

# Does gender difference have an effect in the academic achievements of undergraduate students' and later as interns? A single medical college experience, Taibah University, KSA.

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## Abstract

**Background:** There is a difference in the method of evaluation of undergraduates and interns. Meanwhile undergraduate evaluation is mainly academic, interns' evaluation depends on both academic and personal qualities.

**Objectives:** To study male and female academic achievement as undergraduates and interns, College of Medicine, Taibah University, Saudi Arabia.

**Method:** All the interns' transcripts and internship rotation evaluation for those graduated between 2014 and 2015 have been retrospectively reviewed together with their corresponding undergraduate marks and GPA (The grade point averages) in four major specialties namely: internal medicine, surgery, paediatrics, obstetrics and gynaecology. Results were presented as percentage, mean  $\pm$  SD.  $\chi^2$  and Student's t-tests and binary correlation were used.

**Results:** Regarding surgery and paediatrics undergraduate percent grades, there was a significant gender difference; where  $p=0.049$  and  $0.048$  respectively. During internship rotations, the only gender significant difference was for paediatrics ( $p=0.012$ ) There was a significant gender difference for GPA, where mean  $\pm$  SD for males= $3.7 \pm 0.058$ , for females= $3.9 \pm 0.52$ ;  $p=0.031$ )

**Conclusions:** the performance of male and female interns did not differ neither in their undergraduate study nor in the rotations except in general surgery and pediatric. There is slight but significant better female medical students' education achievement compared to male.

**Keywords:** GPA, Internship, Taibah University, Undergraduate, College of Medicine, Evaluation.

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## Introduction

The College of Medicine in Taibah University was established 2001. The curriculum of the College was based on a block system where the students were enrolled during the five years (after a mandatory preparatory year), in studying basic sciences for two and a half years then they start their clinical medical courses which include Internal Medicine, Pediatrics, Surgery, Obstetrics and Gynaecology as well as courses in Orthopedics, Radiology and other medical and surgical subspecialties, emergency medicine is usually taught as integrated part in different blocks. Once the medical students complete the sixth year, they have to do a one year internship before they are officially graduated. The American National Association of Colleges and Employers (NACE) established a definition of the "internship" which is applicable to any educational process before employment. It is defined as "A form of experiential learning that integrates knowledge and theory learned in the classroom with practical application and skills development in a professional setting" [1].

Internship gives medical students the chance to explore the specialty he/she is trained in and have a clear vision of what he will consider as a career later on. Internship year is an obligatory step for students to graduate from medical school. It is considered as a transition from student to a junior doctor who will work under supervision [2-4].

In Taibah University; the internship year is divided into mandatory rotations, which include two months rotation in Internal Medicine, Pediatrics, Surgery and Obstetrics and Gynaecology and Emergency departments. The remaining two months of internship are left as an elective rotation and the student can rotate in either basic sciences or in any clinical department. Evaluation of a block or a rotation is an essential part of training in order to measure the outcomes and required skills gain.

The evaluation tools used at our medical college depends mainly on objective academic quality achievements which usually includes different formative and summative assessment tools e.g. OSCE, OSPE, written exams, clinical exams and others while internship year assessment focus mainly on subjective assessment of both academic and personal qualities which includes general medical knowledge, history, physical examination, management skills, communication skills, attitude and others.

There are many factors that may influence the educational process. Such factors may include student's own ability, staff professionalism and level of dedication, presence of faculty development programs, curriculum design, available resources, educational environment, emotional and psychosocial support, assessment tools and others [5].

Though gender may affect the amount of knowledge gained as it has been described in different studies, it has been evaluated as an important factor in determining student's academic performance with a lot of variability in its importance reported among researchers.

Some have reported statistically significant differences while others revealed no statistical significant differences in academic performance between male and female medical students [6-8].

To our knowledge this is the first study of its kind studying the importance of gender difference performance in medical students as undergraduate and then as interns in the western side of Saudi Arabia.

## Objective

To study the difference between male and female medical students' academic achievement in the undergraduates and internship clinical rotations at The College of Medicine, Taibah University, KSA in the period between 2014 and 2015.

