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Review

A Narrative Review of Women in Medicine Interest Groups at the Pre-Medical, Graduate, and Post-Graduate Medical Education Levels

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Abstract

Women in Medicine (WIM) interest groups can provide collaboration and support for the professional development of women as they navigate the gender inequities that persist in the healthcare workplace. This narrative review assesses successful methods used by multiple institutions to form groups and toolkits catered to women's empowerment. Medical career education was stratified into three levels: Pre-Medical, Graduate, and Post-graduate Medical Education. A keyword literature search on peer-reviewed platforms including Google Scholar, PubMed, OVID, EBSCO, and gray literature (i.e. medical societies toolkits) was used to identify applicable articles. We aimed to develop a toolkit derived from literature findings consisting of a list of ten steps for creating and maintaining a successful WIM group based on successful measures reported in the literature. Twenty-three studies were selected after screening using the Scale for the Assessment of Narrative Review Articles (SANRA). Data extraction was conducted systematically by three researchers who independently reviewed and documented key information from selected studies. Our analysis identified common success factors across all educational levels, including mentorship, adequate resources, administrative support, networking opportunities, and safe spaces as critical elements for women's career advancement in medicine. Based on these findings, we developed a comprehensive ten-step toolkit for institutions seeking to establish or improve their WIM groups. These implications extend beyond individual career advancement to institutional transformation and patient care improvement. Future research should focus on longitudinal outcome measures to evaluate the long-term impact of these interventions on career trajectories, leadership representation, and organizational climate change.

Introduction

Despite the growing number of women in medicine, challenges of inclusion and equity remain within higher career levels,[1] such as wage disparities, and subtle or overt discrimination in the medical field. For over 25 years, women have constituted approximately 40% of incoming medical students.[3] According to the Association of American Colleges (AAMC) Physician Specialty Data Reports, the percentage of women in the physician workforce has increased steadily since 2007.[2] Yet, despite the increase from previous years, recent studies have highlighted a glaring gender disparity at the leadership level. In 2018, women accounted for merely 18% of hospital chief executive officers (CEOs) and 16% of all deans and department chairs within the United States.[3-4] Furthermore, while female physicians constitute 38% of full-time medical school faculty, only 21% are full-time professors.6 These differences are not limited to categories within hospital administration and academia. In a recent study by Jagsi et al. reported that women are significantly underrepresented in positions of senior authorship and physician-focused medical societies.[5] Reasons for this disparity are multifactorial; however, those most researched are professional isolation, the impact of family responsibilities, and discrimination of age and gender.7 In a recent survey study, authors reported that female physicians were less likely to run for leadership positions, despite many of them being highly qualified and believing that more women were needed in these roles.[8] Within the same article, the authors identified several barriers to running for said positions such as a lack of protected time, work support, experience, and mentorship.[9] While each of the challenges mentioned above for female physicians in leadership has been thoroughly examined, solutions to such barriers are lacking. Thus, effective strategies are needed to improve female physician satisfaction and career advancement within medicine.

A Women in Medicine Interest Group (WMIG) is a professional organization within medical institutions that provides mentorship, networking, and career development support specifically for women in medicine. Women in Medicine (WIM) interest groups present a unique and cost-effective solution for addressing the gender disparity of female physicians in

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leadership. These groups include women and allies and work towards common goals for gender inclusion in the medical field. Current research has explored the implementation of Women in Medicine interest groups at each level of medical education (pre-medical, undergraduate, and medical graduate); however, to our current knowledge, to date, no study has attempted to summarize the data from Women in Medicine interest groups using the current literature at each educational level. To address this research gap, this study aims to develop a Women in Medicine interest group narrative review focused on identifying key components needed for female physicians in leadership, which can potentially be used as a toolkit for future WIM group endeavors. Visibility of women in medical conferences, participation on panels, and invitations to chair sessions have also been a focus of study.[20, 21] For 33 years, the American Academy of Neurology Annual Meeting had no female speakers in plenary sessions. Despite some progress being seen in the most recent years, some considerable gaps persist, and further investigation is needed to understand why this still happens. Furthermore, such opportunities create a safe space for female physicians to express their perspectives and ensure their voices are heard as well as supported.1Thus, the development of women in medicine interest groups offers a professional support system for many female physicians facing the previously outlined social barriers.
While there are multiple interesting initiatives ongoing regarding WIM groups and female empowerment, there is not yet enough literature or toolkits available on how to make such projects move forward and have a great impact. Our goal is to provide the readership with the right tools to achieve success and avoid pitfalls when setting up a WIM group in their institutions. For such reasons a narrative review was deemed necessary and appropriate at the current scenario.

