

Are graduate entrant medical students better prepared for hospital practice than school entrant medical students?

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Abstract

Objectives: To assess the preparedness for hospital practice among graduate and school entry medical students at King Saud bin Abdul-Aziz University for Health Sciences (KSAU-HS).

Methods: This cross-sectional study was conducted at KSAU-HS College of Medicine, during the academic year 2016-2017. A validated self-administered questionnaire was used for data collection. Data were analyzed using SPSS version 22, and non-parametric testing was performed.

Results: The sample consisted of 312 medical students with 103 (33%) graduate entrants. The comparison of overall preparedness showed that students were best prepared for holistic care with median (Q1-Q3) score of 3 (2.6-3.5). The final year clinical students were significantly better among all of the batches in terms of management ($p = 0.008$). Graduate entry students were significantly more prepared compared to school entry students in all areas except science and holistic care ($p = 0.508$ and $p = 0.582$, respectively). Female students were better prepared compared to male students.

Conclusion: This study demonstrated that graduate entrants are more prepared for future careers compared to school entrants. In addition, females showed better preparedness in general compared to males. Although the preclinical students perceived that they were well prepared, the graduating senior most students thought they were not ready to deal with real patients.

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Introduction

Career guidance and preparation in any specialty is a crucial element that ensures proper practice when a graduate student moves from college to practical life.¹ The same preparation applies to the field of medicine; the more an undergraduate is prepared during his college life for actual practice, the better he will be in terms of professionalism and productivity in his area of work.²⁻⁴ Most of the undergraduate curricula at medical colleges primarily involve a preclinical phase that focuses on the basic sciences followed by a clinical phase that emphasizes the clinical aspects of medicine. The vast knowledge that is delivered and attained during the medical years at college makes it even more difficult to ensure full student preparedness for every possible medical scenario.⁵ However, it has been shown that as medical students acquire more diverse educational experiences, it is expected that their preparedness for working life is improved.² In addition, entrance by newly

graduated interns into real-life practice is a stressful period during which they are exposed to many emotional stressors.⁶ The most common factors attributed to stress include lack of control, increased demand, and long working hours during the internship.^{7,8}

Preparedness of medical students for hospital practice has been assessed in numerous studies in different countries. In Ireland, a study done with interns at the beginning of their internships revealed that the vast majority were unprepared, especially with respect to clinical skills, for hospital practice.⁹ Furthermore, a United Kingdom (UK) study reported that junior physicians found the transition from college to practice to be a highly stressful period in which they lack the support and have to be involved with various professional teams.¹⁰ An additional study also reported that UK medical graduates mostly perceived themselves as unprepared for practice and faced problems in time management and safety incidents;¹¹⁻¹³ lack of adequate drug knowledge was also reported by another study.¹⁴ General unpreparedness of medical graduates has been shown by most of the studies done in this area,^{15,16} and it has been suggested that problem-based learning (PBL) curricula are associated with improved preparedness in comparison to traditional

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ones.^{17,18} On the contrary, one Omani study among new residents showed that the majority of students were clinically well-prepared for clinical practice.¹⁹

Several methods have been suggested to improve medical students' practice preparedness. Among these practices is ensuring that students experience contact with patients early on, reforming undergraduate curricula, and initiating sub-internships.⁹ Some studies found that providing an educational workshop on efficient intern characteristics and several real-life issues for future interns resulted in increased confidence prior to the start of internship;²⁰ an internship course also improved the performance of interns on procedures in addition to administrative tasks primarily through highlighting their duties and responsibilities.^{21,22} In addition, increasing workplace support and improving the applicability of the undergraduate course improves practice preparedness.^{2,3} Training programmes should also be directed at enhancing graduates' professionalism and organizational skills.²³

Due to the paucity of literature on medical students' clinical practice preparedness in Saudi Arabia, this study aimed to assess via the Preparedness for Hospital Practice Questionnaire (PHPQ) the level of medical students' preparedness to practice as interns. We also aimed to compare the perceptions of preparedness for hospital practice across gender, year of study, and mode of entry into the medical college as an undergraduate or graduate student. The results of this study can reflect whether medical students are undergoing proper preparation and career guidance throughout their academic journey at the College of Medicine. This in turn can be translated into future university strategies that can be directed to improve career guidance and students' preparedness for clinical practice.