## Methodology

A total of 226 medical students were included in the study during the academic year 2014-2015 retrospectively. We revised their undergraduate score in the four major specialties namely Internal Medicine, Surgery, Paediatrics and Obstetrics & Gynaecology, which matches the four major rotations during their internship year. We used a check list to collect demographic data including student name, gender, University Identification Number, their GPAs and individual major speciality grades percentage were also recorded. We then looked at same group of students during their internship and reviewed their evaluations. All the data were collected using the electronic registry system of the university. Evaluation of their respected rotations were reviewed manually using a check list matching their demographic data and recording their achievements percentage grades in each of the four major rotations. To be an intern a student must pass his undergraduate courses. All undergraduates students registered for the academic year 2014 and 2015 who completed and passed their courses at College of Medicine in Taibah University and passed their internship were included in the study. Those who had their internship under the supervision of the College of Medicine, Taibah University but are not graduates of Taibah University were excluded. As there is no undergraduate course that matches, emergency medicine rotation was also excluded from the comparison. Internship rotations evaluation is not accounted in GPA. The pass mark for both undergraduate's students and internship rotation is a score of 60 percent and above. Initially I analyze the data based on different grades including 60-69, 70-79, 80-89, 90-100 marks but because of the following reasons (1) will have 16 groups to analyze, (2) small number of students in some groups especially in low

score groups, (3) no statistically significant differences between these groups so I merge the groups together to get more statistically significant results.

For these reasons a score of 80 percent was chosen to divide the studied undergraduates and interns into two groups were those with score more than or equal to 80 percent are put in a group, and those with a score of less than 80 percent formed another group. Thus, a total of eight groups were formed to conduct the statistical comparison. Each group contain 111 male and 115 females as students and subsequently as interns will do the same course and rotation.

## Ethical approval

The ethical Committee of the College of Medicine and deanship of the college approved the study. Confidentiality and security of data were assured.

## Statistical analysis

All data were analyzed using SPSS software (Chicago, IL, USA) version 21. Comparison between categorical variables in both groups was done by  $\chi^2$  test, and continuous variables were compared using Student's t test. For statistical analysis, different grades were tested for normality by Shapiro-Wilks test, and they were normally distributed, and they are presented as a mean  $\pm$  SD and compared with the Student's t test. Binary correlation was used to test relation between grades and GPAs. A P value < 0.05 is considered as a statically significant.

## Results

The total number of the enrolled students was 227 (111 males and 116 females). In regards of surgery and paediatrics undergraduate percentage scores, the gender difference was a significant factor.

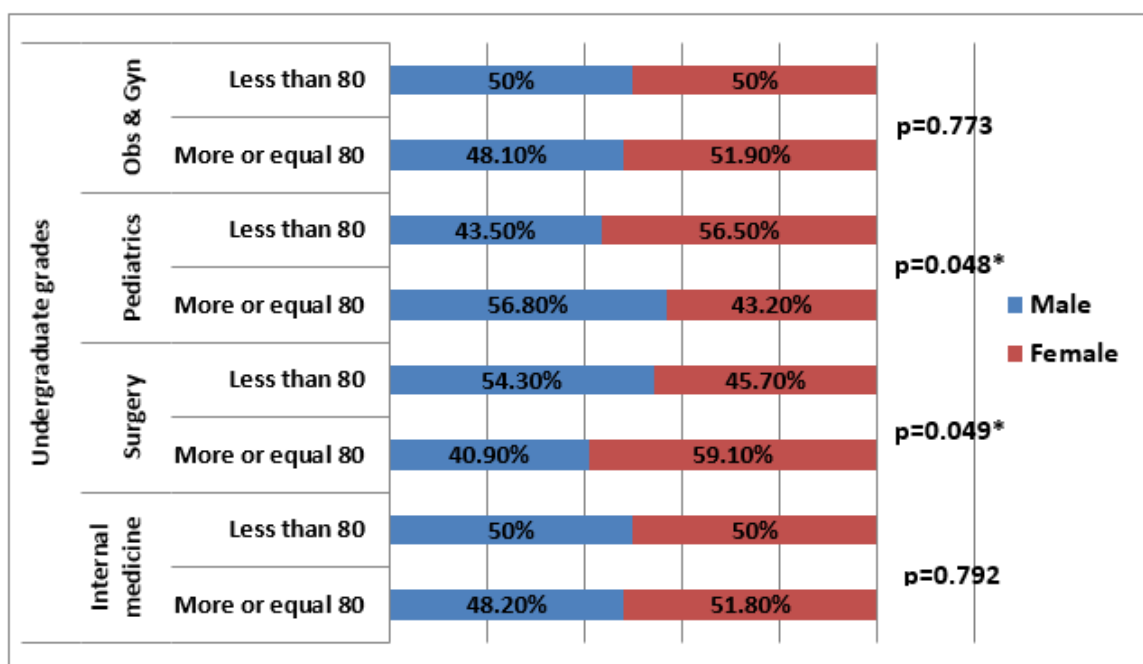
In surgery speciality the students obtained more than 80%. Females accounting for 59.1%. While in paediatric those who scored more than 80% were males accounting for 56.9%. The p value was 0.049 and 0.048 respectively while there was no difference in other specialties (Figure 1).