Methods

A narrative review approach was used to examine Women in Medicine Interest Groups at the Pre-Medical, Graduate, and Post-graduate Medical Education Levels. Applying a narrative approach can provide valuable insights into best practices, challenges, and the broader context of supporting women in medicine. The Scale for the Assessment of Narrative Review Articles (SANRA) will be used to optimize the critical appraisal of selected sources and overall quantification of quality assessment. SANRA is the gold standard for narrative review quality assessment, with a 6-item questionnaire the authors could evaluate each criterion with a scale from 0 to 2 for manuscript quality and suitability to the review.

Search strategy and selection criteria

A semi-systematic literature review was conducted. A keyword literature search of peer-reviewed articles was conducted in November 2021 and in January 2023 on the following platforms: Google Scholar, PubMed, MEDLINE, OVID, and Ebsco. Gray literature (i.e. medical societies' websites) was also utilized to identify relevant articles such as Toolkits and Guides on starting a WIM Group at pre-medical, medical and graduate educational levels. Levels of each educational level are as follows: Pre-medical: those at the undergraduate level that are involved in preparation for medical school, graduate: those enrolled in medical school, and postgraduate: as those defined as further education after medical school, which includes fellowships, medical residency, and Ph.D. programs.

Pre-defined keywords were used to identify potential articles of the current study. All search items were identified in accordance with the themes: Women in Medicine, Women Interest Groups, and/or Female Leadership.

Inclusion and Exclusion Criteria

Articles were included in the study if they were peer-reviewed publications or grey literature pieces curated by accredited medical societies, pertinent to women in medicine groups, published from 2020-2023, included English full-text, and provided a detailed step-by-step guide or case reports of successful WIM groups. Only articles in English were considered for this narrative review, no restrictions on article type were applied during database screening. Articles which scored a zero in any category of the SANRA and that were outside of the study scope were excluded from the study.

Data Synthesis

The selected articles were systematically analyzed by extracting relevant information to establishing WIM groups at various educational levels. The data were synthesized to identify common themes, strategies, and challenges associated with WIM groups. Findings were then organized narratively to provide a cohesive overview of effective practices, highlighting successful approaches. The data extraction process was conducted systematically by three team researchers (S.B., A.C. and G.S.) who independently reviewed and documented key information from the selected studies. The extracted data elements included educational attainment levels, study objectives, and primary research findings. All information was systematically organized and compiled in a collaborative document to ensure consistent data management and facilitate subsequent analysis. This collaborative approach to data extraction helped maintain accuracy and reliability through cross-verification among team members. Each team member was responsible for specific data elements, and regular meetings were held to resolve any discrepancies or uncertainties in the extraction process.

Ethical approval was not required for this review as it is based solely on analysis and synthesis of previously published literature. No primary data collection involving human participants, human tissue, or animal subjects was conducted. All cited studies were assumed to have obtained appropriate ethical approvals as reported in their original publications.

Results

Results highlight several connections of similarity among the respective educational levels. Through our literature search, we

identified key success factors that informed the development of our toolkit. A Ten Steps guide ***(Table 1)*** was created based on the literature findings as an illustrative synthesis.

Table 1. 10 Steps of Creating and Maintaining a Successful WIM Group.

1. Identify prospective women in medicine within individual institutions
2. Gather resources to create a needs-based assessment for prospective WIM
3. Gather mentoring faculty and interested WIM alumnae within local institutions for further mentorship
4. Provide training materials and workshops to faculty and alumnae allocated from previous, successful WIM endeavors (e.g.: WIMS)
5. Advertise the program to WIM via local institutional resources
6. Determine regular meeting schedules and general organization
7. Foster student leadership within the WIM group
8. Encourage individual institutions to harbor and maintain connections with neighboring medical establishments for future opportunities
9. Facilitate meetings or networking with other WIM groups across the country to maintain camaraderie and build professional networks
10. Provide quarterly check-ins to identify gaps and successes within each WIM group

Legend: The table represents the summary of our findings.

