

Perceptions of Education Quality and Influence of Language Barrier: Graduation Survey of International Medical Students at Four Universities in China

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Abstract

Background: As an increasing number of Asian and African students are studying medicine in China, it is imperative to assess the training quality of these international medical students (IMs). The study was to gain insight into the attitudes from China-educated IMs towards the medical curriculum and the influence of Chinese language abilities on their clinical studies.

Methods: A modified Association of American Medical Colleges Graduation Questionnaire was applied among the final-year IMs during the graduation season from May 2019 to July 2019 at four universities in China. The questionnaire asked IMs to evaluate medical education quality and assess their Chinese language capacity. One-way ANOVA was used to determine whether participants' Chinese language capacity was associated with their clinical experience and clinical competence.

Results: Overall, 209 valid responses were received and 76.1% were satisfied with the quality of the medical education. Genetics, physics, and mathematics were seen as the least helpful basic courses for practice, and 21.5% thought community-oriented medicine was a topic that lacked instruction. 58.9% were positive that discussions surrounding ethical topics were involved during their clerkships, and 71.3% believed they had acquired sufficient clinical skills to begin a residency program. Chinese speaking skill and communication manner were significant factors to influence students' clinical experience and competence.

Conclusion: The study demonstrates China-educated IMs' perceptions of the contemporary education policy from various aspects and language influence on their education experiences. The curriculum for IMs in China should be more problem-based to enhance course interaction and more community-engaged to meet people's needs for health and medical care. Besides, the oral Chinese teaching and the initiative to speak need to be emphasized to facilitate the clinical training for IMs. Our findings can be used as a source of evidence to benchmark medical curricular codifications catering for Asian and African students.

Background

Over the past two decades, China has experienced a dramatic growth in enrolment of international students, and clinical medicine is the most-chosen field for academic studies [1]. Many medical schools in China provide a 6-year English-taught undergraduate program for international medical students (IMs) and confer the bachelor of medicine degree to the qualified graduates. Delivered in different universities or colleges in China, the curricula of the program for IMs are similar. The 1st year mainly consists of liberal arts and natural science courses (preparatory year), followed by two years of basic medical science courses (preclinical years). In the 4th and 5th years, clinical courses integrated with bedside trainings are instructed, and the 6th year is the rotating internship; this stage is known as clinical years. Aiming at producing internationally acceptable medical professionals, China trains IMs in compliance with Global Minimum Essential Requirements in Medical Education [2] and has taken a series

of actions to upgrade the standard of the training quality. China International Medical Education Committee has been established [3] and national policies have also been formulated [4–6] to promote and normalize its international medical education.

Currently, over 68,000 IMSs are studying in China, who are mainly from lower income countries in Asia and Africa [7]. These IMSs constitute potential medical workforce not only for their home countries, but also for the countries they intend to migrate to, such as the USA, the UK, Canada, Australia, China, and etc. [8–9]. In light of the significant role played by these IMSs in the healthcare service of their future practice locations, it is, therefore, imperative to assess the quality of international medical education in China.

Students' feedback serves as an indispensable indicator to access the medical education [10], and the time of graduation is proposed as an appropriate moment to collect students' voices [11]. Many researches have applied surveys among graduating students to reflect various aspects of health profession education, exemplified by assessments of medical education in the UK [12] and Vietnam [13], nursing education in the USA [14], and dental education in India [15].

The Association of American Medical Colleges (AAMC) has been administering the Graduation Survey (GQ) annually since 1978 to gather opinions from final-year medical students in the USA about their study experiences and future plans [16], which proves to be an effective tool to identify areas of strength and weakness in the medical program [17]. Developed from the version of the USA, the Canadian GQ is also applied nationally for evaluating the undergraduate MD programs in Canada [18–19]. Due to the great longitudinal stability of the AAMC GQ [20], it has been utilized by researchers to evaluate the medical education in many other countries as well, such as Nepal [21], Iran [22] and Israel [23]. There are also two studies from China, one conducted in mainland China to explore graduates' perceptions on a medical school's traditional and reform curricula [24] and the other conducted in Taiwan of China at 4 medical schools to collect graduates' opinions on medical education [10].

However, to our knowledge, there is no such comprehensive graduation survey directing at IMSs in China yet, whose attitudes should have been paid due attention. During the elevation process, IMSs will provide opinions based on their pre-college experiences back home as well as future career expectations in varied countries, which are pivotal factors to be considered for the curriculum improvement. Besides, although English is the language for instruction in class, the usage of Chinese is unavoidable in the clinical environment, since most of the patients can only speak Chinese, the influence of which on IMSs' clerkship and internship still calls for further exploration.

The study is to investigate, by using the AAMC GQ, how graduating IMSs perceive the international medical education in China and how their language abilities relate to their clinical experience and competence, hoping to provide references for helping shape the future of the education oriented to IMSs from Asian and African countries.

Methods

Setting and participants

The graduation questionnaire for IMSs (IMS GQ) was conducted among the final-year IMSs during the graduation season from May 2019 to July 2019 at four universities in China, which are situated in four cities representing different economic and educational characteristics, aiming to present a comparatively accurate picture of international medical education in China.

Instrument

The IMS GQ was largely based on the AAMC GQ, modified according to the international medical education system in China, with referring to some of the previous studies [10, 21-23]. The IMS GQ contained three sections. The first section collected students' basic personal information, such as gender, age, nationality and university.

The second section asked about students' language capacity, including their self-evaluation of Chinese speaking skills, initiative to communicate in Chinese and information on obtaining the HSK certificate. HSK is short for Hanyu Shuiping Kaoshi, meaning Chinese language proficiency test, a national written exam to test examiners' command of Chinese in listening, reading and writing, organized by Confucius Institute Headquarters (Hanban), a subdivision of the Ministry of Education of China.

The third section included 34 Likert-scale-type questions and 1 question enquiring about the internship location. These 35 questions were classified into 6 domains, namely overall satisfaction (Q11, 1 item), basic science education (Q12-Q18, 7 items), clinical education (Q19-Q31, 13 items), clinical competence (Q32-Q38, 7 items), benefits of diversity (Q39-Q40, 2 items), and study hours of specific topics (Q41-Q45, 5 items).

Data collection and analysis

In the study, electronic questionnaire was employed, except for University A, a proportion of whose respondents completed a paper version of the questionnaire. Each of the 4 participating universities had its own questionnaire distributor(s). At the beginning of the questionnaire, it was clearly stated that the participation was completely voluntary and the result could be used for research on trends in medical education. All the participants gave consent for their opinions to be published in a scholarly journal anonymously.