On the other hand, during internship rotations, the only gender significant difference was observed for paediatric speciality (females who got more than 80% score were 52.3% with a P value of 0.012) while there were no difference in other specialties (Figure 2).

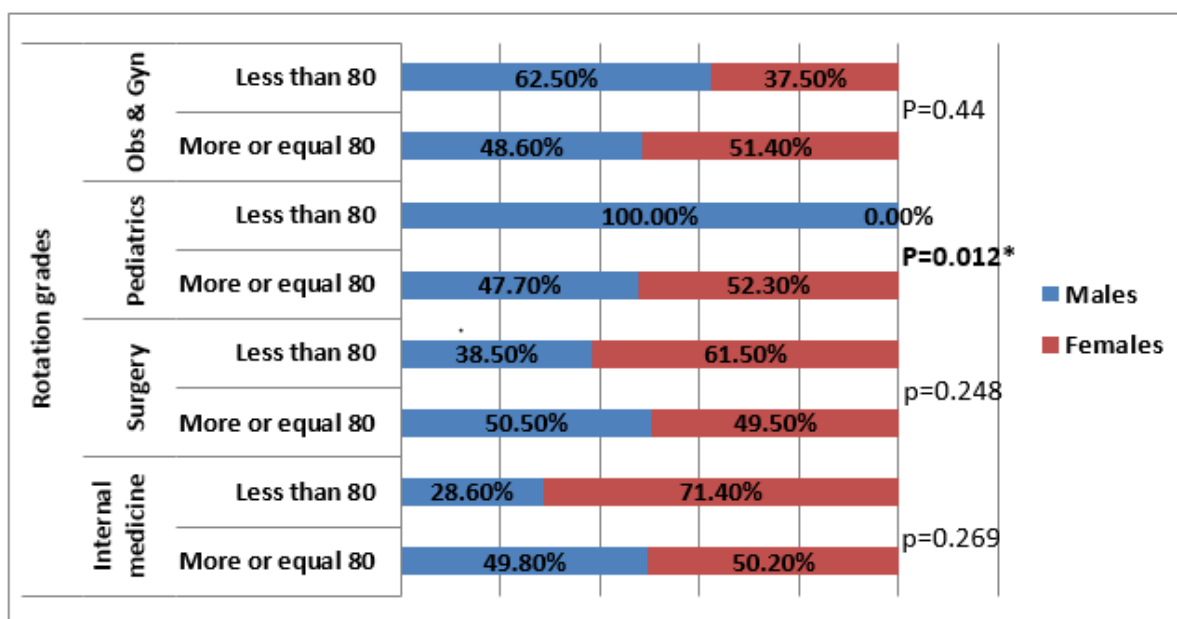
There was a statistical significant gender difference for GPAs, where the mean  $\pm$  SD for males were  $3.7 \pm 0.058$ , and for females was  $3.9 \pm 0.52$  with a p value of 0.031.

More than half of interns enrolled having a GPA during their undergraduate study of 4.5-5 (50.3%) and 3.75-4.5 (54.2%) were females (Figure 3).

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**Figure 1.** Distribution of undergraduate grades by gender, \*p-value is significant at <0.05 level.

