DOI: 10.7860/JCDR/2018/35584.11801

Original Article

Education Section

Factors Influencing Academic Success of High Achievers and Low Achievers in Physiology

REEM RACHEL ABRAHAM[1], M GANESH KAMATH[2], ASHA VASHE[3], WONG HONG JUN[4], MUHAMMAD FAIQ AFIF BIN MOHD TAHRIM[5], MUHAMMAD FAIZ BIN KASMURI[6]

ABSTRACT

Introduction: Academic success of medical students is influenced by several factors.

Aim: To determine whether academic success of, high as well as low achievers, in physiology, in the present academic context is influenced by pre-reported factors.

Materials and Methods: Focus Group Discussion (FGD) sessions were conducted to explore perceptions of high as well as low achievers in physiology, regarding seven pre-reported factors influencing academic success. These factors were: attitude towards medical school, attitude towards teachers, interest in subject, time-management, strategic studying, academic self-perceptions and test competence. First year students (n=13) who had scored distinction (>75%) in physiology, in three block-end examinations and second year students (n=7) who had distinction in all four block-end examinations when they were in first year, were categorized as high achievers. Students (n=14) who were unsuccessful in first year final summative examination, were grouped as low achievers.

Results: The FGD data which was analysed using a deductive analysis framework revealed a positive link between responses for all pre-reported factors with the academic success of high achievers, except time management and strategic studying. Even though the responses from low achievers regarding medical profession, teachers, and interest in subject were positive, these could not be linked to their academic performance in first year. The low achievers in the present study believed that with continuous teacher support, their understanding of physiology could be improved, which in turn could lead to an increased interest in the subject which could motivate them to work hard and improve their academic performance.

Conclusion: Academic success of both high and low achievers in the present academic context were influenced by pre-reported factors. Through this study, students were provided with an opportunity to reflect upon the learning process which is reported to be a learning supportive process. This study also gathered evidence for the fact that medical students need to be made aware of and has to be trained in effective time management skills.

Keywords: Focus group discussions, Medical course, Students

INTRODUCTION

Pursuing a medical course is extremely strenuous and challenging for students. Nevertheless, academic excellence is the most desirable outcome that students, parents and universities expect. Academic success of medical students is influenced by factors such as age [1], motivation [2,3], physical and emotional well-being [4-6] personality, cognitive abilities [7], study strategies etc., [8]. All students admitted to a medical course might not perform academically well, during their medical training. Despite the curricular demands in terms of excessive workload, information overload and lessened time for extracurricular activities, which are factors reported to discourage students from learning and are source of stress [9], some students seem to overcome all these pressures and perform consistently well in academics. This surprising phenomenon, led the researchers of the present study address the question, what differentiates high achievers from mediocre and low achieving students in medical schools, when students from both categories seems to have almost similar Grade Point Average (GPA) scores and are presently exposed to the same curriculum and teaching methods. Anecdotal responses from students themselves indicate that mediocre students put almost the equal amount of effort as their high achieving peers who exceed expectations of the course, but still are not able to meet the expectations of the course.

Previous research has reported that academic performance is influenced by several factors such as academic self-perceptions [10], test competence [11] and time management skills [2,11,12]. Hamza M et al., reported that strategic learning, resource management, internal motivation and efficient management of non-academic problems contributed to high academic achievements [13].

Reports have indicated the positive correlation of motivation and academic performance [14-16]. Self-regulation, is reported to be a cardinal attribute which high achievers possess [17,18].

In the present study, High Achieving (HA) as well as Low Achieving (LA) students' perceptions regarding seven pre-reported factors influencing academic success were explored. Academic success in the present study was defined as *the obtainment of a distinction consistently in all summative examinations in physiology, conducted in first year*. The seven pre-reported factors [Table/Fig-1] [12,19-22] were as follows: attitude towards medical school, attitude towards teachers, interest in the subject, time management, strategic studying, academic self-perceptions and test competence. The present study addressed the following research question: *Is academic success of high as well as low achievers in physiology in the present academic context influenced by pre-reported factors and how these factors influence their academic success?*

MATERIALS AND METHODS

The study was conducted at Melaka Manipal Medical College (MMMC), Manipal Campus, after obtaining approval from Ethics Committee, Manipal Academy of Higher Education, India (IEC 276/2015). This study was undertaken as a part of the Mentored Student Project (MSP) at MMMC between June to October 2015.