For rating how much participants agreed or disagreed with the statements, responses were ranging from "strongly disagree (1 point)" to "strongly agree (5 points)"; for rating the quality of the basic and clinical courses, responses were ranging from "very poor (1 point)" to "excellent (5 points)"; and for rating study hours of specific topics, responses were ranging from "absent (1 point)" to "excessive (4 points)". For the purpose of discussion, "strongly disagree/very poor/absent" and "disagree/poor/inadequate" were

regarded as negative responses, while “strongly agree/excellent/adequate” and “agree/good/excessive” were positive ones. Responses of “neutral/fair” were omitted.

As for the classification of students’ HSK levels, those who held an HSK 3 certificate or below were categorized into lower HSK level group, and those who held an HSK 4 certificate or above were categorized into higher HSK level group.

The data obtained through this study were entered into a database and analysed using SPSS. The responses for the third section in the questionnaire were given as percentages. One-way ANOVA was used to determine whether respondents’ HSK level, Chinese speaking skills and initiative of communicating in Chinese were associated with their clinical experience and clinical competence.

Results

A total of 280 IMSs at the four universities were invited to complete the IMS GQ and 209 responded. The response rate was 74.6%. The demographic data of the respondents was showed in Table 1. Among all the respondents, 66.0% were male. The majority of the respondents fell into the age group of 22-24 (51.2%) and 25-27 (43.5%). The graduating students were from 8 Asian countries and 5 African countries, and Indian students overwhelmingly outnumbered students from other countries, occupying 58.4% of all the participating IMSs in the study. There were 6 students doing the internship in their home countries, and the rest did the internship in China. The aggregate data showed 76.1% were satisfied with the overall quality of their medical education.

Preparatory and preclinical education experience

The result of IMSs’ ratings for the statements about basic science education was showed in Figure 1. Positive responses given by the participants for the six statements were all above 70%. 76.6% of the students believed that required clinical experiences integrated basic science content, and 76.1% held that basic science content objectives were made clear to them. By comparison, 70.3% of the respondents thought basic science content was sufficiently integrated/coordinated, and 70.8% agreed that basic science coursework had sufficient illustrations of clinical relevance.

Figure 2 showed how the respondents evaluated the specific natural science and basic science courses in preparation for their clinical clerkships. Considering the minor variations in the curricula for IMSs in the 4 participating universities, the choice of “Not applicable” was provided in this section, and the respondents could choose it when they did not believe they had received such knowledge. Anatomy (89.4%), physiology (88.3%), and pharmacology (86.0%) were considered most helpful for their clinical work; on the other hand, genetics (74.0%), physics (73.2%), and mathematics (68.8%) received the lowest percentage of agreement in regard of laying foundation for the clerkship.

Clinical education experience

According to the respondents' ratings for the quality of their educational experiences in the clinical courses (Figure 3), internal medicine (89.4%), obstetrics-gynaecology (89.4%), surgery (88.9%) and paediatrics (88.5%) were recognized as good/excellent quality courses by the highest proportion of the respondents, while the satisfactory rate for radiology (79.5%), oncology (76.7%) and community medicine (69.7%) were the lowest. "Not applicable" choice was also provided in this section.

In terms of the statements about clerkship (Figure 4), 69.4% of the students agreed that they had sufficient access to the variety of patients and procedures encountered during clerkship; however, only 58.9% believed that ethical issues were discussed during clerkships. As for internship, although as high as 85.2% of the participants thought the final year (internship) was important for enhancing their medical education, merely 66.0% considered they were given an appropriate role in patient care during the internship (Figure 5).

Regarding to the clinical competence (Figure 6), above 80% of the respondents deemed they could understand the ethical and professional values as physicians and were adequately ready to take care of patients from different backgrounds. However, a comparatively lower rate of students (71.3%) had confidence in their clinical skills to begin a residency program.

Benefits of diversity and study hours of specific topics

Since IMSs were surrounded by classmates coming from diversified cultures and exposed to teachers and patients from outside the home country, the section of benefits of diversity was included in the survey. The result showed that 73.7% of the students thought the cultural diversity within their medical school class enhanced their training and skills to work with individuals from different backgrounds (Figure 7). As for the study hours of specific topics, community-oriented medicine was voted by the largest percentage of the participants (21.5%) as a topic that lacked instruction (Figure 8).

Influence of language barrier

Table 2 showed how respondents' Chinese language capacity influenced their clinical experience and competence. There were totally 18 statements classified into clerkship, internship and clinical competence fields. HSK level was found a significant factor for only 1 statement in internship field (IN-4); respondents with lower HSK levels were more likely to believe that they were given an appropriate role in patient care during the internship than their counterparts with higher HSK levels.

Chinese speaking skill was a significant factor for 14 of all the 18 statements, and LSD was used to further test if there was any significant difference among the weak, adequate and good Chinese speaking skill groups. It was found that respondents with good Chinese speaking skills significantly scored higher than the respondents with weak and/or adequate Chinese speaking skills in the 14 statements, and in the statement CL-1, it was also found that the adequate group scored significantly higher than the weak group.

The communication manner was found an absolute influential factor for respondents' clinical experience and competence, since respondents with active communication manner scored significantly higher than those with inactive communication manner in all the 18 statements.

Discussion

In the study, we conducted the graduation survey among IMSs at 4 Chinese universities using the questionnaire based on AAMC GQ. The study evaluated the effectiveness of the undergraduate program for IMSs in China from multi-aspects and highlighted the influence of language barrier on IMSs' education experience, giving useful information for policymakers and university authorities to make important curricular decisions concerning international medical education catering for Asian and African students.

Although IMSs' rating result of the basic science education was overall positive, it still indicates relatively insufficient interdisciplinarity and clinical relevance in the basic science subjects. Similar circumstances have also been reported in researches from India [25] and Nepal [26]. In fact, just like China, many Asian and African countries traditionally divide the medical curriculum into two separate parts (basic sciences and clinical sciences) and follow discipline-based teaching pattern [25-27], causing basic sciences to be delivered as individual subjects with least cross-subject interaction or clinical practice integration. To address these weaknesses, problem-based learning (PBL) was introduced for a better learning outcome [28], and it is increasingly popular in Asia and Africa [27, 29-32]. China's medical schools began to adopt this experimental teaching approach on Chinese medical students from the mid-80s [33], and started to adopt it on IMSs more recently with positive results [34-36], although the teaching faculties still have to overcome the language challenge reportedly [37].