Pre-medical Educational level

The pre-medical level involves students who are preparing to pursue undergraduate medical education. Within pre-medical literature, we sought to obtain successful common factors that led young women to develop interests in the medical field as well as factors that were lacking in their influence. It was found that programs specializing in Science, Technology, Engineering, and Mathematics (STEM) aimed to support pre-medical students by providing awards to departments and schools to promote their endeavors.[11] Through the Women in Medicine and Health Science Program (WMHSP), students were encouraged to explore interests ranging from academic career tracks to work-life balance. The program was developed to retain female faculty and support career advancement, but also offered mentorship to students interested in careers in academic medicine by cosponsoring classes, workshops, and events for female undergraduate, graduate, and medical students.1This developmental support can be accomplished by institutions through encouraging training amongst staff that focuses on obtaining a gender balance and educating about gender equities at an institutional level. We found that while these programs led to the promotion of mentorship and encouraged interaction between staff and students, there was an overall lack of women in high-achieving positions throughout many universities and establishments.[12] This has been discovered by evaluating sub-specialties of publications of women versus their male counterparts.

Socially, women are often considered different from their male counterparts due to historically constructed societal expectations typically placed on women such as household management, unpaid caretaking, child-rearing, etc. While women in the pre-medical levels dedicate time towards their goals in medical training, as demonstrated by the WMHSP, there is a large interest in work-life balance. The lack of childcare facilities and services while pursuing a pre-medical career is shown to be a problem that many medical schools and institutions do not typically cater to.1 We deduce that women-to-women mentorship would further be necessary for this family-planning aspect as women will readily identify with. The last factor we found as a positive influence on women in the pre-medical field is opportunity. Increased positive interactions in the field, through clinical experiences such as shadowing, volunteering, or short-term positions in hospitals allow young women to experience the field despite the challenges of premedical coursework13.

Medical Graduate Educational level

Shifting the focus to the medical graduate level of education, we found overlaps with the pre-medical education level in terms of mentorship being a crucial aspect of influence, opportunities to allow exposure into the medical field, and the importance of developmental support amongst staff.[14] The largest difference of influence that we discovered through literature studies was that the established groups that have already been developed within medical schools owe their success to perceived identity congruence among faculty. These groups focused on inclusion while emphasizing a sense of belonging by offering a wide range of opportunities (such as academic sponsorships, internships, and skill development strategies) for student involvement. Other successful endeavors included incorporating outside speakers and creating a safe space for students to seek mentorship, co-learning initiatives, and student resources.[15]

Post-graduate level

Regarding the post-graduate education level, we noticed a shift in the importance of empowerment.[16] Allyship and community amongst women physicians are key at post-graduate levels of medical education. Established women physicians and trainees benefited from advocacy of institutional change and developing a dialogue with institutional leaders regarding unconscious bias training, advocacy of motherhood rights, and for wellness and burn-out prevention.[16,17] Continuous follow-up by providing a space to gather while recognizing members` contributions, and ownership of their work with opportunities for CV building has the potential to lead to the overall promotion of women's equity.[18] The Forum for Women in Medicine (FWIM)[22] is one example of a structural solution implemented at the Department of Medicine of Washington University School of Medicine; started in 2014 it has supported more than 110 trainees per year over the course of eight years. FWIM presents sustainability and growth, as well as positive feedback and outcomes of trainees who participate in the program. They host a multitude of events, workshops, and lectures that teach women how to network and gain camaraderie.

Additionally, the gender-based challenges existing in every level of medical education are further evidenced in the leadership gender disparity observed in healthcare. A recent study by Sanchez et al[23] shows that 74.01% of healthcare staff are women but the representation of women in management positions is around 33%, and among service chiefs, 24%. With such disparities WIM groups become even more relevant. The summation of our review considering all career levels is provided in ***Table 1.***

Discussion

The current study identified 10 essential steps of creating and maintaining a successful WIM Group.

Construction of the 10 Steps of Creating and Maintaining a Successful WIM Group.

Step 1: Identify prospective women in medicine within individual institutions. This step aims to identify the women who show interest in joining women in medicine groups or those who are interested in founding a group. Identifying and quantifying this allows resources to be properly allocated. It may also be beneficial for identifying those interested in leadership roles within the organization formed.

Step 2: Gather resources to create a needs-based assessment for prospective WIM groups such as monetary resources, faculty, and outreach methods. Each establishment varies in its foundation for starting women in medicine groups, with specific differences in institutional size, population, and age groups of the individuals involved (i.e. high school, college, post-graduate). Conducting a needs-based assessment helps identify institutional gaps for each WIM group to address what is lacking within the institution and what needs to be focused on in the group. While one institution may need to focus on advocacy, another may need to focus on opportunities for advancement. This assessment allows resources to be allocated toward fixing each institution's weaknesses in order to provide a holistic WIM group for interested individuals.

