

Medical Graduates' Research Practices and Perceptions

A comparative cross-sectional study between 2015 and 2017 graduates of King Abdulaziz University

Ahmed M. Basakran,^{1*} Maysaa A. Banjari,² Malak A. Almarghoub,³ Elaf M. Alzarnougi⁴

التصورات والممارسات البحثية لخريجي الطب دراسة مقطعية تقارن بين خريجي جامعة الملك عبد العزيز لعامي 2015 و 2017

أحمد باسكران، ميساء بنجري، ملاك المرغوب، إيلاف الزرنوقي

ABSTRACT: Objectives: This study aimed to compare changes in medical students' research practices and perceptions of two cohorts of graduates. **Methods:** This cross-sectional comparative study was conducted from November 2014 to December 2017 and included the 2015 and 2017 medical graduates of King Abdulaziz University, Jeddah, Saudi Arabia. A validated self-administrated questionnaire, which included questions about participants' age and gender, research activities, and obstacles to and motivators for research involvement was used. **Results:** A total of 484 graduates were included in this study (response rate: 96.8%). A significant difference was found between the 2015 and 2017 graduates who had not started any research project (48.4% versus 35%; $P < 0.001$) and a 20% increase in the 2017 graduates' confidence in their abilities to start their own projects was observed ($P < 0.001$). Significantly more 2017 graduates were engaged in various research roles, other than 'author', compared to 2015 graduates (71.3% versus 55.4%; $P < 0.001$). Career progression was the main motivator for both the 2015 and 2017 medical graduates to participate in research (79.5%). Reported obstacles to research included a lack of dedicated time for research and methodology training and a shortage of research project opportunities. **Conclusion:** This study highlights positive changes in attitudes towards and perceptions of research among medical graduates.

Keywords: Medical Students; Research; Professional Practice; Attitude; Perception; Medical Education; Saudi Arabia.

المخلص: الهدف: هدفت هذه الدراسة إلى مقارنة التغيرات في التصورات والممارسات البحثية لطلاب الطب على مدار عامين. **الطريقة:** أجريت دراسة مقطعية امتدت من نوفمبر 2014 إلى ديسمبر 2017 وشملت مقارنة خريجي الطب لعامي 2015 و 2017 بجامعة الملك عبد العزيز، جدة، المملكة العربية السعودية. وللمقارنة تم استخدام استبيان تقييم ذاتي معتمد مسبقاً، والذي تضمن أسئلة حول عمر وجنس المشاركين وأنشطتهم البحثية ودوافعهم للمشاركة في البحوث بالإضافة إلى العقبات التي تحول دون تلك المشاركة. **النتائج:** شملت هذه الدراسة 484 خريجاً (معدل الاستجابة: 96.8%). تم العثور على فرق ذو دلالة احصائية بين خريجي 2015 و 2017 من حيث نسبة الطلبة الذين لم يبدأوا أي مشروع بحثي بعد (35% مقابل 48.4%) ($P < 0.001$). تم العثور على فرق ذو دلالة احصائية بين خريجي 2015 و 2017 من حيث نسبة الطلبة الذين لم يبدأوا أي مشروع بحثي بعد (35% مقابل 48.4%) ($P < 0.001$). شارك عدد أكبر من خريجي عام 2017 في أدوار بحثية مختلفة، بخلاف دورهم كمؤلفين، مقارنة بخريجي عام 2015 (55.4% مقابل 71.3%) ($P < 0.001$). كان التدرج الوظيفي هو الدافع الرئيسي لكل من خريجي الطب عامي 2015 و 2017 للمشاركة في البحوث (79.5%). شملت معوقات البحث التي تم ذكرها قلة الوقت المخصص للبحث وعدم توفر التدريب الكافي على منهجية البحث ونقص المشاريع البحثية المتاحة. **الخلاصة:** تسلط هذه الدراسة الضوء على التغيرات الإيجابية في مواقف وتصورات خريجي الطب تجاه البحث.

الكلمات المفتاحية: طلبة الطب؛ بحث؛ الممارسة المهنية؛ موقف؛ تصور؛ التعليم الطبي؛ المملكة السعودية.

