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ORIGINAL RESEARCH

Key Learnings and Perspectives of a Newly Implemented Sex-and Gender-Based Medicine Modular Course Integrated into the First-Year Medical School Curriculum: A Mixed-Method Survey

Nicola Luigi Bragazzi[1–4], Hicham Khabbache[5], Khalid Ouazizi[6], Driss Ait Ali[6], Hanane El Ghouat[6], Laila El Alami[6], Hisham Atwan[7], Ruba Tuma[8–10], Nomy Dickman[10], Raymond Farah[10,11], Rola Khamisy-Farah[9,10]

[1]Human Nutrition Unit (HNU), Department of Food and Drugs University of Parma, Parma, Italy; [2]Laboratory for Industrial and Applied Mathematics (LIAM), Department of Mathematics and Statistics, York University, Toronto, ON, Canada; [3]Postgraduate School of Public Health, Department of Health Sciences (DISSAL), University of Genoa, Genoa, Italy; [4]United Nations Educational, Scientific and Cultural Organization (UNESCO) Chair, Health Anthropology Biosphere and Healing Systems, University of Genoa, Genoa, Italy; [5]Director of the UNESCO Chair "Lifelong Learning Observatory" (UNESCO/UMSBA), Fez, Morocco; [6]Department of Psychology, Faculty of Arts and Human Sciences Fès-Saïss, Sidi Mohamed Ben Abdellah University, Fez, Morocco; [7]Department of Internal Medicine, Kaplan Medical Centre, Hebrew University, Rehovot, Israel; [8]Department of Obstetrics and Gynecology, Galilee Medical Center, Nahariya, Galilee, Israel; [9]Clalit Health Services, Akko, Israel; [10]Azrieli Faculty of Medicine, Bar-Ilan University, Safed, Israel; [11]Department of Internal Medicine B, Ziv Medical Center, Safed, Israel

Correspondence: Nicola Luigi Bragazzi, Human Nutrition Unit (HNU), Department of Food and Drugs University of Parma, Via Volturno 39, Parma, 43125, Italy, Tel +39 0521 903121, Email nicolaluigi.bragazzi@unipr.it

Purpose: Sex and Gender-Based Medicine (SGBM) addresses the influence of sex and gender on health and healthcare, emphasizing personalized care. Integrating SGBM into medical education is challenging. This study examines the implementation of an SGBM course in an Israeli university during the first year of the medical school.

Methods: The course integrated lectures, group work, online gender studies resources, workshops, teacher training, and essential literature. The curriculum spanned pre-clinical and clinical aspects, featuring seven 90-minute sessions. Surveys assessed course structure, content, and lecturers using a 5-point Likert scale and qualitative feedback. Quantitative analysis involved descriptive statistics, and thematic analysis was used for qualitative data.

Results: Of the 84 students surveyed, 35 (41.7%) responded to the first part, and 30 (35.7%) to the second. The SGBM course received high satisfaction with an average score of 3.63, surpassing other first-year courses (average 3.21). Students appreciated the supportive academic atmosphere (mean score 4.20) and diverse teaching methods (mean score 4.03), while the development of feminist thinking was less appreciated (average score 3.49). Lecturers received high ratings (average score 4.33). Qualitative feedback highlighted the value of group work, the significance of the subject matter, and the helpfulness of supplementary videos. Students requested more content on contemporary issues like gender transition and patient perspectives. The feminist medicine aspect was contentious, with students seeking better gender balance and scientific evidence.

Conclusion: Introducing SGBM into the first-year curriculum yielded positive results with high student satisfaction for content and lecturers. An expanded course module is planned, to be assessed at the end of the next academic year.

