Fostering Professional Development in Medical Students: Gender Differences in Medical School Honors Programs

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Abstract

Gender differences exist in undergraduate medical school and specialty choice and the role of gender has not been well studied in honors programs. Do traditional gender differences exist and remain in these programs in medical school? Longitudinal data from medical students graduating from 2009-2013 (n=678) at one medical school were analyzed to explore associations between program enrollment, demographic characteristics, academic performance and specialty choice. 245 (36%) medical students enrolled in the Bioethics and Professionalism Honors Program (BPHP) and 130 (19%) enrolled in the Research Honors Program (RHP). For BPHP, a significantly larger proportion of females completed the program (p=0.001); for RHP a significantly smaller proportion of females enrolled (p=0.02) while a similar proportion of both genders completed it. More women completed both programs. RHP students had significantly stronger academic profiles than non-enrolled students and were more likely to choose a surgical specialty. Given these results, honors programs may help foster women's professional development and leadership in medicine. These demographic differences were noted and require further study.

INTRODUCTION

Since the 1970s, the proportion of female applicants and matriculants to U.S. medical schools has steadily increased reaching a peak of 50.8% and 49.6% respectively in 2003 (1). Women compose nearly half (47.2%) of entering medical students (2). Gender differences in medical school application test scores, licensing exams and specialty choices have been reported. Cuddy and colleagues reported that women outperform men in USMLE Step 2 and specific clinical areas, although men had higher Medical School Admission Test (MCAT) Biological and Physical Sciences scores and performed better on the United States Medical Licensing Examination (USMLE) Step 1 than women (3, 4). In addition, specialty choice for women has historically emphasized type of patient encountered and patient education, with more women selecting primary care and related specialties, while men emphasized specialties with financial advantages and requiring manual dexterity skill, such as surgery (5).

In undergraduate medical education (UME), the importance of fostering professionalism, self-directed learning, communication and analytic skills, and overall to train "good" physicians regardless of gender is widely accepted (6, 7, 8, 9). The optimal curriculum for achievement of these aims is debated, with some schools creating required or elective scholarly concentrations, tracks, distinctions or pathways. Other schools offer honors programs, i.e. those outside of the formal curriculum, that provide students with the opportunity to foster their professional development and skills in a range of areas. There is a paucity of information about the effects of honors programs on enhancing medical education and fostering professional development or the characteristics of participating students. Yet, these programs may play an important role in providing both unique and additional opportunities for students to develop professionally and personally beyond the requirements of the core medical school curriculum. The Loyola University Chicago Stritch School of Medicine (SSOM) offers its medical students the opportunity to participate in two honors programs: 1) The Bioethics and Professionalism Honors Program (BPHP); and 2) Research Honors Program (RHP). The broad aim of these optional programs is to enhance the individual student's education and professional development.

This study was conducted to assess these programs and determine whether established gender differences in

undergraduate medical education are also seen in honors programs. We describe these programs and examine the gender differences in enrollment, completion, and specialty choice of honors program enrolled and non-enrolled students.

HONORS PROGRAM DESCRIPTIONS

Bioethics and Professionalism Honors Program

Authors have characterized bioethics education as "…moral education aimed at character formation, integrity, and professional virtues" (10). Despite the fact that ethics education is a standard component of UME, there is little consensus on which standards should be covered (11, 12,13,14). Medical schools grapple with what ethics content to teach, how best to teach it, and what impact ethics education might have on the professional development of medical students.

In the US, a major effort is underway to assess the current ethics education curriculum and develop consensus on the measurable objectives (15). The Project to Rebalance and Integrate Medical Education is working to describe the goals of ethics education and humanities and determine how it can best be integrated into UME to impact professionalism (16). In addition, some medical schools promote optional programs to enhance medical student awareness, knowledge, and skills regarding ethical and professionalism issues and career development (17, 18, 19).

Drawing on its Jesuit, Catholic heritage, SSOM has a large number of students who are active in a self-directed curriculum related to bioethics, service to the underserved, leadership, and professionalism. As the oldest of the honors programs, the BPHP is a two and a half year program that began in 2003, with 229 students completing it from 2006 through 2013. It aims to enhance the development of the character and intellect of its students in these areas. The program provides a formal structure for students to enhance their knowledge and awareness of bioethics and professionalism while undertaking a range of activities including service to the underserved, community health research, and clinical research.