ADVANCES IN KNOWLEDGE

- Positive changes in medical graduates' perceptions of research and practice is an indication of the importance of awareness to research involvement.
- The main barriers affecting research activities were a lack of dedicated time and methodology training as well as a lack of research project availability.

APPLICATION TO PATIENT CARE

- Understanding evolving changes in perceptions and practice associated with research will help to focus efforts to ensure more research involvement among medical graduates.
- Improving perceptions of research and practice among medical graduates can help them properly implement evidence-based medicine in a clinical setting.

¹Faculty of Medicine, University of Jeddah, Jeddah, Saudi Arabia; Departments of ²Pediatrics and ³Obstetrics & Gynecology, King Abdulaziz University, Jeddah, Saudi Arabia; ⁴Department of Internal Medicine, King Faisal Specialist Hospital and Research Centre, Jeddah, Saudi Arabia

*Corresponding Author's e-mail: maysaa.ban@live.com

RESearch IS AN ESSENTIAL COMPONENT OF medicine as it plays a vital role in advancing scientific knowledge.¹ Clinicians are required to make decisions based on the best available evidence. This practice can only be accomplished with optimum understanding of research principles.² In order to improve medical practice and scientific knowledge, research activities should be encouraged and implemented in the undergraduate years.³

Encouraging medical students to participate in research can help them develop skills associated with communication, teamwork, time management and independent learning. As students gain research experience, they in turn are motivated to pursue a career in research. Further, participating in research at an early stage in education could help students establish a positive perspective towards science and scientific methodologies.⁴⁻⁷

Understanding the attitude of undergraduate students and graduates towards research can improve research practice in the postgraduate period.⁸ Shahbaz *et al.*'s study conducted in Lahore with undergraduate university students found that 86% believed research was an essential aspect of their field of study; however, only 33% had previous research experience.⁹ In addition, Ibrahim *et al.*'s study in Egypt revealed that 69% of medical students believed that research experience would greatly help their long-term career objectives, yet only 11% had published a paper.¹⁰

Several studies have been conducted in Saudi Arabia to understand medical students' perceptions of their research practice. A study conducted in Makkah's Umm Al-Qura University with undergraduate students in the health colleges revealed that only 6.6% had published research-based writing.¹¹ Another study conducted in Jeddah in 2010 with medical graduates of King Abdulaziz University found that 31% had co-authored research papers, with only 3.2% being first authors.¹²

At King Abdulaziz University, research is an essential part of the undergraduate curriculum. At the time of this paper's writing, students had no graduation requirements to participate in a research project. However, during their third, fourth and fifth years of medical school, the university offered lectures and assignments designed to teach undergraduates the basics of research, such as idea formation, data acquisition and analysis, manuscript writing and how to appraise research articles. The current study aimed to compare research practices and perceptions among undergraduate medical students who graduated in 2015 and 2017 from King Abdulaziz University.

These two groups were chosen because of increased efforts around improving research awareness over the two years preceding this study, in part due to a new unit established to deliver free workshops emphasising

the importance of research. In addition, in Jeddah in 2016, a summer school was established to encourage undergraduate students to participate in research by providing them with research opportunities. Finally, the Saudi Commission for Health Specialties (SCFHS), the organisation responsible for postgraduate studies in Saudi Arabia, announced that conducting research, authoring papers and presenting at conferences would improve a medical graduate's likelihood of admission into postgraduate programmes.

Methods

This comparative cross-sectional study was conducted at King Abdulaziz University in Jeddah, Saudi Arabia, between November 2014 and December 2017. The study included 2015 and 2017 medical school graduates who had completed six years of an undergraduate medical programme and were in their internship years during the data collection phase. Both groups were approached in person or through mobile phone text messages. This population was chosen due to ease of access and because the graduates were in the process of applying to postgraduate programmes and would therefore be aware of research.

This study used a validated, self-administered, online questionnaire that was originally used in a study conducted in the same setting; permission was taken from the primary author to use this tool in the current study.¹² The questionnaire comprised 29 questions, including questions about age, gender and grade point average (GPA). Further questions sought information about research activities, motivators to be active in research, obstacles affecting research progress and measures to improve research involvement. Graduates' answers were classified according to a Likert scale and were rated from strongly disagree to strongly agree (1-5, respectively).