Keywords: sex- and gender-based medicine, medical education, medical training, curriculum integration

Introduction

Sex and Gender-Based Medicine (SGBM) is a relatively new field aimed at developing frameworks for investigating human physiology and physiopathology and implementing tools for diagnosis and optimal treatment based on the

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understanding that an individual's sex and gender influence the body's systems. This field aligns with the broader trend of individualized and personalized care driven by innovation and increased scientific knowledge.[1–3]

Sex and gender are distinct variables affecting health and disease.[4–8] "Sex" is a biological variable linked to genetic/ genomic, endocrinological, and phenotypic components, while "gender" is more related to personal and societal experiences. SGBM relies on understanding that both biology and social roles are crucial for the prevention, screening, diagnosis, and treatment of many conditions and diseases.[9]

Training future healthcare providers in the principles of sex- and gender-based differences in health and disease is critical to enhancing patient management by considering the precise needs of each patient rather than a "one size fits all" approach.[1–3] Integrating sensitive thinking about sex and gender into the healthcare system can contribute to better healthcare for all, including children, women, men, LGBTQ+ individuals, and various socio-ethnic groups.[1,5,10–13] With the development of feminist thought, medicine has significantly improved its approach to women, including attitudes toward the body, patient care, and recognizing differences in women's lives.[14,15] Feminist medicine calls for a broader perspective beyond biology, advocating for increased representation of women in leadership roles and creating supportive environments for diverse genders and social statuses.[16–20] Teaching feminist principles in medical education can address gender bias and promote equitable healthcare, enhancing critical thinking about medicine's practice and teaching.[20]

However, despite that incorporating all these topics and components into medical research and education is vital, numerous surveys have revealed inconsistencies and inadequacies in integrating sex and gender into medical school curricula.[1,5,10–13] To the best of our knowledge, there are a few reports describing the experience of implementing a medical syllabus introducing the major concepts of SGBM, including the feminist principles.[1] This paper presents the first introduction of an SGBM course into the medical school curriculum at Bar Ilan Medical School in Safed, Northern Israel. We also share the results of a student survey assessing the relevance and satisfaction with this course. Finally, we propose methods and outlines for incorporating comprehensive SGBM content into medical education to improve healthcare services and treatment.

Methods

Ethical Aspects of the Study

Ethical clearance was received from the Ethics in Research Committee (IRB) of the Azrieli Faculty of Medicine, Bar-Ilan University, Israel (approval code 16/2023).

Written, informed consent was obtained from the study participants, which included publication of anonymized responses, and the study was conducted following the guidelines outlined in the Declaration of Helsinki.

Studying Medicine in Israel

Studying medicine in Israel involves several key steps. Initially, students must complete high school and obtain a *Bagrut* certificate, focusing on excelling in science and mathematics. Most medical schools also require a bachelor's degree in a relevant field, such as biology or chemistry, along with preparation for the psychometric exam, a crucial standardized test for university admissions. The admissions process is highly competitive, relying heavily on academic performance and psychometric exam scores. Once accepted, the medical program spans six years: the first three years cover preclinical studies (anatomy, physiology, pharmacology), while the last three years focus on clinical rotations in various specialties. After graduation, students must complete a one-year rotating internship at a hospital. Subsequently, they can apply for specialty training programs, which last four to six years, depending on the specialty. Aspiring doctors must then obtain a license from the Ministry of Health, which involves passing licensing exams and meeting other requirements. To maintain their license, medical professionals in Israel must engage in continuous education and periodically renew their credentials. Medical education in Israel is known for its high standards and rigorous programs, with specific requirements varying between medical schools.

Course Organization

Based on the specific needs of the Medical School at Bar Ilan University, local organization, logistics, availability of resources, time, financial constraints, and a previously conducted extensive literature research,[1] we devised an SGBM course.