Students enter the BPHP in January of their first year and complete in June of their third year. They are paired with a bioethics faculty advisor who provides feedback on their work. Requirements include: setting annual goals related to their bioethics and professionalism activities and knowledge, reflecting on those activities in a protected online portfolio, attending topical seminars, and completing a capstone proposal and project. Students spend 1-2 years planning, undertaking and completing their capstone project that may be empirical/clinical research, pedagogical, service-oriented, or conceptual in nature. They orally present their project as an academic poster at the end of their third year and are evaluated by faculty and peers. Students who complete this program are eligible for a fourth year elective designed to submit their capstone project for publication.

Research Honors Program

Many medical students wish to enrich their knowledge and skills in biomedical research during medical school. Given the demands of the core medical school curriculum, the additional time and effort that is necessary to develop research skills may pose a challenge for certain students. There are barriers to medical students who wish to gain these skills, including a lack of direction, lack of mentor interest, lack of time and opportunity (20, 21).

Despite these challenges, drivers for participation include positioning for competitive residencies, professional ambition and knowledge or other professional goals. There is a general perception that students with stronger traditional academic profiles are more likely to participate in research during medical school, yet there is little evidence to support this belief. In addition, the literature to date does not provide predictors for medical student research program directors regarding enrollment, retention, and completion of such programs.

The SSOM RHP is a 3-year optional honors program offered to qualifying medical students; the program graduated its first student in 2008. A prerequisite for the program is completing the STAR (Student Training in Approaches to Research) program. STAR is an 8-week, full time research program, under the guidance of a student-selected research mentor. The program occurs in the summer between the first and second years of medical school. Students who successfully complete the requirements of the STAR program are invited to participate in the Research Honors Program. The aim of the program is to acquire research skills and demonstrate those skills in the completion of a research project described in two forms of research dissemination (manuscript and poster).

The RHP includes eight research seminars covering research ethics, study design, scientific writing, institutional review

boards, seeking funding, authorship, informed consent, and basic biostatistics. Each session has assigned reading and small group tasks. In addition, students must complete a research project under the guidance of a student-selected research mentor. Research Honors students must complete a one-month research elective during their third or fourth year. Dissemination must include a poster presentation at Loyola's campus-wide celebration of research as well as submission of a completed original research manuscript to a peer review journal prior to graduation. Students are also required to attend twelve scientific journal clubs of their choice during their third and fourth year.

METHODS

Data were retrieved from a longitudinal SSOM database that collects data on each student from admission to graduation. Data included demographic characteristics, MCAT scores, rank, USLME scores, and specialty choice. Information on enrollment and completion of the two honors programs was collected from the individual program records. We evaluated characteristics and gender distributions in enrollment, completion, and specialty choice among honors program participants compared to non-participants enrolled in the core curriculum only. The study was reviewed and granted exempt status by the Loyola University Chicago Health Sciences Division Institutional Review Board.

Statistical Analysis

Standard descriptive statistics were reported, mean + standard deviation for numerical variables and frequency count (%) for categorical variables. Two sample t-tests were used for the comparison of academic outcomes between students who enrolled in BPHP or RHP and students who did not enroll in either honors program. Chi-square tests were used to examine the association between enrollment in BPHP and RHP and specialty preference. The proportion of female and its confidence interval were calculated. All analyses were performed using SAS 9.2 (SAS Institute Inc., Cary, NC).

RESULTS

Table 1 summarizes demographic characteristics for the 678 medical students who graduated in the classes of 2009-2013. Of these students, 245 (36%) enrolled in the BPHP and 130 (19%) enrolled in the RHP. Thirty-two (4.7%) students were enrolled in both programs. The majority of students in these honors programs were white-non-Hispanic, Catholic, and undergraduate science majors consistent with the demographic characteristics of the students enrolled in the core curriculum only.

There was a significantly smaller proportion of women enrolled in the RHP 40% vs. 60% (p=0.02) without any difference in the proportion of participating women successfully completing the RHP, 45% vs. 55% (p=0.42). The BPHP program showed a different relationship between gender, enrollment, and completion. There was no difference in the proportion of women versus men enrolling in the BPHP program; however, a significantly higher proportion of women completed the program, 65% vs. 35% (p=0.0001) (Table 2).

To assess academic profiles, we compared students enrolled in at least one honors program (RHP or BPHP) with non-enrolled students, namely those participating in the core curriculum alone. Academic profiles for RHP students were significantly higher than core curriculum students for all measures except USMLE 1 scores (225.2+24.17 vs. 221.2+21.53, P=.08). RHP students had significantly stronger academic profiles than BPHP and core curriculum students (Table 4); the academic profiles for BPHP students were similar to students in the core curriculum.