Data were analysed using Statistical Package for the Social Science (SPSS), Version 16 (IBM Corp., Armonk, New York, USA) and were expressed as numbers and percentages. A chi-squared test was used to assess whether the data followed a random distribution. A *P* value of <0.005 was considered statistically significant.

Consent was collected after the purpose of the study was thoroughly explained to the participants. Ethical approval was received for this study from the Ethical Committee of King Abdulaziz University (62261\39\d).

Results

A total of 500 medical graduates were contacted and 484 completed the questionnaire (response rate: 96.8%)

Table 1: Comparison of the research activities, grade point averages, genders and ages between 2015 and 2017 medical graduates from King Abdulaziz University, Jeddah, Saudi Arabia (N = 484)

Characteristic	n (%)		P value	n (%)		P value
	2015 graduates			2017 graduates		
	Started research (n = 95)	Did not start research (n = 89)		Started research (n = 195)	Did not start research (n = 105)	
Gender						
Male	31 (32.6)	54 (60.7)	<0.001	86 (44.1)	64 (61)	0.005
Female	64 (67.4)	35 (39.3)		109 (55.9)	41 (39)	
GPA						
4–5	61 (64.2)	55 (61.8)	0.085	165 (84.6)	42 (40)	<0.001
3–3.99	14 (14.7)	23 (25.8)		25 (12.8)	62 (59)	
≤2.99	0 (0)	0 (0)		1 (0.5)	0 (0)	
Undisclosed by students	20 (21.1)	11 (12.4)		4 (2.1)	1 (1)	
Age in years						
≥24	56 (58.9)	34 (38.2)	0.005	94 (48.2)	44 (41.9)	0.296
<24	39 (41.5)	55 (61.8)		101 (51.8)	61 (58.1)	

GPA = grade point average.

Table 2: Comparison of research activity between 2015 and 2017 medical graduates from King Abdulaziz University, Jeddah, Saudi Arabia (N = 484)

Graduates' research involvement	n (%)		P value
	2015 graduates (n = 184)	2017 graduates (n = 300)	
1. Graduates who had not yet started a research project	89 (48.4)	105 (35)	<0.001
2. Graduates who had started a research project	95 (51.6)	195 (65)	<0.001
3. Graduates who had started a research project but stopped	51 (27.7)	58 (19.3)*	<0.001
4. Graduates who had completed a research project	44 (23.9)	145 (48.3)*	<0.001
Role in research other than author[†]	(n = 102)	(n = 214)	<0.001
Hypothesis creation	32 (17.4)	60 (20)	
Data collection	80 (43.5)	204 (68)	
Data analysis	33 (18)	69 (23)	
Manuscript writing	31 (16.8)	63 (21)	
Graduates who had submitted their papers for publication	31 (30.4)	111 (37)	<0.001
Graduates who had published a research paper	16 (8.7)	68 (22.7)	<0.001
Graduates who felt confident enough to start their own project	78 (42.4)	186 (62)	<0.001
Graduates who felt confident in submitting an article without supervision	25 (13.6)	112 (37.3)	<0.001

*Some participants chose both options three and four as they had participated in more than one research project. [†]Participants could choose more than one option.

of which 51.4% were females. Females and those with higher GPAs were more likely to begin research during their undergraduates' education [Table 1]. More 2015 graduates had not started a research project compared to 2017 graduates (48.4% versus 35%; $P < 0.001$) [Table 2]. Moreover, a significant increase was seen in the number of 2017 graduates compared to 2015 graduates engaging in research in a role other than author such as data

collector, etc. (71.3% versus 55.4%; $P < 0.001$). Less 2015 graduates published papers as a first author than 2017 graduates (8.7% versus 22.67%; $P < 0.001$). More 2017 graduates felt confident to start their own research project (62% versus 42.4%; $P < 0.001$) and submit an article without supervision (37.3% versus 13.6%; $P < 0.001$) than 2015 graduates [Table 2].