Objectives of the SGBM Course

The objectives of our SGBM course are designed to provide a comprehensive and holistic understanding of the intersection between sex, gender, and medicine. We emphasize both social and clinical aspects, recognizing that gender-related factors significantly impact healthcare outcomes. Integrating this course into the curriculum ensures that gender awareness becomes a core component of medical education, preparing future healthcare professionals to apply these principles in their careers. A key goal is to teach students to adopt a critical "gender lens", helping them identify and overcome gender biases, disparities, and inequalities. This fosters critical thinking and a gender-sensitive perspective in medical practice. Additionally, the course aims to develop students' sensitivity to the complexities of sex and gender, crucial for providing inclusive and effective healthcare. Another objective is to link social contexts related to sex and gender, such as power imbalances, discrimination, violence, and oppression, with various health conditions. This promotes a holistic approach to medicine by considering broader societal influences on health, eradicating bias and sexism, recognizing and addressing gender-based violence, and fostering a discrimination-free, empathetic healthcare environment. Effective communication with diverse patients is also essential. The course encourages future healthcare professionals to be inclusive and empathetic, enhancing their ability to connect with patients from various backgrounds. Moreover, students are taught to critically analyze medical research, promoting engagement in research and the generation of new knowledge in gender-aware medicine. Ultimately, the course aims to produce doctors who are knowledgeable about gender medicine and socially conscious, actively addressing gender-related injustices in healthcare. Evaluating students' preparedness ensures they have acquired the necessary knowledge and skills to apply gender-aware medical practices effectively. Collectively, the SGBM course aims to equip healthcare professionals with the tools to provide equitable and gender-aware medical care, improving healthcare quality and reducing disparities in healthcare outcomes. These objectives are summarized in Box 1.

Box 1 Objectives of the Sex- and Gender-Based Medicine (SGBM) Course Implemented at the Medical School at Bar Ilan University, Safed, Israel

Objectives of the SGBM course
Emphasize the social and clinical aspects of gender-aware medical studies.
Integrate the course within the curriculum.
Teach students to adopt a critical "gender lens" and identify and overcome gender biases, disparities, and inequalities.
Teach students to develop sensitivity to the complexities of sex and gender and their connections.
Teach students to connect social contexts and issues around sex and gender (including power balance, discrimination, violence, oppression, and authority) with various diseases and health conditions.
Prevent bias and sexism.
Identify violence - all types of violence.
Foster better communication and understanding with diverse patients.
Critically analyze medical research.
Create more comprehensive and in-depth research.
Educate future doctors to become aware of gender medicine and social injustices related to sex and gender.
Evaluate students' preparedness.

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Outline of the SGBM Course Structure

The course was structured into various components to facilitate the integration into the medical school curriculum and included a mixture of lectures, group work exposure to global online resources on gender studies, workshops for faculty development, and teacher training as well as providing the students with relevant literature.

The intended course curriculum development spans several years, focusing on both pre-clinical and clinical aspects of sex and gender-specific medicine. The first-year curriculum consisted of seven sessions. The students were divided into seven groups. Each session lasted 90 minutes, with the first 45 minutes dedicated to a lecture and the second 45 minutes comprised of small workgroups of approximately ten students and two facilitators. In these groups, we presented cases of patient encounters from a gender perspective, listened to a podcast featuring a patient's encounter in a hospital setting, and discussed gender-aware communication.

The course content for the first-year students who had previously graduated with a three-year undergraduate degree was structured with various lecture topics, as outlined in Box 2 below.

At the end of the course, we planned for students to be able to i) understand fundamental concepts in feminism, gender-aware medicine, and various gender-related topics, ii) identify social, cultural, and systemic contexts relevant to women's health, and iii) embed gender-aware thinking in their clinical studies and enable students to examine all learnings through the gender lens.