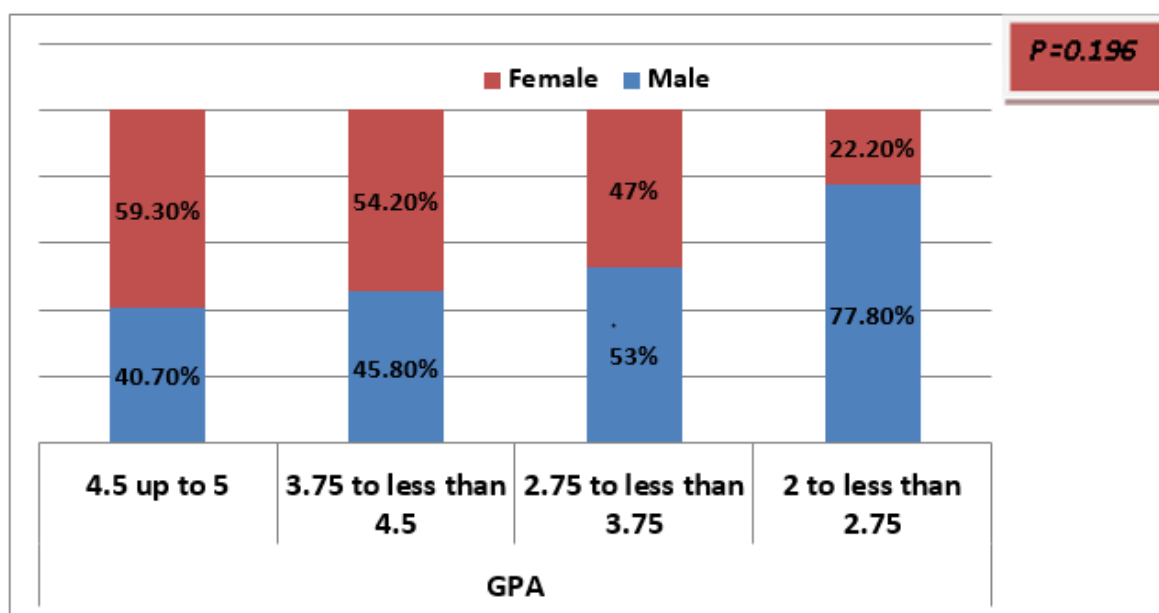


**Figure 2.** Distribution of rotation grades by gender, \*p-value is significant at <0.05 level.

The study revealed a positive significant correlation between GPAs and rotation grades for the specialty of Internal Medicine, Surgery, Paediatrics and Obstetrics& Gynaecology but there were no statistically significant differences between male and female students. (Table 1)

Though we did not compare between undergraduate percentage score and the internship rotations in emergency medicine for

the earlier mentioned reasons; it was of notice that in emergency medicine rotation, the mean grade was  $92.5 \pm 5.59$ ; with significant gender difference of ( $91.6 \pm 6.40$  and  $93.4 \pm 4.53$  for male and female interns respectively,  $p=0.016$ ).



**Figure 3.** Distribution of interns by gender and GPA, \*p-value is significant at <0.05 level.

**Table 1.** Correlation between GPA and rotation marks, \*\*Correlation is significant at the 0.01 level (2-tailed).

Departments	Males		Females		Total	
	Correlation coefficient (r)	Significance	Correlation coefficient (r)	Significance	Correlation coefficient (r)	Significance
Internal medicine	0.778**	0	0.781**	0	0.761**	0
Surgery	0.867**	0	0.765**	0	0.800**	0
Pediatrics	0.904**	0	0.704**	0	0.817**	0
Obs & Gyn	0.742**	0	0.608**	0	0.688**	0

## Discussion

In Saudi Arabia, despite the cultural and religious issues, the number of female students in higher education rose almost six folds compared to male enrolments. In our Study at college of medicine at Taibah University which is located in Al-Madinah Al-Munawarah, Saudi Arabia, the second holy city in Islam, one would suspect lower females student number compared to males, considering cultural and religious factors. In reality the number of female applicants to our medical college is almost equal to males. As the number of female students is growing up, there is a lot of literatures studying medical student's gender difference and its effect in the performance during undergraduate education [4-10].