Table 3: Factors motivating 2015 and 2017 medical graduates from King Abdulaziz University, Jeddah, Saudi Arabia, to actively participate in research (N = 484)

Factor*	n (%)			P value
	2015 graduates (n = 184)	2017 graduates (n = 300)	Total (n = 484)	
Career progression	138 (75)	247 (82.3)	385 (79.5)	0.052
Improved academia	101 (54.9)	189 (63)	290 (59.9)	0.077
Personal interest	54 (29.3)	108 (36)	162 (33.5)	0.132
Supervisor encouragement	32 (17.4)	38 (12.7)	70 (14.5)	0.151
Peer pressure	14 (7.6)	54 (18)	68 (14)	0.001
No motivation	4 (2.2)	16 (5.3)	20 (4.1)	0.090

*Participants could choose more than one factor.

Graduates identified career progression as the main motivator to participate in research (79.5%), followed by a motivation to improve academic performance (60%) and pursue research interests (33.5%). In addition, peer pressure to carry out research was significantly higher among the 2017 graduates than the 2015 graduates (18% versus 7.6%; $P < 0.001$) [Table 3].

In terms of barriers to active research, a lack of dedicated time (73.4%) and methodology training (69.6%) were identified as major obstacles by the 2015 graduates. On the other hand, the 2017 graduates reported that the main barriers to being more active in research was a lack of dedicated research time (66.3%) and a paucity of available research projects (60%) [Table 4].

The majority (60.8%) believed that including a one-month rotation devoted to research during the internship period could be an effective approach to enhancing research activities. In addition, 60.3% agreed that a 2–3-month rotation would have the same benefit.

Discussion

This study aimed to compare research practice and perception among 2015 and 2017 graduates of an undergraduate medical programme in Saudi Arabia. The findings highlight the effect of increased awareness of the importance of research and a change in research-specific criteria for post-graduate programme acceptance.

Two main findings emerged from this study. First, significantly more 2017 graduates were active in research compared to 2015 graduates ($P < 0.001$). Second, the researchers noted a pronounced boost in graduates' confidence in their ability to author and submit research independently, demonstrating a positive change in attitudes and perceptions.

Table 4: Factors preventing 2015 and 2017 medical graduates from King Abdulaziz University, Jeddah, Saudi Arabia, from being active in research (N = 484)

Factors*	n (%)		P value
	2015 graduates (n = 184)	2017 graduates (n = 300)	
Lack of dedicated research time	135 (73.4)	199 (66.3)	0.014
Lack of methodology training	128 (69.6)	172 (57.3)	0.040
Lack of available projects to join	117 (63.6)	180 (60)	0.168
Lack of workshops on research	112 (60.9)	143 (47.7)	0.023
Lack of convenient data systems	87 (47.3)	166 (55.3)	0.007
Faculty members not providing assistance	77 (41.8)	154 (51.3)	<0.001
Difficulty writing in English	62 (33.7)	108 (36)	0.427
Lack of financial rewards	62 (33.7)	98 (32.7)	0.053

*Participants could choose more than one factor.

In this study, 65% of the 2017 graduates indicated they had begun their own research project in comparison to 51.6% of the 2015 graduates. This finding could be explained by an increased awareness of the importance of involvement in research through the activities of student research units and the changes that occurred in the SCFHS criteria of admission into postgraduate programmes. It is worth noting that research involvement of both the 2015 and 2017 graduates is higher than other studies done in Sweden and Brazil.^{13,14} However, both of these studies were conducted on medical students, while our study was conducted on medical graduates, who had more time to be involved in research.

In the current study, the confidence of the graduates to start their own projects without supervision increased significantly in 2017, possibly due to those graduates' increased involvement in research-promoting activities ($P < 0.001$). Past research has noted that students' active participation in research can improve their confidence in and understanding of research, in addition to increasing their interest in pursuing research-based careers in the postgraduate period.¹⁵ However, graduates expressed concerns about not having sufficient research opportunities in their university. This finding could indicate that even though barriers were present, students found alternative solutions to increasing research involvement, such as eliciting support from supervisors from different universities and attending summer schools or focused workshops that provided research opportunities.