In the study, we found anatomy and physiology received the highest percentage of agreement in regard of underpinning IMSs' clerkship. These two subjects also ranked top in other GQs in the USA [16], Canada [18], Iran [22], Israel [23] and Taiwan of China [10]. As anatomy, physiology and pharmacology are among the fundamental sciences to medical practice [38], these subjects' importance should hardly need repeating. Besides, there might also be another feasible reason; medical students are found to undergo a considerable knowledge loss of basic sciences in their later years of education [39-40], and pathophysiology-related basic subjects are more memorised [38], because the constant reference to clinical application could reinforce students' insight into these subjects [41].

By contrast, statistics, epidemiology and genetics, despite their close connection with clinical diseases, were among the least helpful preclinical subjects for medical practice in our survey as well as some other surveys conducted elsewhere [16, 18, 22-23]. Students' mastery of statistics and epidemiology largely depends on their mathematical abilities. If teachers in China prepare lessons based on the general academic background of Chinese students, who are known for good command of mathematics, there might be a mismatch between the difficulty of the lessons imparted by teachers and that accepted by IMSs. As for genetics, a rapidly developing discipline involving state-of-the-art concepts and latest

research findings, IMSs will be discontent if the teachers cannot stay abreast of the relevant scientific advances. Besides, due to the inadequate application of evidence-based medicine in some countries, IMSs might have not realized the importance of this subject.

Many participants gave negative responses to the benefits of natural sciences for medical practice in our study, which is supported by evidence from published literature [10, 23], possibly attributed to the poor knowledge retention of the related subjects and a loose partnership between the natural science and clinical application. However, Goldszmidt et al. [42] argue that using natural science knowledge, such as physics, to illustrate clinical phenomena can produce a causal explanation of the latter, which promotes medical students' memory for clinical details.

Our findings are in consonance with the reports that the education experience in internal medicine, obstetrics-gynaecology, surgery and paediatrics ranked top 4 among all the clinical courses [10, 21]. However, the quality of community medicine was considered the lowest in our study, which is also the case with the study in Taiwan of China [10], whereas medical students in surveys conducted in Canada and Iran speak highly of this subject [18, 22]. Moreover, the fact that a high percentage of IMSs deemed the study hours devoted to community medicine was scanty further illustrated their dissatisfaction with this course.

Medical education policies in different counties are influenced by the respective health care systems. In China, the health care system is hospital-based and the tiered medical services are highly underdeveloped [43], which explains the inadequate role played by community medicine in public health maintenance. As a result, conceivably, the major hospital-based disciplines are fully supported with abundant teaching resources, while the education related to primary care is behindhand. However, IMSs' home countries are generally medically underserved, where the population need to benefit from enhancement of primary care and an increase in general practitioners [44-45]. In fact, community-oriented approaches have already been emphasized at medical schools in many Asian and African countries, including India [46], Nepal [47-48], Pakistan [49] and Ghana [27], with the aim to produce health professionals with competencies and values to serve in local communities, particularly rural areas [50]. Given the vital position of community medicine in IMSs' home countries, policy planners and educators in China should consider reorienting the medical education tailored to IMSs to some degree, putting more effort to fortify theoretical teaching of community medicine and create more practice opportunities in a community setting, to meet the medical conditions of IMSs' home countries.

The results regarding quality and outcome of clinical education in our study denote that the clinical training of IMSs in China is still insufficient, and in particular, linguistically demanding tasks tend to obtain lower ratings. A case in point is that talking ethical topics in depth involves using sophisticated words, and correspondingly, over 40% of our participants provided a negative response towards ethical discussions during their clerkship. For another instance, using the Chinese language skilfully is critical to patient administration for interns in China, which goes with the result that a high percentage of our participants complained about the inadequate role they played during the internship. Our findings also

demonstrate that, IMSs' speaking skills and communication manner, compared to HSK levels, have a greater impact on their clinical experience and competence. Medical schools in China are therefore advised to strengthen the oral Chinese teaching for IMSs and encourage students to take initiative to speak, since doing so will facilitate the likelihood of a quality time in their clinical clerkship and rotations.

IMSs' clinical study is also affected by cross-cultural issues. Although the respondents were very positive towards the access to the variety of patients and procedures during their clerkship, they had comparatively low confidence in the clinical skills they had acquired. Apart from the language barrier, local patients' strong awareness of self-protection and privacy may pose difficulties for IMSs' hands-on experiences during the process [51]. To cope with the obstacles, simulations have been highly recommended by researchers and applied in many medical schools in China as an effective method for clinical teaching for IMSs [51-52]. Cross-cultural factors are influential for ethics teaching too, since ethical topics are highly culture-specific, and thus the ethical standards for IMSs are diversified. So IMSs will not be able to successfully obtain an appropriate and deep understanding of ethical topics without practicing in their home countries or other destination countries.

Conclusion

In the study, we found the international medical education in China lacked a close connection between basic sciences and clinical practice and was insufficient in community-oriented coursework. We also found IMSs with stronger Chinese speaking skills and intentions were more likely to think highly of the clinical training. These results suggest that the curriculum for IMSs in China should be more problem-based and community-engaged, and focus more on oral Chinese teaching. Our findings provide illuminations for government and educators on the orientations to improve curriculum quality for Asian and African medical students.

Abbreviations

AAMC: Association of American Medical Colleges; AFMC: Association of Faculties of Medicine of Canada; GQ: Graduation Survey; HSK: Hanyu Shuiping Kaoshi; IMS: international medical student; PBL: problem-based learning; UK: United Kingdom; USA: United States of America

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Xuzhou Medical University and all participants gave consent to participate.

Consent for publication

All participants gave consent for publication of their data.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Hong Sun and Wen Li contributed to the study conception and design, interpretation of data and critical revision of manuscript. Wen Li was involved in literature review, data collection, data analysis and manuscript drafting. Chang Liu was involved in study design, data collection and analysis. Shenjun Liu was involved in data analysis and interpretation. Xin Zhang, Rong-gen Shi, Hailan Jiang, Yi Ling were involved in data collection and analysis. All authors read and approved the final manuscript.

