examinations on models and real patients can be provided in clinical periods.

In addition, opportunities for practical applications of breast examinations can be created in community health centers. Students can also be trained to provide self-breast examination education and information on common problems and solutions in primary care settings. In last periods and internship period, students can participate in breast multi-disciplinary meetings to gain the ability to provide consultation to patients in radiology and recognize/direct pathological conditions.

In clinics; Obstetrics and Gynecology, Pediatric Surgery, and Pediatrics, clinical areas can be prepared for observation of issues such as mastalgia, mastitis, breastfeeding, problems during puberty, and cancer diagnosis and processes in Oncology training. Vertical integration program can be given through PBLs, small group studies, simulated patient applications, and role-playing exercises.

Suggested assessment strategies

As an assessment; multiple-choice questions with UCEP 2020 learning levels can be performed. Skill exams can be conducted with control lists for simulated patient applications and skills training on breast examinations using models. Then, feedback can be obtained through surveys of faculty members and students.

Discussion

Integration in medical education is a crucial and complex issue that is considered a fundamental educational strategy. However, like many integrated programs, the level of integration in the IU-ITF UGME program does not reach the higher levels outlined in Harden's 11-step integration ladder [6]. Integration is at the level of temporal coordination in the first three terms and at the level of awareness in the fourth and fifth terms in IU-ITF UGME program.

There is no single definition for the concept of integrating educational programs. Typically, integration involves combining basic, clinical, and social sciences in one course during preclinical years or weaving interdisciplinary block courses (such as ethics) throughout the program [7, 8]. Integration in medical education has various benefits, such as emphasizing patient problems by linking basic and clinical sciences, enhancing diagnostic skills, being more meaningful and engaging for students, and incorporating socio-humanistic and public health aspects into education through vertical integration. Despite the

opposition from some educators, integration plays a key role in delivering an effective educational program [9, 10].

In the transition to an integrated education program, the perceptions of program stakeholders are crucial, yet little attention has been given to this issue. A study conducted by Muller JH and colleagues in a medical school implementing an integrated education program in 2008 focused on the perceptions of students, faculty members, and program coordinators. The results of their study indicated that all stakeholders highlighted the importance of interdisciplinary teaching in an integrated program, the necessity of preparing basic science material for practical application in clinics, and the significance of detailed monitoring of the program by program coordinators [8]. Furthermore, the study highlighted some challenges, such as the ability of different disciplines to collaborate in teaching, faculty members' reluctance to transition to a new educational model, communication between stakeholders, and maintaining consistency throughout the lessons. Program coordinators expressed their view on integration, stating that it involves gathering members from various departments and disciplines around a table and noting the predominant representation from one or two disciplines, differing from the traditional program's composition [8]. A workshop conducted with faculty members at Istanbul Faculty of Medicine revealed similar findings. Participants highlighted significant barriers to integration, such as the entrenched departmental structure, resistance from some faculty members, and the influence of institutional culture, which hinders adaptation to the integration process.

An intern survey evaluating the program's compatibility with UCEP 2020 revealed that while intern doctors had adequate knowledge on clinical symptoms/signs/conditions related to breast health and diseases, they lacked competency in prevention methods. The study unveiled deficiencies in practical medical skills, such as breast and axillary region examinations, and self-breast examination teaching capabilities. These deficiencies may stem from inadequate structured training in breast examination skills and clinical breast examination in the current education program, as well as a lack of skills assessment exams. The program's shortcomings highlighted by intern doctors reinforce the need to address deficiencies in clinical experiences within the program.

In Türkiye, there is no other study evaluating the alignment of breast health and disease topics in the undergraduate medical education program with UCEP 2020. However, studies from institutions that generally assess medical education programs in terms of alignment with UCEP 2020 have been reviewed. They indicated that the content of the undergraduate medical education program fully and completely covers all clinical symptoms, core diseases, and basic medical skills outlined in UCEP 2020, with a very detailed and comprehensive program. However, there was approximately a 25% deficit in the overall skills expected to be acquired by students as outlined in UCEP [11–13]. When considering the results of all these studies together, it is evident that the situation in medical faculties is fairly consistent. In conclusion, students are not adequately prepared for primary healthcare services based on the basic medical skills defined in UCEP 2020.

The strength of this study is that, there is no other study in Türkiye that is as organized and structured as this one evaluating the undergraduate medical education program, and these results actually include important results and details that are known but not documented before. On the other hand, the most significant limitation of this study is the exclusion of faculty members who are resistant to change. They did not come to the workshop even though they were invited. Instead, the study primarily included faculty members who are already actively addressing deficiencies in the program and working on areas that require improvement.