This observed high level of confidence and increased research practice could be a result of reporting

bias or sample bias, as the students may have wanted to over-represent their achievements and the sample of this study only included medical programme graduates. A study conducted in Madinah, Saudi Arabia revealed a direct relationship between students' academic year and their research involvement.³ Therefore, further research is needed to analyse research practices among students of all academic years to better understand students' perceptions at all levels of education.

Career progression was one of the main motivators for research involvement for both the 2015 and the 2017 graduates, which is similar to findings from studies conducted in King Abdulaziz University, University College Cork and Universiti Sains Malaysia.^{16,17} Furthermore, peer pressure to carry out research was found to have significantly increased in the 2017 cohort comparing to the 2015 cohort ($P < 0.001$). This increase may be attributed to increasing competition between graduates or the more stringent research recommendations implemented by the SCFHS in 2017.

Graduates identified many barriers affecting their research participation. Both 2015 and 2017 graduates agreed that lack of time negatively impacted their research practice (73.4% and 66.3%). Similar obstacles to research were reported by medical students in another Saudi Arabian study conducted in five medical schools.¹⁸ These findings also concur with those of a study done in the United Kingdom, where 74% of their sample reporting that time constraints acted as a crippling barrier to their research activities.¹⁹ The persistence of this obstacle indicates the importance of allocating time dedicated specifically to research.

The majority (60%) of the 2017 graduates believed that there was a shortage in the number of available research projects, indicating a need for more enthusiastic faculty members and summer schools to provide more research opportunities for interested students. It is worth noting that starting from 2021, authoring a research project will become a prerequisite for graduation from King Abdulaziz University. This positive change can play an important role in improving students' future participation in research.

The current study noted an improvement in knowledge regarding the existence of research methodology training, possibly because of the free workshops conducted by the students' research unit. This positive change indicates that plans to improve students' research practice are succeeding; however, more efforts are needed to ensure the adequacy of the given lectures and workshops. This obstacle represents a serious barrier to students' research practice, as reported in similar studies conducted in Saudi Arabia and Pakistan.^{9,12}

The primary limitation of this study is that the data was collected from the graduates via a data collection

tool and not through one-on-one interviews. Qualitative interview-based studies can help researchers better understand graduates' perceptions of research and find solutions to increase their research involvement. Additionally, conducting this study with a larger sample and including graduates and students from several universities and different academic years could give more insight into how to improve students' and graduates' practices and perceptions of research.

Conclusion

This study highlighted positive changes in attitudes and perceptions of research among graduates of a medical programme in Jeddah, Saudi Arabia. However, it still demonstrates the importance of providing more research opportunities and research-based lectures as well as matching supervisors with medical students and recent graduates in order to ensure the quality of their conducted research.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FUNDING

No funding was received for this study.

References

1. Kasulkar AA, Gupta M, Chari S, Kanade HT. Assessment of medical students' interest in research in central India. *J Evol Med Dent Sci* 2013; 2:5375–81. <https://doi.org/10.14260/jemds/997>.
2. Murdoch-Eaton D, Drewery S, Elton S, Emmerson C, Marshall M, Smith JA, et al. What do medical students understand by research and research skills? Identifying research opportunities within undergraduate projects. *Med Teach* 2010; 32:e152–60. <https://doi.org/10.3109/01421591003657493>.
3. Noorelahi MM, Soubhanneyaz AA, Kasim KA. Perceptions, barriers, and practices of medical research among students at Taibah College of Medicine, Madinah, Saudi Arabia. *Adv Med Educ Pract* 2015; 6:479–85. <https://doi.org/10.2147/AMEPS83978>.
4. Burgoyne LN, O'Flynn S, Boylan GB. Undergraduate medical research: The student perspective. *Med Educ Online* 2010; 15:5212. <https://doi.org/10.3402/meo.v15i0.5212>.
5. Reinders JJ, Kropmans TJ, Cohen-Schotanus J. Extracurricular research experience of medical students and their scientific output after graduation. *Med Educ* 2005; 39:237. <https://doi.org/10.1111/j.1365-2929.2004.02078.x>.
6. Vujaklija A, Hren D, Sambunjak D, Vodopivec I, Ivanis A, Marusić A, et al. Can teaching research methodology influence students' attitude toward science? Cohort study and nonrandomized trial in a single medical school. *J Investig Med* 2010; 58:282–6. <https://doi.org/10.2310/JIM.0b013e3181cb42d9>.
7. Buckley S, Coleman J, Davison I, Khan KS, Zamora J, Malick S, et al. The educational effects of portfolios on undergraduate student learning: A Best Evidence Medical Education (BEME) systematic review. BEME guide no. 11. *Med Teach* 2009; 31:282–98. <https://doi.org/10.1080/01421590902889897>.