Few studies have shown that male medical students do better than female. On the other hand a lot had shown the opposite. The female undergraduate student's performance was found to be better than male undergraduates considering their GPAs at the University of Jordan. Saudi female students demonstrated superior academic performance compared to male students in pre-clinical courses at medical college [11-12].

Al-Mulhim et al. in his study on Saudi medical students showed better female performance on subjective evaluation but

there was no differences in written examination [13]. On the other side, others had shown that the male students had higher academic performance compared to their female counterparts [14-19].

Haq et al. and others showed no significance in gender difference in their studies [20]. In our study we focused on comparing the difference between the student's gender and their internship rotation's evaluation, GPAs and undergraduate performances.

Though the GPAs of female interns were higher than male interns at different levels, this was not statistically significant. Female interns scored higher marks in undergraduate studies in general surgery course while male interns scored higher marks in pediatrics undergraduate course.

Though gender difference may affect the knowledge achieved as it has been described in different studies, this study has shown only slight significant difference during internship rotations.

This may confirm that the gender difference is a factor that may affect the educational achievement but not as a major factor as it has been thought. The question to be answered is why gender affects the educational outcome?

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Motivation may be an important factor. Study style, studying time, study environment at home, personality type and psychosocial elements are other factors that may influence the better outcome of female medical students compared to males [21].

Based on the cultural and religious factors, others had attributed the better scores for female students compared to male students due to leniency and courtesy [22,23].

Michels et al. developed a portfolio consisted of 15 tasks that were clustered into four categories using a double rating system [24]. He concluded that an assessment procedure with a double rating system obtained a high reliability with 15 tasks. S. Passeri et al. developed an alternate instrument of evaluation called ACHA (Assessment of Knowledge, Skills and Attitude) in University of Campinas-Unicamp, Campinas, Brazil as a tool of monitoring of medical students during internship progress [25]. They concluded that ACHA was better than OSCE as an assessment tool for evaluating student performance. A lot of researchers recommended a change in

current evaluation model of internship year with different recommendations [26-28].

In fact, many assessment tools are used to evaluate the performance of medical interns during their internship year. The evaluation form is used to evaluate four main areas which are patient safety and quality of patient care, communication and interpersonal skills, professionalism, and clinical judgment. In Taibah University we are using two major characters with subdivisions to evaluate our interns Table 2.

For better understanding of the importance of the internship evaluation by the evaluating specialty; the evaluation was done only by the consultant directly supervising the intern. It was clear to the evaluating consultants during the orientation day the importance of such evaluation not only for the interns but also for the community and patients safety. It was explained to him/her the importance of this evaluation for the interns choosing what specialty they will do as a future career and to know about their strengths and weaknesses and the opportunities they have to improve.

**Table 2.** Internship evaluationuation.

Academic qualities	Personal qualities
General medical knowledge	Character, behavior, Relationship with patients and relatives
History taking and examination skills	Responsibilities and self-confidence
Ability to diagnose and manage problems	Relationship with colleagues and medical staff
Quality of written records	Attendance and punctuality
Quality of oral presentation	Ethics

## Conclusion

Though there is slight but significant better female medical students' education achievement compared to male students with regard to GPA, this cannot be generalized as male students did better in some undergraduate courses and internship rotations compared to female students. Many factors might be involved. Controlling of other factors such as leniency and courtesy may further explain whether this difference is real or not. Using different models of assessment may be worth trying. Some of the limitations of our study include the retrospective study, the limited number of students enrolled. The accuracy of the consultant's evaluation is another limitation we were faced with. It will be great if we can compare our results with other studies done in similar cultures. Finally, a multicenter study with enrolment of a larger number of students is needed.

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## References

1. <https://www.naceweb.org/talent-acquisition/internships/15-best-practices-for-internship-programs/>
2. Scicluna H A, Grimm MC, Jones PD, et al. Improving the transition from medical school to internship-evaluation of a preparation for internship course. *BMC Med Educ.* 2014;14:14-23.
3. Cave J, Woolf K, Jones A, et al. Easing the transition from student to doctor: how can medical schools help prepare their graduates for starting work? *Med Teach.* 2009;31:403-8.