Compared to core curriculum students, specialty choice was significantly different for students enrolled in RHP (p=.0002), but not for BPHP students (p=.25) (Table 5). Further analysis revealed that 43 (43%) of RHP enrolled students selected surgery over primary care while 95 (23%) core curriculum students selected surgery over primary care (p<0.0001) (Table 6). RHP enrolled students were also more likely to choose surgery over the other specialty group (n=43, 61%) compared to core curriculum students (n=95, 43%, p=0.009).

DISCUSSION

Our analysis detected notable gender differences that have not been previously reported: proportionately more women completed these honors programs and more men withdrew from them. While similar proportions of women and men entered the BPHP, significantly more women completed this program. In the RHP, a smaller proportion of women enrolled in the program, while a similar proportion of women and men completed it. These findings may be due to gender differences such as an appreciation of the self-directed learning style of these programs that may be more appealing to females and/or allow them to demonstrate leadership skills in areas not traditionally covered in the core curriculum, e.g. specific research topics, community and service based projects. There

may also be a subset of women who enrolled and have a personal trait of tenacity that increased their ability to complete the program. These honors programs may provide an additional platform for women in UME to excel and/or showcase their abilities and develop relationships with mentors (22, 23). They may enhance female student's medical education and professional or specialty choice opportunities. For the BPHP, the opportunity to focus on topics and projects outside of basic science and engage with people may appeal to women, given their traditional motivation in medicine for "person-oriented" activities and specialties (24). In the RHP, women may be increasingly aware that to match in a competitive specialty research experience is vital and more women are choosing these types of specialties than in the past (25). Over time, this change may mean the traditional gender gaps in certain specialties will narrow and the implications for UME and graduate medical education need careful examination.

The reasons why men withdraw from the honors programs more frequently than women are not well understood. It may be that as the demands of medical school increase, they are less able to multi-task and need to focus primarily on their curricular studies. They may not think they need the honors programs to provide an advantage in specialty choice or may be involved in other extra-curricular activities outside of the honors programs. This phenomenon needs further exploration and we plan to follow up with students of both genders who complete and withdraw from the programs. In a qualitative study we can identify themes in their motivations, challenges and reasons for getting involved, completing and withdrawing from the honors programs.

The gender differences we detected are likely multifactorial and may be due to the perceived utility of the additional curriculum once specialty preference solidifies. The finding that academically stronger students engage in the RHP, including women, is likely due to their career projection toward more competitive residency positions, where research training and productivity places them at a competitive advantage.

Our findings of gender differences in honors program enrollment and completion could also have implications for the gender-related differences seen in the career progression in rank and leadership positions in academic medicine. Recent reports show that despite the increased enrollment of women in medical schools, women lag behind men in the length of time to promotion to higher ranks and leadership (26, 27). Several studies speculate that male dominated social norms in the medical school and career environment may be a factor in the gender differences in career progression (28, 29). Medical school honors programs and the relationship to career progression should be explored in US medical schools. Women may benefit in the short term and in the long term from early leadership opportunities and self-directed learning that is provided in honors programs.

Despite the rigorous core curriculum of medical school, many medical students seek additional cognitive and/or experiential learning for further professional development. Overall, we believe that there is value in offering honors programs for motivated, capable medical students. Our approach to providing these programs complements and goes beyond the core curricular opportunities in these areas. Honors programs may be one area of UME that can be tailored to the unique needs of our changing of health professionals. Our finding of gender difference offers educators an opportunity to further tailor these programs to attract qualified students and retain them until program completion, regardless of gender. Furthermore, these programs support the LCME standards for academic learning environments and fostering a "community of scholars/research opportunities" (30). For select students, such an approach is appropriate whereas for others, the unexpected demands of medical school, superimposed on their personal and family life, may preclude expansion of their academic activities. This initial assessment provides us with information to refine our approach to program description and management. In addition, it provides a single-school profile for comparison with other schools that follow a similar tactic for offering enhanced curriculum.

Honors programs offer the opportunity for students to enhance their UME and further develop skills such as self-directed learning, leadership, as well as develop key relationships with mentors. The impact of such programs on medical students and continued evaluation of gender differences over the long term is worthy of further study. Within our institution, we plan continued tracking and assessment of the characteristics of students engaged in the co-curricular programs, including a recently introduced co-curricular program in Global and Community Health. Our findings will be strengthened by additional data and evaluation of similar programs contributed by other medical schools.