8. Alghamdi KM, Moussa NA, Alessa DS, Alothimeen N, Al-Saud AS. Perceptions, attitudes and practices toward research among senior medical students. *Saudi Pharm J* 2014; 22:113–17. <https://doi.org/10.1016/j.jsps.2013.02.006>.
9. Shahbaz T, Masooma N, Naeem M, Siddiqui H, Nawaz I, Firdous Z. Perception and attitude towards research: A comparative study among medical and non-medical undergraduate students at University of Lahore. *Pakistan J Med Health Sci* 2016; 10:122–6.
10. Ibrahim SI, Afifi AM, Zahran A. Knowledge, attitudes and practices of medical students towards research in two public universities in Egypt. *Proceedings of the IRES 23rd International Conference, Dubai, UAE, 29th December 2015*.
11. Nour MO, Natto HA, Faden BS, Almghrabi NA, Alqurashi AA, Alaiafi AA, et al. Participation of health colleges' students in research at Umm Al-Qura University, Saudi Arabia: A cross-sectional study. *Imp J Interdiscip Res* 2017; 3:429–35.
12. Alsayed N, Eldeek B, Tayeb S, Ayuob N, Al-Harbi A. Research practices and publication obstacles among interns at King Abdulaziz University Hospital, Jeddah, Saudi Arabia, 2011-2012. *J Egypt Pub Health Assoc* 2012; 87:64–70. <https://doi.org/10.1097/01.EPX.0000417978.44502.61>.
13. Stockfelt M, Karlsson L, Finizia C. Research interest and activity among medical students in Gothenburg, Sweden, a cross-sectional study. *BMC Med Educ* 2016; 16:226. <https://doi.org/10.1186/s12909-016-0749-3>.
14. Oliveira CC, de Souza RC, Abe EH, Silva Móz LE, de Carvalho LR, Domingues MA. Undergraduate research in medical education: A descriptive study of students' views. *BMC Med Educ* 2014; 14:51. <https://doi.org/10.1186/1472-6920-14-51>.
15. Robertson J, Blackler G. Students' experiences of learning in a research environment. *High Educ Res Dev* 2006; 25:215–29. <https://doi.org/10.1080/07294360600792889>.
16. Ibrahim NKR, Fetyani DM, Bashwari J. Assessment of the research-oriented knowledge, attitude and practice of medical students and interns of the King Abdulaziz University, Jeddah and the adoption of a research-intervention educational program. *Rawal Med J* 2013; 38:432–9.
17. Ismail IM, Bazli MY, O'Flynn S. Study on medical student's attitude towards research activities between University College Cork and Universiti Sains Malaysia. *Procedia Soc Behav Sci* 2014; 116:2645–9. <https://doi.org/10.1016/j.sbspro.2014.01.628>.
18. Al-Hilali SM, Al-Kahtani E, Zaman B, Khandekar R, Al-Shahri A, Edward DP. Attitudes of Saudi Arabian undergraduate medical students towards health research. *Sultan Qaboos Univ Med J* 2016; 16:e68–73. <https://doi.org/10.18295/squmj.2016.16.01.012>.
19. Nikkar-Esfahani A, Jamjoom AA, Fitzgerald JE. Extracurricular participation in research and audit by medical students: Opportunities, obstacles, motivation and outcomes. *Med Teach* 2012; 34:e317–24. <https://doi.org/10.3109/0142159X.2012.670324>.