Course Assessment

Following the implementation of the SGBM course, a mixed-method survey was conducted among medical students to evaluate the new curriculum. The survey had two parts: one assessing the course structure and content, and the other evaluating the lecturers. Both parts used a quantitative evaluation based on a 5-point Likert scale
(1 being the lowest, 5 the highest) and a qualitative section for suggestions on improvement and sustainability. For the quantitative analysis, descriptive statistics were performed. Data were checked for quality and consistency, visually inspected for outliers, and synthesized into means and standard deviations using SPSS software (version 28). The qualitative analysis employed thematic analysis, a flexible method valuable in various fields for understanding patterns in textual data. The process began with data familiarization through repeated readings of students' responses to gain an initial understanding. Initial codes were generated by identifying key concepts and labeling text segments. These codes were then grouped into potential themes by examining their similarities, differences, and relationships. The identified themes were reviewed and refined to ensure they accurately represented the data. Each theme was named and defined to capture its essence clearly. A detailed report was then written, including the identified themes, supported by excerpts from the data, along with brief interpretations and explanations. This comprehensive approach provided both quantitative and qualitative insights into the effectiveness and areas for improvement of the newly implemented SGBM curriculum. The analysis was carried out utilizing ATLAS.ti software (ATLAS.ti Scientific Software Development GmbH, ATLAS.ti Mac. V. 23.2.1, ATLAS.ti Scientific Software Development GmbH, Mac, 2023).

Box 2 Sex- and Gender-Based Medicine (SGBM) Course Content Outline

SGBM course content outline
Introduction to SGBM.
SGBM practices in Israel and Worldwide.
Differences between sexes and genders: biological, societal, and psychological aspects
Development of feminist thought in the 20th and 21st centuries
"Mind The Gender Gap" sub-module, including gender bias in medicine, gaps and bias in research, clinical practice, services, and medical innovation.

Results

Survey results

Out of eighty-four, thirty-five students responded to the first part of the survey, and thirty students to the second part of the survey, the quantitative results of which are presented in Table 1. Qualitative evaluation was summarized into themes, per the students' responses, as explained in the methods section.

Quantitative Assessment of the SGBM Course

Overall, satisfaction with the SGBM course yielded an average score of 3.63, which is higher than average appreciation of the other courses taught at the medical school during the first year of the 4-year pathway medical curriculum (mean score of 3.21). More in detail, the supportive academic atmosphere of the SGBM course was the most appreciated aspect (mean score of 4.20), followed by the combination of different teaching methods (mean score of 4.03), learning through class lectures, and the coordination between the lectures (both, mean score of 3.97), whilst the development of feminist thinking was the least appreciated aspect of the course (average score of 3.49). Further details are reported in Table 1, to which the reader is referred.

The lecturers were all rated highly on the 5-point Likert-scale with an average mean score of 4.33 (ranging from 4.23 to 4.43).

Qualitative Assessment of the SGBM Course

Students' qualitative responses also yielded important insights. Feedback from the students rated working in groups as very valuable and important, and the subject matter as relevant and important. There was also a comment about the video

Table 1 Quantitative Evaluation of the Sex- and Gender-Based Medicine (SGBM) Course Components

Question	Mean (Likert-scale score*)	Standard deviation	N (number of students)
To what extent are you satisfied with			
Learning through class lectures	3.97	1.30	35
The combination of different teaching methods	4.03	1.29	34
The coordination between the lectures	3.97	1.25	35
In my opinion			
The academic atmosphere of the course is supportive	4.20	1.17	35
The course contributes to my training as a doctor	3.74	1.42	35
To what extent are you satisfied with			
Sex and gender awareness medicine course and the various components	3.63	1.42	35
To what extent did			
The work in small groups contribute to my knowledge of sex- and gender-aware medicine	3.60	1.48	35
Please rate the degree of contribution of each of the following topics below to your knowledge of SGBM			
Introduction to gender medicine	3.77	1.35	35
The development of feminist thinking	3.49	1.38	35
Differences between sex and gender and related biological, societal, and psychological aspects	3.63	1.40	35
Workshop on gender bias in the field of biomedicine	3.60	1.53	35

Notes: *5-point Likert scale scoring: 1=lowest score, 5=highest score.

supplementary material contributing to the student's understanding and ideas. Students also expressed the need for not simply presenting the facts but also being given tools to know how to navigate real-world situations, including more personal stories from lecturers or patients.

> Working in groups is very interesting and helps create a discussion on a variety of important topics. Student 1

In terms of areas for improvement, several students emphasized the need for inclusion of more contemporary and "hotter"/"controversial" topics, such as gender transition, gender-affirming surgery, and sex reassignment. The students highlighted that this part of the course was lacking. They also noted the importance of bringing the patient's perspective into the conversation of how patients experience their interaction with the medical system.