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Tables

Table 1 Demographic data of the respondents

	University A	University B	University C	University D	Total
Questionnaire distributed (n)	56	135	69	20	280
Respondents (n)	54	112	35	8	209
Gender (%)					
Male	38 (70.4%)	80 (71.4%)	14 (40.0%)	6 (75.0%)	138 (66.0%)
Female	16 (29.6%)	32 (28.6%)	21 (60.0%)	2 (25.0%)	71 (34.0%)
Age upon graduation (%)					
Invalid ^a	0	2 (1.8%)	1 (2.9%)	0	3 (1.4%)
22-24	35 (64.8%)	55 (49.1%)	15 (42.9%)	2 (25.0%)	107 (51.2%)
25-27	19 (35.2%)	47 (42.0%)	19 (54.3%)	6 (75.0%)	91 (43.5%)
28-30	0	7 (6.3%)	0	0	7 (3.4%)
31-33	0	1 (0.9%)	0	0	1 (0.5%)
Country of origin (%)					
India	38 (70.4%)	69 (61.6%)	13 (37.1%)	2 (25.0%)	122 (58.4%)
Nepal	9 (16.7%)	36 (32.1%)	0	0	45 (21.5%)
Bangladesh	4 (7.4%)	5 (4.5%)	0	0	9 (4.3%)
Mauritius	0	0	7 (20.0%)	0	7 (3.3%)
Sri Lanka	0	0	7 (20.0%)	0	7 (3.3%)
Thailand	0	0	6 (17.1%)	0	6 (2.9%)
Pakistan	0	2 (1.8%)	0	3 (37.5%)	5 (2.4%)
Ghana	0	0	1 (2.9%)	1 (12.5%)	2 (1.0%)
Somalia	2 (3.7%)	0	0	0	2 (1.0%)
Afghanistan	0	0	0	1 (12.5%)	1 (0.5%)
Comoros	1 (1.9%)	0	0	0	1 (0.5%)
Indonesia	0	0	1 (2.9%)	0	1 (0.5%)
Jordan	0	0	0	1 (12.5%)	1 (0.5%)

Note: ^a Three respondents accidentally type their graduation year “2019” instead of their age, so their responses to this question were considered as invalid.

Table 2 Respondents’ Chinese language capacity’s influence on their clinical experience and competence

	HSK certificate (Mean)			Chinese speaking skills (Mean)				Communication manner with teachers and patients in Chinese in hospital (Mean)		
	Lower HSK level (n=105)	Higher HSK level (n=104)	P	Weak (n=34)	Adequate (n=105)	Good (n=70)	P	Not Active (n=64)	Active (n=145)	P
Clerkship (Subtotal)	22.17	21.63	.309	20.71	21.29	21.90	.000	20.20	22.66	.000
CL-1	3.73	3.58	.145	3.26	3.59	3.94	.000	3.31	3.81	.000
CL-2	3.68	3.64	.757	3.56	3.55	3.87	.014	3.45	3.75	.007
CL-3	3.63	3.57	.571	3.41	3.50	3.84	.004	3.38	3.70	.006
CL-4	3.74	3.72	.836	3.64	3.62	3.94	.016	3.38	3.89	.000
CL-5	3.83	3.62	.066	3.41	3.60	4.06	.000	3.41	3.86	.000
CL-6	3.56	3.51	.657	3.41	3.43	3.76	.018	3.28	3.65	.004
Internship (Subtotal)	19.41	19.27	.769	18.53	18.99	20.26	.027	17.98	19.94	.000
IN-1	4.10	4.18	.396	4.18	4.06	4.24	.257	3.98	4.21	.046
IN-2	3.96	4.01	.657	3.91	3.93	4.10	.316	3.77	4.08	.006
IN-3	3.78	3.78	.986	3.50	3.71	4.01	.009	3.48	3.91	.001
IN-4	3.82	3.57	.039	3.41	3.59	3.99	.002	3.36	3.84	.000
IN-5	3.75	3.73	.858	3.53	3.70	3.91	.079	3.39	3.90	.000
Clinical competence (Subtotal)	27.03	27.05	.970	26.09	26.54	28.24	.004	25.34	27.79	.000
CC-1	3.75	3.72	.773	3.41	3.69	3.97	.002	3.45	3.86	.000
CC-2	3.87	3.85	.820	3.82	3.76	4.01	.039	3.61	3.97	.000
CC-3	3.91	3.86	.564	3.59	3.87	4.06	.008	3.55	4.03	.000
CC-4	3.90	3.82	.387	3.82	3.74	4.04	.010	3.61	3.97	.000
CC-5	3.76	3.86	.344	3.59	3.74	4.01	.007	3.56	3.92	.001
CC-6	3.90	4.05	.053	3.91	3.92	4.07	.198	3.83	4.03	.016
CC-7	3.94	3.90	.656	3.94	3.82	4.07	.033	3.73	4.01	.004