4. Carr SE, Celenza A, Puddey IB, et al. Relationships between academic performance of medical students and their workplace performance as junior doctors. *BMC Med Educ.* 2014;14:157.
5. Carr SE, Celenza A, Lake F. Assessment of Junior Doctor performance: a validation study. *BMC Med Educ.* 2013;13:129.
6. Ferguson E, James D, Madeley L. Factors associated with success in medical school: systematic review of the literature. *BMJ.* 2002;324:952-7.
7. Faisal R, Shinwari L, Hussain SS. Academic performance of male in comparison with female undergraduate medical students in Pharmacology examinations. *J Pak Med Assoc.* 2017; 67: 204-8.
8. Doris A, Neill DO, Sweetman O. Gender single-sex schooling and maths achievement. *Econ Educ Rev.* 2013;35:104-19.
9. Dayioğlu M, Türüt-Aşik S. Gender differences in academic performance in a large public university in Turkey. *High Edu.* 2007;53:255-77.
10. Salem RO, Al-Mously N, Nabi NM, et al. Academic and socio-demographic factors influencing students' performance in a new Saudi medical school. *Med Teach.* 2013;35:83-9.
11. Khwaileh FM, Zaza HI. Gender differences in academic performance among undergraduates at the University of Jordan: Are they real or stereotyping. *Coll Stud J.* 2011;45:633-48.
12. Abu-Hola I. Uncovering gender differences in science achievement and attitudes towards science for Jordanian primary pupils. *Damas Univ J.* 2005;21:19-53.
13. Al-Mulhim AA, Elsharawy MA, Al Awad N. The influence of gender on Saudi students performance in the undergraduate surgical examination. *Surg Sci.* 2012;3:206-9.
14. Abdu-Raheem BO. Gender differences and students' academic achievement and retention in social studies among junior secondary schools in Ekiti State. *Eur J Educ Stud.* 2012;4:155.
15. Odeh Y. Factors Affecting Academic Achievement for Students. In: *Basics of Scientific Research and Informatics Course.* Zarqa J Re Stud. 2007;8:1-22.
16. Gupta R, Sharma S, Gupta M. A study of gender difference on the measure of academic achievement in adolescent students. *VSRD.* 2012;11:23-27.
17. Axelson RD, Solow CM, Ferguson KJ, et al. Assessing implicit gender bias in medical student performance evaluations. *Eval Health Prof.* 2010;33:365-385.
18. Sadker M, Sadker D. Failing at fairness: How our schools cheat girls. New York. Touchstone. 1994:271-303.
19. Bienstock JL, Martin S, Tzou W, et al. Medical students' gender is a predictor of success in the obstetrics and gynecology basic clerkship. *Teach learn med.* 2002;14:240-3.
20. Haq I, Higham J, Morris R, et al. Effect of ethnicity and gender on performance in undergraduate medical examinations. *Med educ.* 2005;39:1126-8.
21. Afuwape MO, Daniel OI.. Gender difference in integrated science achievement among pre service teachers in Nigeria. *Educ Res Revs.* 2008;3:242-5.
22. Kusrkar R., Ten cate Th J, Vos CMP, et al. How motivation affects academic performance: a structural equation modelling analysis. *Adv Health Sci Educ.* 2013;18:57-69.
23. Blanch DC, Hall JA, Roter DL, et al. Medical student gender and issues of confidence. *Patient educ couns.* 2008;72:374-81.
24. Michels NR, Driessen EW, Muijtjens AM, et al. Portfolio assessment during medical internships: how to obtain a reliable and feasible assessment procedure. *Educ Health (Abingdon).* 2009;22:313.
25. Passeri S, Li LM, Nadruz WJ, et al. Medical Students Progress in the Practice Assessment of Knowledge, Skills, and Attitudes. *Creat Educ.* 2015;6:805.
26. Ahern SF, Morley PT, McColl GJ, et al. Governing the reform of the medical internship. *Med J Aust.* 2016;204:374-5.
27. <https://www.aamc.org/download/470400/data/mspe-recommendations.pdf>.
28. Hannon FB. A national medical education needs' assessment of interns and the development of an intern education and training programme. *Med educ.* 2000;34:275-84.

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