> I would have been happy if we had touched on issues such as gender-affirming surgery, and the provision of supportive treatments in the community to people who have undergone or are undergoing a gender transition process. Student 5

> I think there is a place in the sex- and gender-based medicine course to touch on gender issues that concern the doctor, such as sex reassignment surgeries or how we perceive a patient who wants to undergo gender reassignment surgery or hormonal treatments. I feel that these issues are present in the clinic and were noticeably absent from the course. Student 7

> Of course, there are physiological differences between women and men, but in my opinion, it is more interesting to touch on intersex and transgender issues in patients. To understand how such a patient experiences their reality, what they face, and what is expected of us as doctors in such a situation. Student 10

The aspect of feminist medicine was also a contentious issue raised by the students. Some of the students felt that they needed more balance between male and female sex and gender differences. There were comments from students that the course was more favored toward women and the term "feminist" medicine was misleading. One student even expressed that the course was pushing a feminist agenda and that biases were made on the part of the professional staff and not of the students. There was also a comment to bring more scientific data and evidence to back up claims of inequities in data. Finally, some students also expressed frustration at the limited time allocated to the SGBM course.

> I would also like to see incorporated a perspective for the male gender, that could explain how and why, for example, with all the discrimination against women in medicine, men still die ten years earlier. Student 3

> It is important to provide serious studies that show that there is, indeed, a phenomenon of the lack of adequate medical treatment for women more than men. The videos we saw in class are very interesting, but I lacked the reference in terms of peer-reviewed studies and numbers that show the extent of the phenomenon. Student 2

> The course was presented as sex- and gender-aware medicine, but the main and almost exclusive emphasis in the course is on women. It is good and important to do a course on how to treat the female side in the world of medicine, but the name of the course is misleading and does not reflect its content. Student 13

> Two days is a very short time and simply not enough for such an important topic, when talking with men during classes, one gets the feeling that they still have difficulty even acknowledging the existence of gender biases. Student 11

Specific comments concerning the lectures were in their favor, including that they showed patience toward understanding differences in students' opinions and views and succeeded in creating a good and supportive learning atmosphere.

Finally, areas for improvement included not pushing the feminist agenda, but, rather, making the course more representative and equitable for all genders. Other comments from students indicated that more scientific substantiation needs to be brought and more diverse perspectives should be offered.

Discussion

This is the first report of our experience in implementing an SGBM module into the medical school curriculum at Bar Ilan University, Safed campus in Northern Israel. The SGBM curriculum objectives, course structure, and content were developed for a four-year curriculum, however, we presented only our findings for the first year of this four-year curriculum.

All students entering this program have been accepted with a prior undergraduate three-year degree. In the future, our university will be opening a full six-year curriculum. Our first experience of integrating SGBM into the curriculum included a stand-alone modular course of seven sessions interspersed throughout the academic year. While this included the advantage of having a specific focus on SGBM for the students, it did not allow for the integration of the concepts of SGBM into multiple discipline modules, such as cardiovascular medicine, immunology, neurology, or pharmacology modules. It, therefore, remains challenging to identify specific areas in which sex and gender content are missing from medical curricula and to determine how to fill these gaps.[2,8] The content of the course also therefore involved deliberation as to what specific subjects should be incorporated into the first-year course.

We know from the existing scholarly literature that barriers to the implementation of SGBM, include not only the limited resources of faculty time, time constraints within the existing curricula, uncertainty as to the ideal time to introduce this subject to medical students but also the lack of knowledge of how much and in what format SGBM content already exists within the medical school curricula.[21] Given our faculty constraints, as previously mentioned, we implemented the module for the first-year curriculum to focus on an introduction to SGBM, how it is perceived and implemented in Israel versus the worldwide landscape, as well as bringing the perspective of feminist medicine, and the integration of sex and gender into research and innovation, including exercises on their own unconscious bias they may affect their activities as doctors. Our course content and lecturers were assessed by a student survey to provide quantitative results through a Likert-scale scoring system as well as qualitative results, in terms of reflection on the course and areas for improvement, although it was not calculated for statistical significance.