Figures

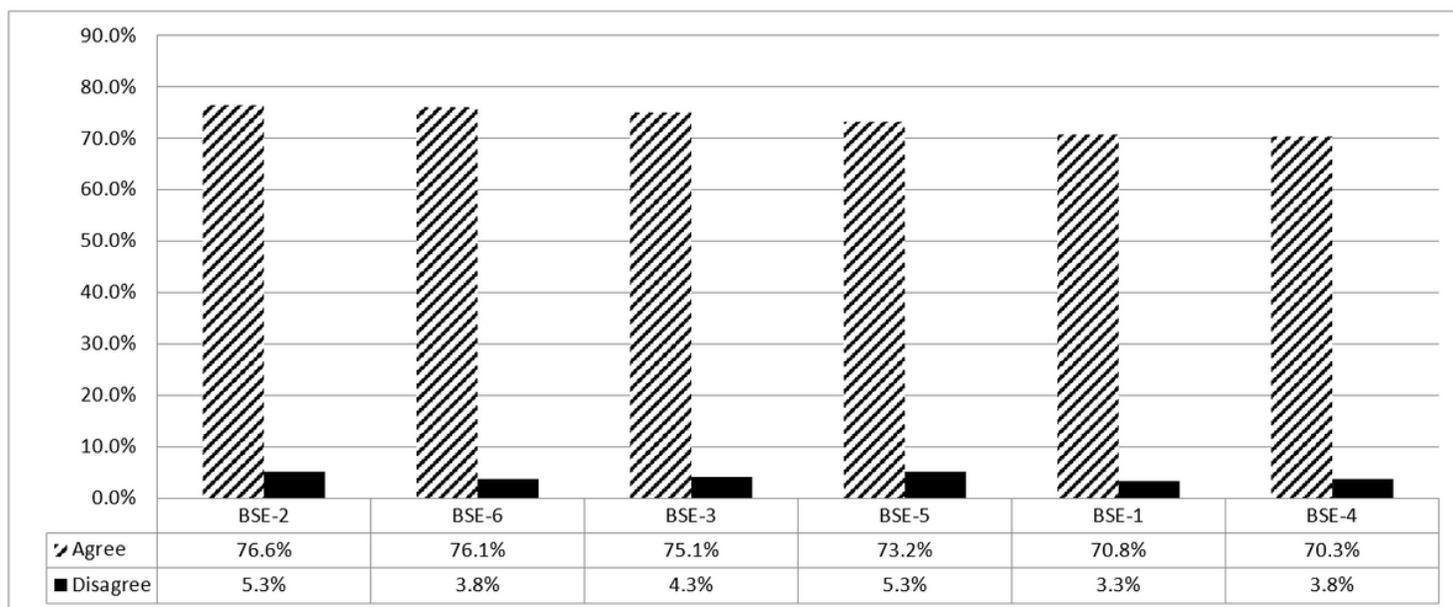


Figure 1

Respondents' ratings for the statements about basic science education (N=209). Notes: BSE is short for basic science education. BSE-1: Basic science coursework had sufficient illustrations of clinical relevance. BSE-2: Required clinical experiences integrated basic science content. BSE-3: Basic science content objectives and examination content matched closely. BSE-4: Basic science content was sufficiently integrated/coordinated. BSE-5: Basic science content was well organized. BSE-6: Basic science content objectives were made clear to students.

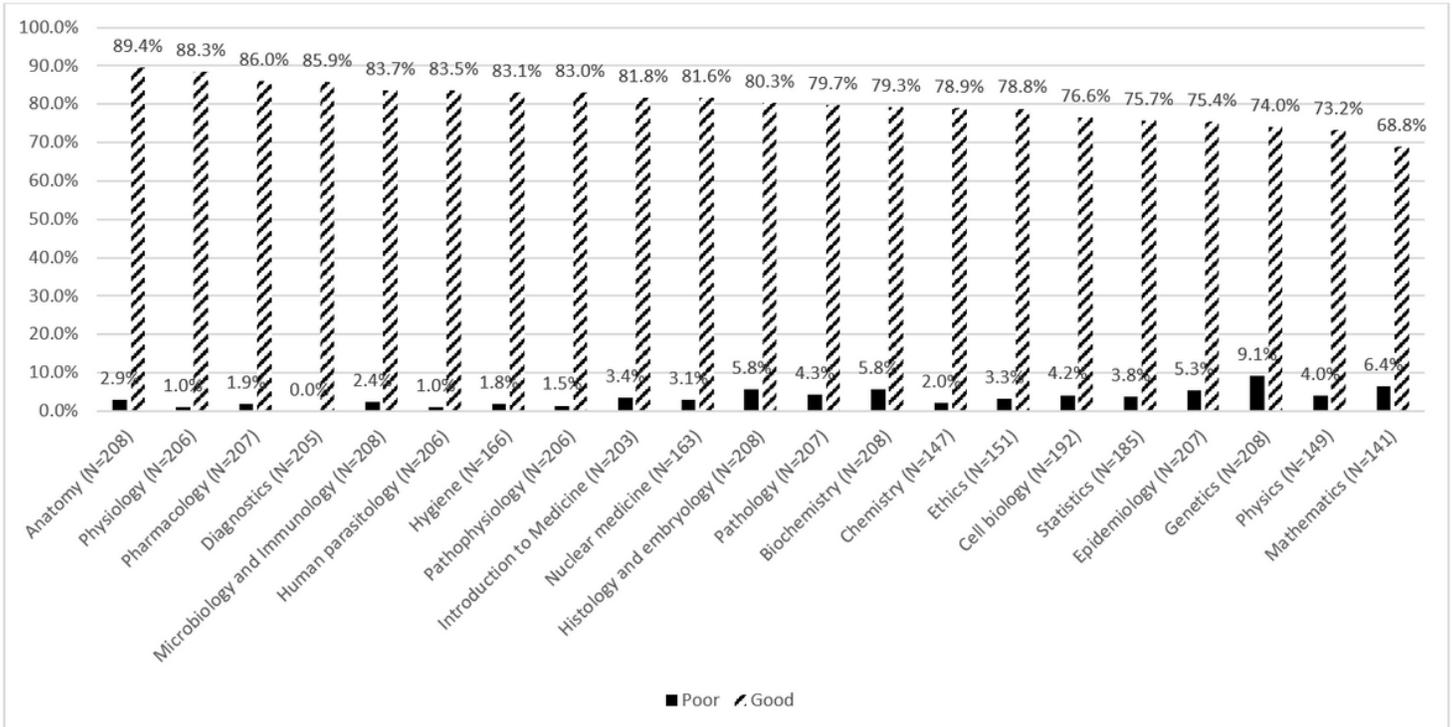


Figure 2

Respondents' ratings for how the basic science courses prepare them for clinical clerkships. Notes: For each subject, the choice of "Not applicable" is provided, and if the respondent did not believe he/she had received such knowledge in the university, he/she could choose "Not applicable". The number of the respondents who chose "Not applicable" for each subject was excluded from the total count for this subject when the percentage was accumulated. The number of the respondents who provided a rating other than "Not applicable" was given after each subject in this figure.