Methods

This was a cross-sectional survey of medical students at College of Medicine, King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), Riyadh. The College of Medicine follows aPBL curriculum and was founded in 2004; however, the female campus was made functional in 2011. It was amongst one of the first universities' in Saudi Arabia which started the admission of graduate entrants into the Bachelor of Medicine/Bachelor of Surgery (MBBS) degree programme. There are separate campuses for male and female students wherein female students are taught mostly by female tutors and vice versa. Both campuses follow the same curriculum, which was adapted from University of Sydney, Australia's curriculum with a few modifications in the light of local

Saudi culture and norms. Over the years, the number of students on both campuses has increased by almost four-fold. There is a separate clinical skill centre with advanced labs in which students are taught hands on clinical skills through new technology and techniques. All of the students in the 3rd and 4th (pre-clinical years) receive training in the clinical skill center, whereas the fifth and final years are the clinical years in which students are exposed to real life patients in hospital settings.

All medical students enrolled for the session 2016-17 from preclinical and clinical years were approached. The number of male students was higher compared to females in all years with approximately 1600 students on both campuses. The sample size was calculated assuming the prevalence at 50% as no similar study was done in our context, a margin of error of 5% and a population size of 1600, the estimated sample size was 310 students.²⁴ The participants were selected using the quota sampling technique after considering three parameters: (1) a student's year of study; (2) a student's mode of entry (graduate versus school); and (3) a student's gender. Efforts were made to meet all three parameters during data collection, and through initial descriptive frequencies, any group with fewer numbers were specifically targeted later until the numbers were met.

The PHPQ survey was adopted to collect information from participants.² This survey is a valid and reliable tool used in many studies; permission for its use was obtained via email from the original authors. This questionnaire has a total of 41 items and eight sub-scales that assess different areas of clinical practice, including

- ◆ Interpersonal skills (four items)
- ◆ Confidence (six items)
- ◆ Collaboration (four item)
- ◆ Patient management (five items)
- ◆ Understanding science (four items)
- ◆ Prevention (six items)
- ◆ Holistic care (six items)
- ◆ Self-directed learning (six items)

The batch leaders for each year on the male and female campuses were informed about the aim of the study and the method of filling the questionnaires. The questionnaire was distributed to female students by the co-investigators, whereas in the male campus the questionnaire was distributed and collected back by the batch leader for each class.

Statistical analysis: All of the collected data were first entered into a Microsoft Excel file and then transferred to IBM SPSS statistics software version 22 for analysis. The questionnaire's reliability was tested for the current sample. The overall Cronbach alpha of all 41 items was 0.94 while for the individual subscales the alpha coefficients ranged from 0.70 to 0.82. The median interquartile range (IQR) was reported for each of the eight subscales assessing the preparedness level. Additionally, for categorical variables, frequencies and percentages were reported. The association between the student's mode of entry to medical college, campus (male/female), and year of study and their preparedness level scores were evaluated using non-parametric Mann-Whitney U and Kruskal-Wallis tests of association. Furthermore, post-hoc pair-wise comparison was performed following a Kruskal-Wallis test, if that test was statistically significant. The level of significance was set at $p < 0.05$ for all the tests applied.

Ethical approval was granted by King Abdullah International Medical Research Center (KAIMRC). The study was approved on 13/04/2017 with reference number IRBC/438/17. Informed consent was taken from all of the participants included in the study. Confidentiality and anonymity were ensured throughout the research.

Results

A total of three hundred and fifteen students were included for final analysis with a mean age of 22.7 ± 2.7 years. The male to female ratio was almost 1:1. One third of the sample were graduate entrants 103 (33%), and amongst them 45 (44.6%) had been previously employed and had done some sort of paid work before joining the medical college (Table-1).

The median IQR scores for all eight subscales of the PHPQ were calculated. The results showed that overall

Table-1: Demographic profile of students (n= 315).

Items/Variables		Frequency n	Percentage %
Age (years)	(mean \pm SD)	22.7 ± 2.7	
	Minimum	19	
	Maximum	32	
Age categories	18-20 years	66	21.2%
	21-23 years	147	47.1%
	24 and above	99	31.7%
Gender	Male	156	49.5%
	Female	159	50.5%
Year of study	Final year	76	24.4%
	5th year	61	19.6%
	4th year	105	33.8%
	3rd year	69	22.2%
Campus	COM-Female	159	50.5%
	COM-Male	156	49.5%
Mode of entry to medical college	High School entrants	210	67.1%
	Graduate entrants	103	32.9%
Employment status before joining the course (n=103)	No job	56	55.4%
	previously employed	45	44.6%

preparedness of students was best for holistic care with a median IQR score of 3 (2.6-3.5) followed by self-directed learning scoring 3(2.5-3.3) while the lowest preparedness was perceived for interpersonal skills with median score of 2.2(1.7-2.7).