Step 3: Gather mentoring faculty and interested WIM alumni within local institutions for further mentorship. A lack of mentorship was found amongst all three education levels. Therefore, finding faculty within each institution who have a particular interest in mentorship can help build a basis for mentorship at the inception of the group. The use of alumnae from each institution, as well as from local hospitals allows for consistency and shared experiences amongst current students and trainees creating more substantial connections. Studies have shown that women as well as other underrepresented populations in medicine can gain substantially just from having equal representation at events such as medical conferences.[20]

Step 4: Provide training materials and workshops to faculty and alumni allocated from previous, successful WIM endeavors (e.g.: The Women in Medicine group). Many successful endeavors produce useful material that can be used beyond the originating group. Furthermore, skill-building sessions for members are a powerful tool wherein senior members or alumni can deliver workshops and seminars for junior members. Skill-building sessions can focus on a multitude of skills, from public speaking, work ethics, and team building to clinical techniques and research methods.

Step 5: Advertise the program to WIM via local institutional resources. Networking is a key factor in connecting women in medicine. A study by Santhosh18 et al. highlights the importance of community building and the creation of an identity for the group, e.g., validating members' experiences. We can conclude that advertising the program to women in medicine via methods such as social media is essential to expand the group`s network, and local institutional resources should be used for such a purpose. Twitter (X) has been a pivotal resource in accessing other women in medicine where several medical professionals are able to self-identify themselves in their designated fields to allow future physicians access to their daily tweets and to eliminate biased categorization that others may place upon them. This is evidenced by Hinson and Gonzalez who highlight the power of the younger generation of medical professionals seeing equitable representation.[20]

Step 6: Determine regular meeting schedules and organization such as group roles. Santhosh et al.18 also mention the sustainability of professional women in medicine groups, which is related to having a structure that allows for committees and subcommittees with limited terms to allow for the rotation of power and avoid burdening a small group of individuals. Only through an organized and flexible schedule can it become possible to achieve such goals. Acknowledging the work put into the group is also advised, such as a reward system or public acknowledgment to other members in order to provide positive reinforcement. Acknowledgement can come in different forms; creating a culture of constructive feedback, recognition of authorship and leadership in projects and innovative ideas, keeping track of hours spent in the group, etc.

Step 7: Foster student leadership within the WIM group, through positions on subcommittees or to leading research endeavors. Establishing student leadership positions is a critical component of the development of women in medicine groups. Through early exposure to leadership positions within medicine, women gain the skills necessary to be successful leaders throughout their careers while encouraging women to strive for higher positions throughout their future careers.

Step 8: Encourage individual institutions to harbor and maintain connections with neighboring medical establishments for future opportunities. Connections between institutions on a local level present a collaborative approach toward success in women in medicine groups and broadening the mentorship network. These nuanced approaches create broader opportunities for current and future women in medicine.

Step 9: Facilitate meetings within WIM groups across the country and world to maintain camaraderie and build professional networks. Meeting with neighboring institutions offers a unique opportunity for networking within established academic connections. Additionally, exposure to certain advancements of other establishments creates dynamic solutions for future leaders of women in medicine.

Step 10: Provide quarterly check-ins to identify gaps and successes within each WIM group. Regular check-ins provide an additional basis of support for women in medicine. These methods allow administrators to address the challenges and prevent the possibility of future gaps within the interest group. Finally, regular check-ins (via group meetings and/or individual feedback) provide students with an opportunity for growth, reflection, and learning from their current progress. A potentially helpful way of having check-ins is hosting listening sessions and periodically conducting a needs assessment.[22]

The review reveals a consistent thread of essential factors supporting women's career growth in medicine across all educational levels. Mentorship, adequate resources, administrative support, networking opportunities, and safe spaces emerge as critical elements at the pre-medical, undergraduate, and graduate medical education stages. However, the manifestation and impact of these factors evolve as women progress through their medical education journey.

At the pre-medical level, mentorship often focuses on encouragement and guidance for entering medical school, while at the graduate level, it shifts towards career specialization and leadership development. Despite these progressions, challenges persist across all levels, including stereotypes, imposter syndrome, and balancing personal and professional responsibilities. However, strategies to address these challenges become more sophisticated and targeted as women advance in their medical careers. This progression underscores the importance of continuity in support systems throughout the educational pipeline, with each level building upon the foundations laid in previous stages to foster the success of women in medicine.

Limitations

The paucity of literature did not allow for a systematic review with a meta-analysis of findings. Narrative reviews are more prone to selection bias, and even though there was an attempt to minimize it via ample inclusion criteria, it cannot be guaranteed the present paper is not subject to selection bias. Another limiting factor was the lack of studies evaluating the impact of WIM groups. We believe that such impact studies are an important method to gather evidence-based arguments for their implementation. They are also a way to measure the impact of WIM groups on gender equity in healthcare workspaces.