Table 1

Characteristics of Honors Program Students, 2009-2013

Characteristic	Research n=130 (19%)	Bioethics n=245 (36%)	Non-participants n=303 (45%)	All Students n=678 (100%)
Gender:				
Female	52 (40)	135 (55)	176 (53)	349 (51)
Male	78 (60)	110 (45)	159 (47)	329 (49)
Race/ethnicity:				
White Non-Hispanic	99 (77)	193 (79)	249 (75)	514 (76)
Black Non-Hispanic	3 (2)	9 (4)	21 (6)	32 (5)
Hispanic	6 (5)	8 (3)	14 (4)	28 (4)
Asian Pacific or Pacific Islander or American Indian or Alaskan	19 (15)	29 (12)	38 (11)	83 (12)
Other	2 (2)	5 (2)	12 (4)	18 (3)
Undergraduate Major:				
Science Major	101 (78)	163 (67)	233 (70)	470 (69)
Non science Major	29 (22)	82 (33)	102 (30)	208 (31)
Religion:				
Catholic	71 (55)	128 (54)	157 (48)	336 (51)
Protestant	24 (19)	48 (20)	74 (23)	139 (21)
Other*	15 (12)	17 (7)	31 (10)	61 (9)
Non specified**	19 (15)	44 (19)	64 (20)	124 (19)

*Other represents Hindu, Islam, Jewish, Buddhist
** Non-specified indicates students who did not list a Religious affiliation.

Table 2

Bioethics and Professionalism Honors Program Enrollment and Gender Differences

	Female	Male	P value (CI%)
BPHP Enrolled Students N=245	135(55%)	110(45%)	0.11(49-61)
Students Completing BPHP N=163	106(65%)	57(35%)	0.0001(57-72)
Non-enrolled BPHP Students N=433	214(49%)	219(51%)	0.81(45-54)

Table 3

Research Honors Program Enrollment and Gender Differences

	Female	Male	P value (CI%)
RHP Enrolled Students N=130	52(40%)	78(60%)	0.02(32-49)
Students Completing RHP N=75	34(45%)	41(55%)	0.42(34-57)
Non-enrolled BPHP Students N=548	297(54%)	251(46%)	0.05(50-58)

Table 4

Academic Profiles of Honors Program Enrolled Compared to Non-enrolled Medical students

Academic Outcomes*	Research n=130 mean(SD)	Non-enrolled n=333 mean(SD)	P value
Basic Science Rank**	60.73 (40.53)	70.45(40.06)	.02
MCAT Score***	31.33 (3.14)	30.07(2.89)	<.0001
Junior Rank§	62.61 (41.26)	72.80(41.83)	.02
Senior Rank§§	58.86 (39.45)	71.96 (40.98)	.002
USMLE1	225.2 (24.17)	221.2 (21.53)	.08
USMLE2	234.9 (22.70)	230.6 (20.61)	.05

*Data represents mean and standard deviation
**Student's basic science rank at the end of M2
***First MCAT score taken
§ Cumulative GPA from M1-M3
§§ Cumulative GPA from M1-M4

Table 5

Honors Program Enrollment and Specialty Choice

Specialty Preference*	Research n=128(%)	Non enrolled n=545(%)**	P value	Bioethics n=244(%)	Non enrolled n=429(%)	P value
Primary Care	57(44)	323(59)	.0002	148 (61)	232(54)	.25
Surgery	43(34)	95(17)		45 (18)	93(22)	
Other	28(22)	127(23)		51 (21)	104(24)	

*Primary care = Family Medicine, Internal Medicine, OB/GYN, Pediatrics
Surgery = Cardiac Surgery, Neurosurgery, Orthopaedics, Otolaryngology, Surgery, Urology
Other = Anesthesiology, Emergency Medicine, Further Education, Neurology, Opthalmology, Pathology, Psychiatry, Radiation Oncology, Radiology, Transition Year
** frequency missing data=5

Table 6

Research Honors Enrollment and Specialty Choice

	Enrolled No. (%)	Non enrolled* No. (%)	P value
Primary Care	57(67)	323(72)	.38
Other	28(33)	127(28)	
Surgery	43(61)	95(43)	.009
Other	28(39)	127(57)	
Surgery	43 (43)	95(23)	<.0001
Primary care	57 (57)	323(77)	

*Frequency missing data= 5

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