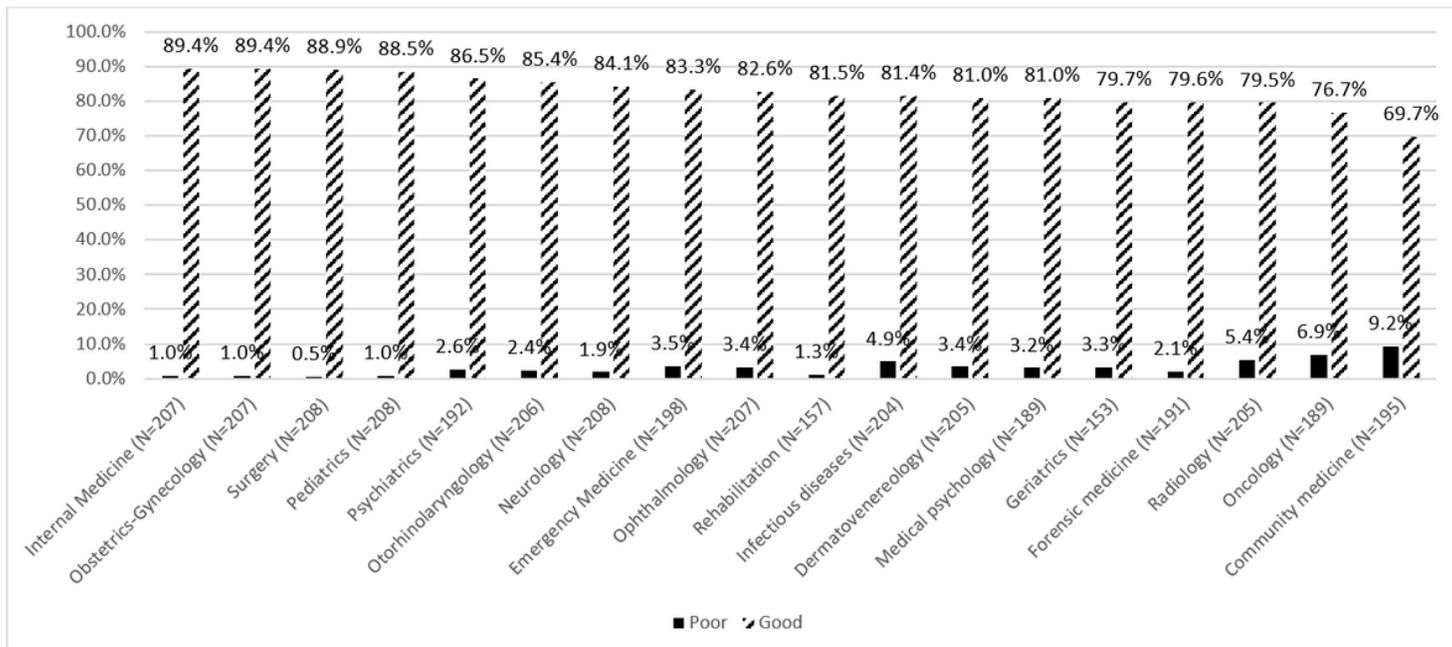


Figure 3

Respondents' ratings for the quality of their educational experiences in the clinical courses. Notes: For each subject, the choice of "Not applicable" is provided, and if the respondent did not believe he/she had received such knowledge in the medical school, he/she could choose "Not applicable". The number of the respondents who chose "Not applicable" for each subject was excluded from the total count for this subject when the percentage was accumulated. The number of the respondents who provided a rating other than "Not applicable" was given after each subject in this figure.

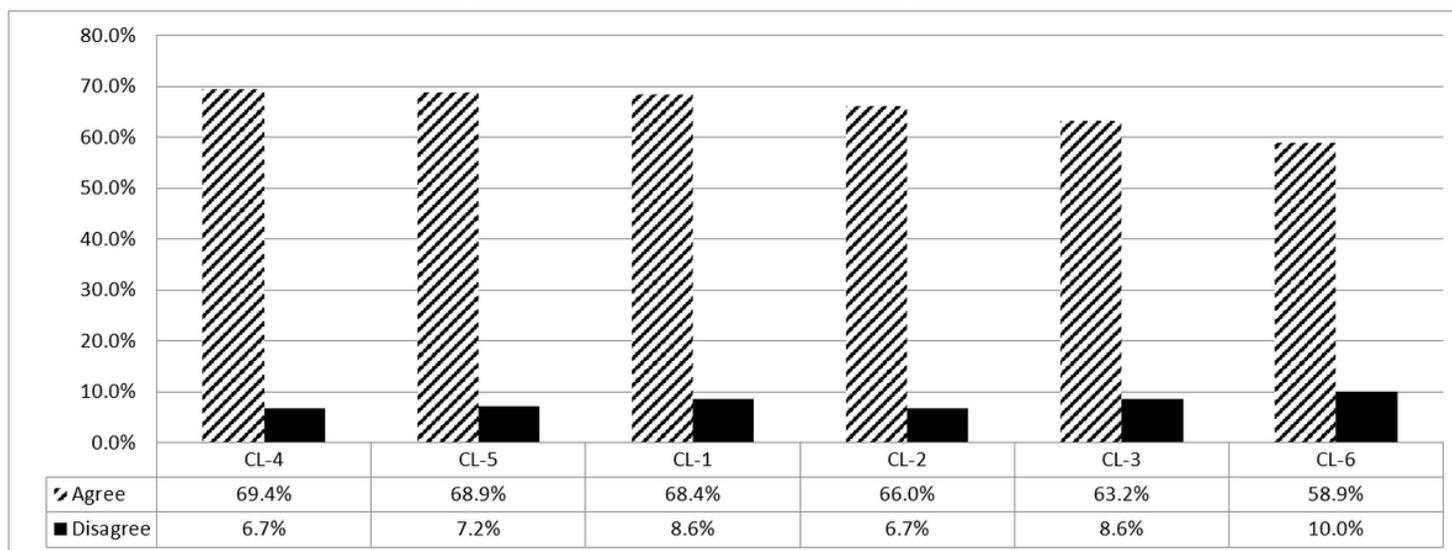


Figure 4

Respondents' ratings for the statements about clerkship (N=209). Notes: CL is short for clerkship. CL-1: Faculty provided effective teaching during clerkship. CL-2: The supervision I received was adequate

during clerkship. CL-3: There was sufficient use of simulations during the clerkship. CL-4: I had sufficient access to the variety of patients and procedures encountered during clerkship. CL-5: I was given timely feedback on performance in clerkships. CL-6: Ethical issues were discussed during clerkships.