Strengths

While Toolkits and Guides for Women in Medicine Interest Groups exist in the literature19, there are no conclusive publications that provide an overview of the creation of women in medicine groups at different educational levels. Therefore, the present narrative review is novel and might serve as a trailblazer and guide for new WIM interest groups across the country and internationally.

Conclusion

It is evident that adequate resources, including administrative and financial support, provided to WIM groups play a pivotal role in the success of those groups. After evaluation of common successes and pitfalls of previous groups available through literature, this narrative review outlines 10 Steps ***(Table 1)*** that pre-med, undergraduate, and graduate-level WIM groups may follow to obtain a level of success comparable to previous groups. Further research should be conducted on the impact of such groups in developing a more equitable work environment for physicians and healthcare workers.

Summary – Accelerating Translation

This narrative review, titled "Women in Medicine Interest Groups Across the Educational Continuum: A Narrative Review and Toolkit for Institutional Implementation," addresses the persistent gender disparities in medical leadership despite increasing numbers of women entering medicine. While women constitute approximately 40% of medical students, they represent only 18% of hospital CEOs and 16% of medical school deans and department chairs, highlighting the need for effective strategies to support women's career advancement throughout their medical education journey.

The study aimed to develop a comprehensive toolkit for creating and maintaining successful Women in Medicine (WIM) interest groups by examining effective practices across pre-medical, graduate, and post-graduate medical education levels. A narrative review approach was employed using systematic keyword literature searches across multiple databases including Google Scholar, PubMed, MEDLINE, OVID, and Ebsco, conducted in November 2021 and January 2023. Gray literature from accredited medical societies was also included to identify relevant toolkits and guides. Articles were evaluated using the Scale for the Assessment of Narrative Review Articles (SANRA) to ensure quality assessment, with screening and analysis performed by three team researchers who systematically extracted and analyzed data from selected studies.

Twenty-three studies met the inclusion criteria and were systematically analyzed to identify common themes, strategies, and challenges associated with WIM groups across different educational levels. The analysis revealed that mentorship, adequate resources, administrative support, networking opportunities, and safe spaces were consistently identified as essential factors for success across all educational levels. At the pre-medical level, programs like the Women in Medicine and Health Science Program demonstrated success through mentorship opportunities, work-life balance support, and clinical exposure experiences. Graduate-level programs showed success through identity congruence among faculty, inclusion initiatives, and comprehensive student resources. Post-graduate programs emphasized empowerment, allyship, community building, and institutional advocacy for policy changes addressing unconscious bias and wellness.

The synthesis of findings led to the development of a practical 10-step toolkit for establishing and maintaining successful WIM groups. These steps include: identifying prospective women in medicine within individual

institutions, gathering resources to create needs-based assessments, recruiting mentoring faculty and alumni, providing training materials from successful programs, advertising through institutional resources, establishing regular meeting schedules and organizational structure, fostering student leadership opportunities, maintaining connections with neighboring medical establishments, facilitating networking with other WIM groups nationally and internationally, and conducting quarterly evaluations to identify gaps and successes.

The review demonstrates that while challenges such as professional isolation, family responsibilities, and discrimination persist across all educational levels, the manifestation and solutions for these challenges evolve as women progress through their medical careers. Mentorship focus shifts from encouragement for medical school entry at the pre-medical level to career specialization and leadership development at graduate levels. The importance of continuity in support systems throughout the educational pipeline was emphasized, with each level building upon foundations laid in previous stages.

This narrative review serves as both a trailblazer and practical guide for new WIM interest groups nationally and internationally. The research demonstrates that adequate administrative and financial resources are pivotal for group success, and the 10-step framework provides a evidence-based approach for institutions seeking to establish effective WIM programs. The study acknowledges limitations including the paucity of literature preventing systematic review with meta-analysis, potential selection bias inherent in narrative reviews, and the lack of impact studies evaluating WIM group effectiveness. However, the review's strength lies in its novel comprehensive overview of WIM group creation across different educational levels, filling a significant gap in existing literature. The authors conclude that further research should be conducted to evaluate the impact of such groups in developing more equitable work environments for physicians and healthcare workers, emphasizing the potential of WIM groups as cost-effective solutions for addressing gender disparities in medical leadership.

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SB, AC, GS: Study Conceptualization, Data curation, Formal analysis, Writing MK, SJ: Project Administration RB: Supervision.

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