The graduate entry students were significantly more prepared with higher scores compared to school entry students in all areas except for science and holistic care in which no differences by mode of entry into medical school was noted with Mann-Whitney U = 10,221; $p = 0.508$ and Mann-Whitney U= 10,352; $p = 0.582$, respectively. The comparison by campus showed that the female campus was doing better student preparation

Table-2: Preparedness for practice among school and graduate entrants and by campuses (n=315).

Sub scales	Mode of entry to Medical college			Campuses		p-value*
	School Entrants Median(Q1-Q3)	Graduate Entrants Median(Q1-Q3)	p-value*	Female campus Median(Q1-Q3)	Male campus Median(Q1-Q3)	
Interpersonal Skills	2.3 (1.8-2.8)	2.3 (2-2.8)	0.004	2.3 (1.8-2.8)	2.3 (2-2.8)	0.114
Confidence	2.5 (2.2- 2.8)	3.0 (2.5-3.5)	0.000	2.7 (2.2-3.3)	2.5 (2.2-3)	0.026
Collaboration	2.5 (2-3)	2.8 (2.3-3.3)	0.008	2.8 (2-3)	2.5 (2-3)	0.149
Management	2.2 (1.8-2.6)	2.4 (2-3)	0.004	2.2 (1.8-2.8)	2.2 (1.8-2.6)	0.925
Science	2.8 (2.3-3)	2.8 (2.3-3.3)	0.508	2.8 (2.3-3.3)	2.8 (2.3-3)	0.089
Prevention	2.8 (2.3-3.2)	3.2 (2.7-3.5)	0.002	3.0 (2.5-3.4)	2.8 (2.3-3.2)	0.014
Holistic Care	3.0 (2.7-3.5)	3.2 (2.5-3.7)	0.582	3.2 (2.7-3.7)	2.9 (2.5-3.3)	0.003
Self-directed Learning	2.8 (2.5-3.2)	3.2 (2.7-3.7)	0.001	3.2 (2.7-3.7)	2.7 (2.3-3.2)	0.00

*p values for Mann-Whitney U test, the significance level is .05.

Table-3: Comparison of preparedness by current year of study (n=315).

Sub scales	Pre-clinical years		Clinical years		p-value
	3rd year Median(Q1-Q3)	4th year Median(Q1-Q3)	5th year Median(Q1-Q3)	Final year Median(Q1-Q3)	
Interpersonal Skills	2.3 (2-3)	2.3 (1.8-2.8)	2.3 (1.8-2.5)	2.3 (2-2.8)	0.212
Confidence	2.8 (2.3-3.2)	2.5 (2-3)	2.7 (2.2-3)	2.8 (2.3-3.2)	0.040*
Collaboration	2.8 (2.3-3.3)	2.5 (2-2.8)	2.5 (2.3-3)	2.5 (2-3.1)	0.008*
Management	2.3 (1.8-2.8)	2.2 (1.8-2.5)	2.4 (2.2-2.8)	2.4 (2-2.8)	0.008*
Science	3 (2.5-3.3)	2.8 (2.3-3)	2.8 (2.3-3.3)	2.5 (2.3-3)	0.132
Prevention	3 (2.3-3.3)	2.8 (2.5-3.2)	2.8 (2.5-3.4)	2.8 (2.5-3.3)	0.784
Holistic Care	3.3 (2.8-3.7)	3.0 (2.5-3.3)	3.2 (2.8-3.5)	2.9 (2.5-3.5)	0.005*
Self-directed Learning	3.2 (2.7-3.7)	2.8 (2.5-3.3)	3 (2.7-3.3)	3 (2.4-3.3)	0.053

*Independent samples Kruskal Wallis test applied, the significance level is .05.

than the male campus in the areas of confidence (Mann-Whitney U = 10,462; p = 0.026), prevention (Mann-Whitney U = 10,272; p = 0.014), holistic-care (Mann-Whitney U = 9,848; p = 0.003), and self-directed learning (Mann-Whitney U = 9,395; p < 0.000). While both campuses were similar in terms of preparation for interpersonal skills, collaboration, management, and science (Table-2).

The assessment of preparedness by current study year (pre-clinical versus clinical) showed that students' perceptions about preparation were significantly different across the four years in areas of confidence, collaboration, management, and holistic care. The final year clinical students were significantly better among all of the batches in terms of management (Kruskal-Wallis H, c2 [2] = 11.703; p = 0.008), whereas the junior most pre-clinical batch was better amongst the others in the area of holistic care (Kruskal-Wallis H, c2 [2] = 12.662; p = 0.005) (Table-3).