Overall, the students rated the SGBM course favorably. It was important for us to evaluate the course through the students' responses, not only to assess the impact of the content and course structure on the student competencies but also as a means of engagement early on, in the development of our curriculum. Other research has shown that the engagement of the learner in the earliest stages of curriculum development has proven to be a valuable resource in implementing change.[6,8]

Other student surveys have also been done worldwide to assess the impact and relevance of the introduction of SGBM into medical curricula, showing that most medical students strongly agree that SGBM improves patient management and should be included as a part of the medical school curriculum. Only a small percentage of medical students consider SGBM the same as women's health.[5]

Introductory courses to SGBM, implemented as preclinical electives, significantly enhance learners' familiarity with SGBM concepts and foster strong agreement among students regarding the importance of receiving SGBM education during their medical training.[22] Differently from this study, our course was mandatory, which presents advantages and disadvantages. An elective course presents a more flexible course that can be feasibly implemented into the curriculum; however, integration is then selective, and only some of the students may study the course.[12] Each educational setting has unique challenges to overcome in order to be change-makers and innovators of the medical curriculum.[2] In a recent systemic review, main educational themes were identified including how much SGBM is covered by medical courses and integrated into current medical curricula, the knowledge of sex and gender medicine among medical and allied health profession students, the need for and willingness toward acquiring sex- and gender-sensitive skills, how to integrate SGBM into medical curricula in terms of barriers and facilitators, and the impact of sex- and gender-sensitive topics integrated into medical curricula. These principles were brought into the planning, implementation, and review of our course.[1]

One challenge, that we experienced with our course was the feminist medicine component. One of the benefits of a sex and gender-sensitive approach is that at its essence it can ensure the best possible healthcare for all sexes and genders.[12] However, the well-known fact that much research has been based on the male-centric model has shifted the focus to the less studied gender, namely women. The predominance of research data focused on the male model generates a lack of high-quality evidence, resulting in physicians having to extrapolate medical recommendations from research mainly done on men, slowing down the overall implementation of sex–gender difference detection in clinical research.[4] There seems also to be an overlap between sex-and gender-sensitive medicine where there are clear research and knowledge gaps in women's health, and between gender mainstreaming, which focuses on equality, and the promotion of

women.[12] The approach to feminist medicine content of our course also raised this challenge as seen by the qualitative assessment responses from students.

In the future, we feel that sex- and gender-sensitive medicine should be the more appropriate term to choose and content should be patient-orientated to avoid any misperception of a feminist or women's health-focused only agenda. However, at the same time, the theory of feminist medicine should continue to be taught to enable female healthcare students to be supported, and strive for academic excellence, and critical thinking without judgment.

Limitations

Our study population represented a small sample of students, and the present survey-based study was not designed to be generalized to other medical schools/contexts and populations. Moreover, only the 1st year curriculum of a 4-year curriculum was analyzed and presented. As this was the first year of our implementation, we experienced a learning curve regarding the content and the student reflection. In addition, this was a stand-alone module, presented at various time points during the year, but there is no systematic integration of this course content into the overall curriculum. This limitation is partly due to the barriers raised previously of time constraints within the existing curricula and the need to enlist multidisciplinary changemakers in all the medical disciplines teaching the students over the entire four-year curriculum. This remains a work in progress.

Conclusions

Our analysis and experience in implementing SGBM into the first-year curriculum was generally favorable with relatively high student satisfaction scores both on content and lecturer competencies. We are now progressing toward a larger and expanded course module for the first-year curriculum which will need to be analyzed and assessed for impact at the end of the next academic year. At the same time, we will continue to work with all faculty members to accelerate the adoption of sex-and-gender-sensitive medicine into the regular curriculum.

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