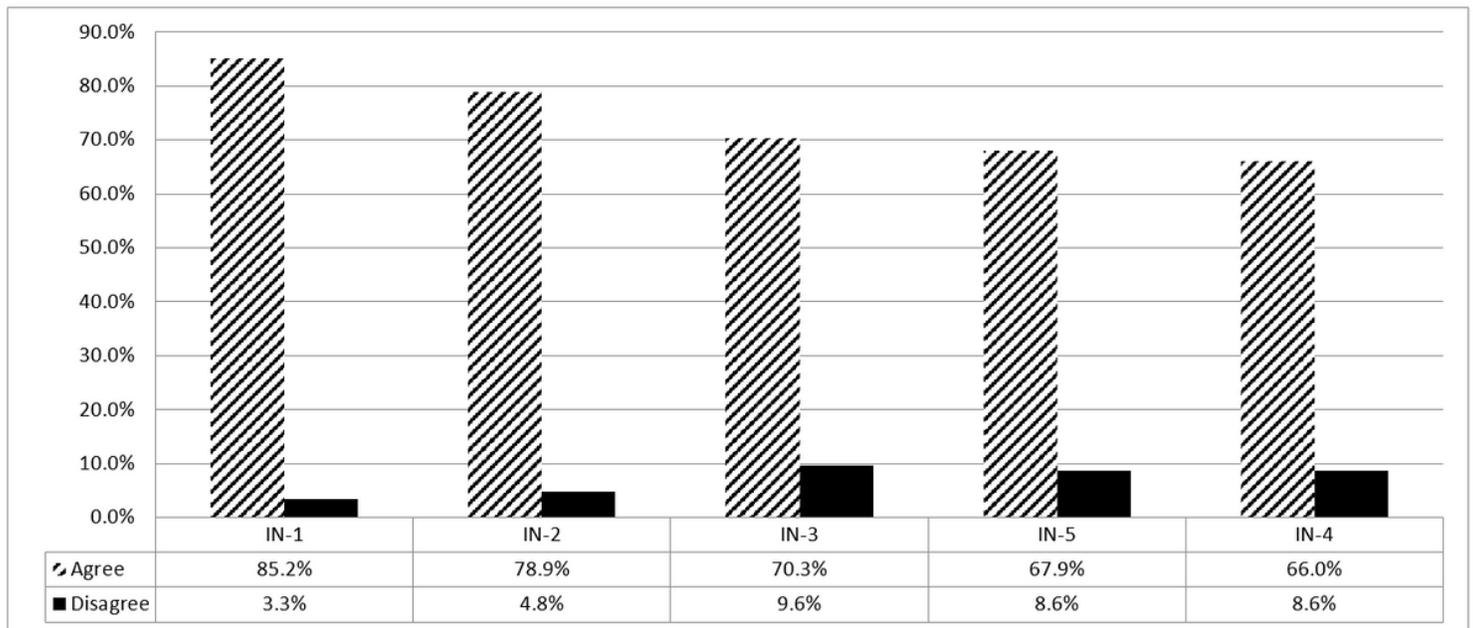


Figure 5

Respondents' ratings for the statements about internship (in China) (N=203). Notes: The students who did the internship outside China were excluded from the data analysis of the ratings for the statements about internship. IN is short for internship. IN-1: The final year (internship) was important for enhancing my medical education. IN-2: The final year (internship) was helpful in my preparations for residency. IN-3: The faculty provided clear guidance on what I needed to learn and do in the internship. IN-4: I was given an appropriate role in patient care during my internship. IN-5: I was taught sufficient clinical skills in preparation for clinical practice as physicians.

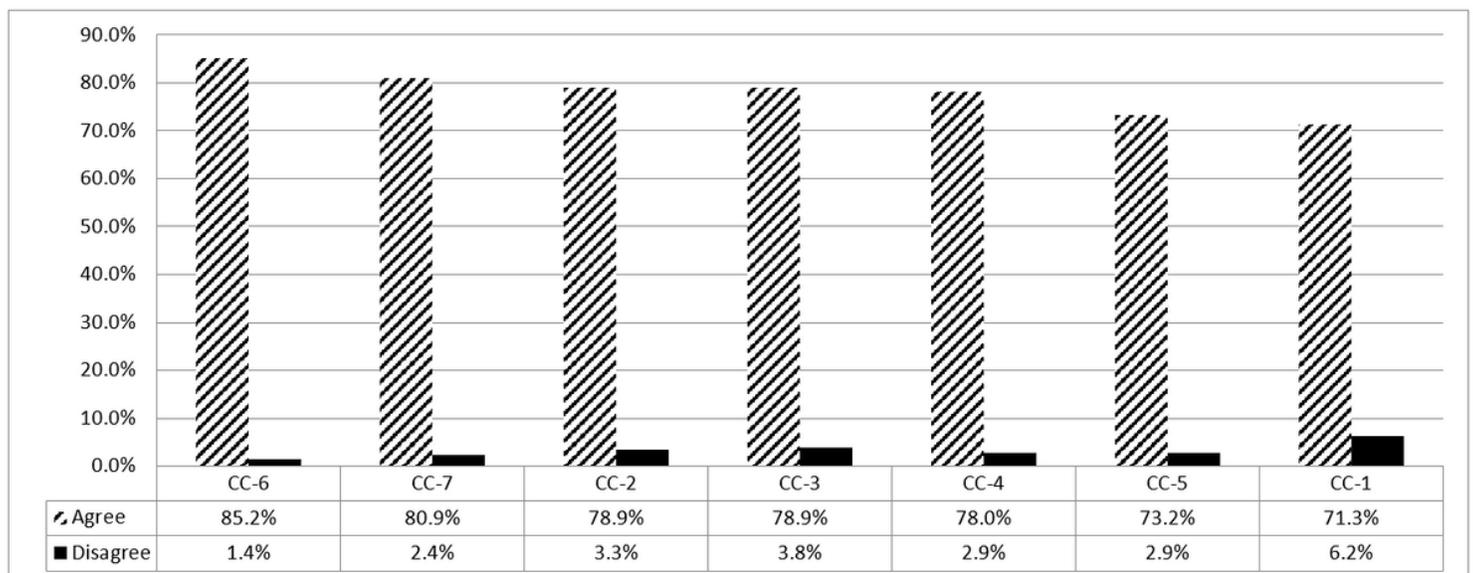


Figure 6

Respondents' Self-evaluation of clinical competence (N=209). Notes: CC is short for clinical competence. CC-1: I am confident that I have acquired the clinical skills required to begin a residency program. CC-2: I have the fundamental understanding of common conditions and their management encountered in the major clinical disciplines. CC-3: I have the communication skills necessary to interact with patients and health professionals. CC-4: I have basic skills in clinical decision making and the application of evidence based information to medical practice. CC-5: I have a fundamental understanding of the issues in social sciences of medicine (e.g., ethics, humanism, professionalism, organization and structure of the health care system). CC-6: I understand the ethical and professional values that are expected of the profession. CC-7: I believe I am adequately prepared to care for patients from different backgrounds.