The Bonferroni post hoc pair-wise comparison showed no significant differences across the clinical versus pre-clinical years in terms of confidence. However, the junior most batch was significantly better compared than others in terms of collaboration, such as team approach to care (F=3.38, p=0.005, two tailed). In terms of patient management and practical skills, the 4th year students were significantly better compared to the clinical students of the 5th and final years (F=2.92, p=0.021 and F=2.74, p=0.037, respectively). In terms of holistic care (appreciation of the impact of multiple variables on patients' health and disease), the junior most batch was better than the others (F=2.79, p=0.032). For the overall preparedness across all of the subscales, the junior most batch was better than the others (F=2.88, p=0.023, two tailed).

Discussion

The fact that most medical graduates are unprepared for

hospital practice has been well-documented in the literature.^{9,11-13,16} According to the overall level of preparedness based on the subscales, this study showed that the students were only adequately prepared for holistic care and self-directed learning and unprepared for the rest of the components; this finding agrees with those in most of the literature. The possible explanation for adequate preparedness of students at our university on these two sub-scales might be attributed to the PBL-based curriculum adopted by our university. This curriculum emphasizes the importance of self-directed learning in the learning process²⁵ and trains students for the holistic approach, which accounts for the interplay of all factors affecting an individual's health including societal, cultural, and family aspects. With respect to the remaining subscales of confidence, interpersonal skills, management, and collaboration, inadequacy was shown. The least preparedness was seen with respect to management of procedural skills and hands-on experiences, which is also consistent with other studies.¹⁰ Although our university provides fully equipped clinical labs, the clinical experience of students is still lacking and maybe attributed to insufficient clinical tutoring. As shown in the literature,^{12,23} students in our study also perceived an unpreparedness for interpersonal skills, which encompasses disclosure of problems to the patients and their families, counseling difficult patients, and other factors. Also, team-work and collaboration with the various multidisciplinary health teams was an area that was lacking for our students. All these areas of unpreparedness imply that medical students need more exposure to these concepts and clinical experiences to enrich their practical expertise before entering the workplace.

The study's findings also indicate that with respect to the mode of entry into the College of Medicine, graduate

entry students are more prepared for practice than their high school counterparts. A possible explanation for that finding could be the older age of graduate students, which can be associated with more maturity towards real life practice in addition to employment experience for some of the graduate students that is reflected on enhancing their soft skills such as interpersonal skills, prevention and counseling, collaboration, and practical management skills. This is similar to what was reported in other studies about the importance of older age in creating motivation and confidence in the career choice; a prior degree contributed to better preparedness to a lesser extent than age in terms of improving cooperativeness and study approaches, such as self-directed learning.^{26,27} It is important to note that in Saudi Arabia, KSAU-HS was the first university to pave the way for graduate entry into the College of Medicine in 2012 for females and 2010 for males. The other Saudi colleges are following this initiative of introducing graduate entry to their colleges.

In addition, females were found to be better prepared in terms of confidence, prevention, holistic care, and self-directed learning. The female students performed better on these components due to the possibility of having better communication skills and a higher motivation for self-learning and improvement. This agrees with the literature in which a better attitude towards doctor-patient communication in female students was indicated.^{28,29} The separate nature of the male and female campuses, which complies with cultural/societal requirements of Saudi Arabia, might also play a role in the underlying differences.

With respect to the year of study, fourth year students (Batch 13) were the most prepared for practice in holistic care, management, and collaboration. It is worth noting that batch 13 had the highest number of graduate-entry students enrolled on both male and female campuses. The higher level of preparedness might be associated with the higher number of graduate students in this year in particular, which in itself is a factor of improved preparedness.^{26,27} Other possible explanations for the preparedness of the 4th year students is the fact that the Saudi Commission for Health Specialties (SCFHS) has started implementing tougher selection criteria and mandated research publications for residency requirements and internship in the particular field of interest. The highly competitive environment of the medical field, especially when it comes to securing a place for internship or a scholarship, has led students to participate in more research projects and to work more on themselves to

prove their capabilities and move up in their careers.

Although this study was conducted at a single medical college in Saudi Arabia, it included both segregated male and female campuses while ensuring a homogenous distribution among the different batches or years. This was done in an attempt to improve the representativeness of our study sample. Possible limitations of this study include reporting bias, which might have overestimated the preparedness of students to hospital practice due to the questionnaire's self-reporting nature.

Conclusion

This study has demonstrated that graduate entrants are more prepared for future careers compared to school entrants specifically in confidence, collaboration and prevention. In addition, females showed better preparedness in the domains of confidence, prevention, holistic care and self-directed learning compared to males. This study also highlights the importance of early hospital practice guidance for medical students. Career guidance programmes for preparation of students for smooth transition toward becoming a practicing doctor should be considered by medical schools.

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