Numerous studies have been conducted on how topics should be addressed in the organization of undergraduate medical education programs. Students have found problem-based learning to be more encouraging, humane, engaging, difficult but beneficial. In a review article published by Nandi PL et al., students mentioned that they find traditional learning to be irrelevant, passive, and boring. Students who use the problem-based learning method demonstrate better interpersonal skills and psychosocial knowledge towards patients, while students who use the traditional model perform better in basic science exams. Generally, educators prefer problem-based learning [14].

Lam AK et al. stated that web-based modules are an important resource that can facilitate pathology teaching and enhance pathology education in medical schools. They also have the potential to be used nationally and internationally in other fields due to their multidisciplinary structure and flexibility of presentation [15]. In their studies, McNulty JA et al. analyzed the use of video lessons in basic science courses for medical students. They found that the individual use of videos was related to the difficulty of the subject, students preferred to use video lessons more for reviewing the course and preparing for exams, and the most viewed videos resulted in lower exam scores due to the more difficult and harder to understand topics [16]. On the other hand, when specially prepared multidisciplinary modules are made available for remote access and the possibility of accessing them at any time, independent learning is encouraged, and students' participation and success are positively affected, as demonstrated by Lam et al. Another teaching model that has become increasingly popular in

recent years is the flipped classroom model [17, 18]. This method differs from traditional classes where students passively receive information from the teacher. The flipped classroom model provides flexibility for students to learn at their own pace, promotes retention of content, and increases students' interest in learning [19–22]. In clinical pathology, an ultrasound-guided anatomy lesson and practical applications can be included in the program to demonstrate changes in anatomical structures and increase memorability.

There have been numerous studies conducted on the effectiveness of skill training in breast examination. When examining these studies, it is seen that training with breast models, standardized patients, or in a virtual breast clinic is effective in acquiring breast examination skills [23–27]. In their randomized controlled studies, Campbell et al. showed that training in breast examination using standardized silicone models was more effective in detecting masses in the breast [23]. In the studies by Nassif et al., it was observed that hybrid simulation using standardized patients and breast model jackets to teach clinical breast examination increased sensitivity in skill but did not change specificity. However, it was found to be effective in increasing students' self-confidence [26]. The results of this study show that hybrid simulation leads to a significant improvement in medical students' ability to correctly diagnose a lesion and interpret potential malignancy.

It is essential for medical students to feel comfortable and safe when interacting with patients in clinics. Currently, due to the high number of students in many medical faculties, a lack of experienced teaching staff, and insufficient time allocated to education by teaching staff, medical students do not have enough exposure to seeing and examining patients alongside faculty members in clinics before directly interacting with patients. This lack of experience can make them feel tense, insecure, and uncomfortable when meeting patients in the clinic. One solution to this fundamental issue in medical education is to ensure that students have acquired basic breast examination skills before interacting with patients in the clinic. Taking histories from standardized patients, performing physical examinations, and practicing breast examination skills on breast models and simulators are proven teaching methods in medical education. Training sessions with breast models and standardized patients increase students' self-confidence, while decreasing anxiety and stress levels [24, 27]. Another effective teaching method that can be implemented in university hospitals is peer education or involving residents in student education. Studies in this area show positive changes in residents' attitudes towards teaching and improvement in their understanding of educational principles. Additionally, the majority of residents (92.5%) believe that their role as educators for medical students, interns, and other residents is highly important [27–30].

This study primarily identifies the deficiencies and redundancies in the program, highlights areas for improvement, and provides recommendations to address these issues. However, to develop a new program, further investigation is needed to determine specific learning goals and objectives, how they will be integrated into the program, and which teaching and assessment methods should be employed.

Conclusions

Nationwide, several fundamental challenges are commonly encountered, including an excessive number of students, inadequate educational environments, lack of motivation, and difficulties in integrating topics related to breast health and diseases. Additionally, cultural and religious taboos often prevent male students from performing patient examinations.

The primary challenges and risks associated with integration include a lack of recognition among faculty members regarding the importance of integration, a rigid departmental structure, resistance to innovations in the educational program, and a reluctance to abandon individual teaching approaches.

Addressing these challenges is essential to improving medical education. By fostering greater collaboration, updating program structures, and overcoming cultural and institutional barriers, future healthcare professionals will be better equipped to effectively manage breast health and diseases. Addressing these challenges will be key to improving medical education and enhancing the competence of future healthcare professionals.

Supplementary information

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Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

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Data availability
All materials described in the manuscript, including all relevant raw data, will be freely available post-publication to any scientist wishing to use them for non-commercial purposes without restriction, without breaching participant confidentiality.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from the Istanbul Faculty of Medicine ethics committee (2020/411), and necessary permissions were secured from the Dean's Office for the survey and workshop (Supplement 2).

Informed consents
were taken from all participants in the research from both faculty members and intern physicians.

Consent for publication
Not applicable.

Competing interests
There is no competing interests for both authors.

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