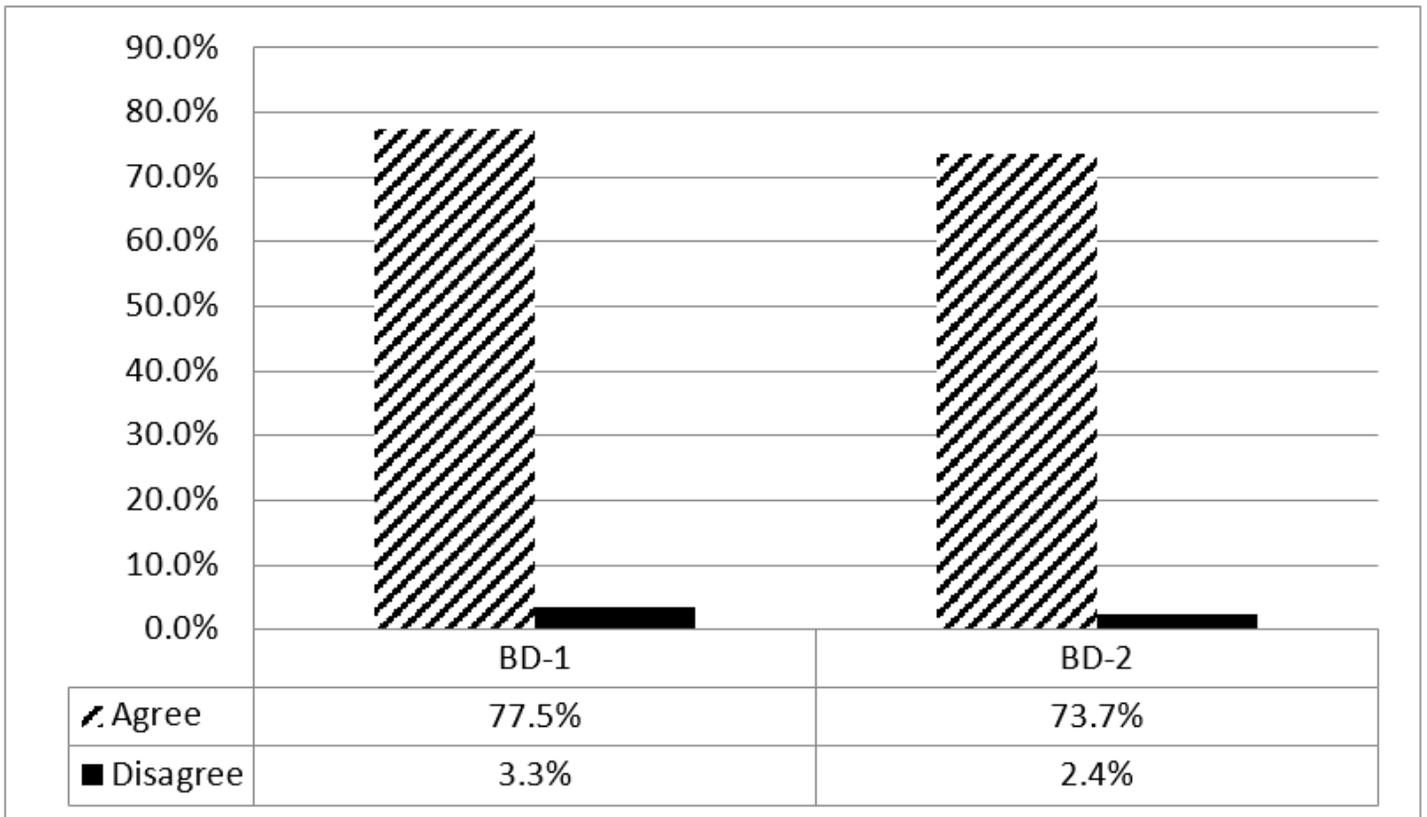


Figure 7

Respondents' ratings for benefits of diversity (N=209). Notes: BD is short for benefits of diversity. BD-1: My knowledge or opinion was influenced or changed by becoming more aware of the perspectives of individuals from different backgrounds. BD-2: The cultural diversity within my medical school class enhanced my training and skills to work with individuals from different backgrounds.

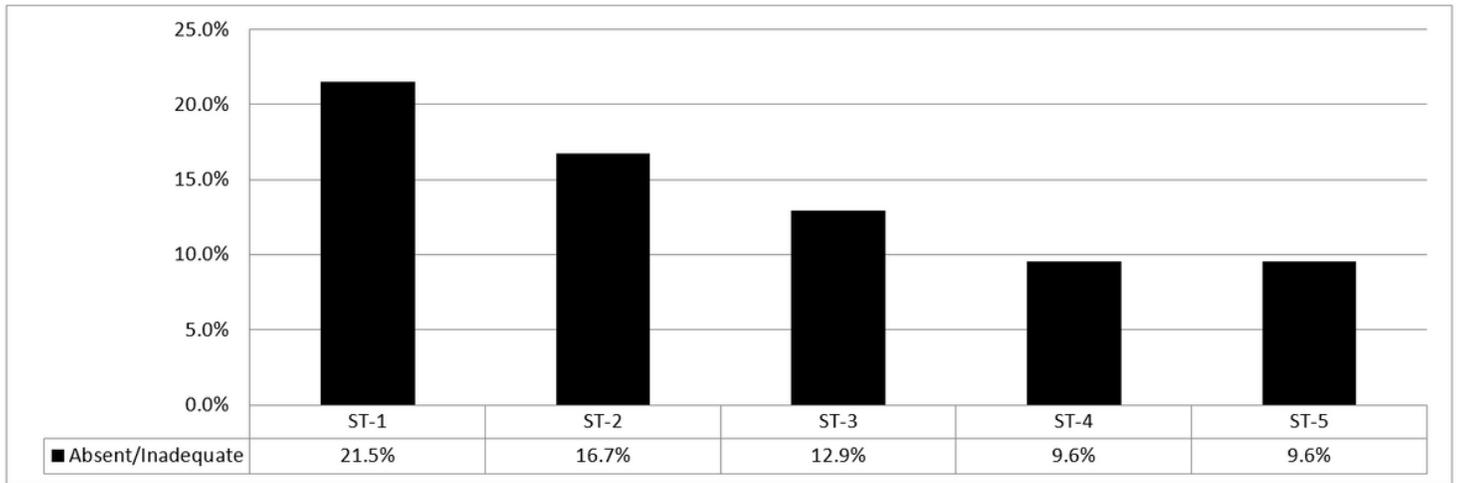


Figure 8

Respondents' opinions about study hours of specific topics (N=209). Notes: ST is short for specific topics. ST-1: Community-oriented medicine ST-2: Culturally appropriate care for diverse populations ST-3: Practice of medicine ST-4: Clinical decision making and clinical care ST-5: Health policy