Factors	Meanings
Attitude towards medical profession	Refers to the interest of a student towards medical profession
Academic self-perception	Refers to how a student views his or her academic ability [22]
Attitudes toward teachers	Refers to a student's self-reported interest in and affect toward teachers [19]; The requirement of learning support from teachers
Test competence	student's ability to deal and muddle through the amount of course material for examinations [20]
Time management skill	Ability to plan time lines to achieve a set of objectives, being able to prioritize work tasks [12]
Strategic studying	knowledge and application of effective study skills by student [21]
Interest in the subject	Refers to a students desire to learn the subject matter

[Table/Fig-1]: Pre-reported factors of academic success and their meaning [12,19-22].

MMMC offers the five-year Bachelor of Medicine and Bachelor of Surgery (MBBS) program, in twin campuses. Students spend their first two and a half years at Manipal Campus, India and the latter at Melaka Campus, Malaysia. There are two admission intakes per year. The first year subjects include anatomy, physiology and biochemistry which are taught in four blocks (teaching units). Students who are unsuccessful in first year summative examination undergo a refresher term of six months, during which lectures and practical classes are conducted. However, the number of face to face contact sessions with teachers is less, compared to the regular students (for e.g., 2 discussion sessions per week, instead of 4/5 lecture classes for regular students per week).

The present study adopted a qualitative research design using a case study approach to explore the perceptions of high achievers and low achievers in physiology, regarding pre-reported factors influencing academic success. Purposive sampling was adopted to ensure that the research question of the study will be best answered with the selected participants. In the present study, all first year students (n=13) who had scored distinction (>75%) in physiology, in three block-end examinations and all second year students (n=7) who had a distinction in all four block-end examinations when they were in first year, who were willing to be a part of the study, were categorized as high achievers. First year students had not completed the fourth block-end examination at the time of the study, because of which their block 4 exam scores could not be taken into consideration.

A group of low achievers (n=14 in total) who were unsuccessful in physiology in first year summative examination and were pursuing six months of refresher term (during the period of this study), and willing to be a part of this research were also invited (n=5). One Focus Group Discussion (FGD) session was conducted with each group and the sessions were facilitated by all researchers of this study.

The author of this article asked questions based on a discussion guide [Table/Fig-2] on the seven pre-reported factors and the other five co-investigators individually wrote the responses as the FGD sessions were not audio-recorded. Member checking was done at the end of the sessions, to ensure correctness of data. Further FGD sessions were not conducted with the high achiever group, as data saturation had reached with the two groups and also because volunteers were not available from the low achievers group. A summary was prepared by the five co-investigators independently, following a review by primary investigator and together with the co-investigators, reached a consensus regarding the responses. Thereafter, the responses were analysed separately by forming two groups, (1st group: first, second and third author; 2nd group: fourth, fifth and sixth author) of this article, using a deductive analysis framework [16], wherein the data was looked for occurrence or non-occurrence of the dimensions of the seven pre-reported factors. The results were compared between the groups by the first author and a consensus regarding the results was reached by the two groups.

Attitudes towards medical profession
• Is it by your own interest that you have joined a medical school/ parents' pressure? Please elaborate
Attitudes towards physiology teachers
• Could you please share your attitude towards physiology teachers i.e., do you feel that their support is essential for your academic success? Please elaborate
Interest in subject
• Do you value the relevance of learning physiology? Please elaborate
• Do you think that understanding physiological concepts is important for your future clinical practice? Please elaborate
Time management
• Do you study physiology every day? If yes, how much time?
• Do you study it first, second or third in sequence?
• How do you balance between study time and leisure time? Please elaborate
Strategic studying
• Do you study physiology independently/study groups/both?
• Do you refer only the recommended books/other books/notes/all
• Do you make your own physiology notes?
• Even if there is class test for other subjects, will you study physiology the previous day?
Academic self-perceptions
• Do you have sufficient confidence that you will score well in physiology exams? Please elaborate
• What motivates you to study physiology? Please elaborate
Test competence
• For physiology examinations, do you refer only textbooks/notes/question papers/all?
• Do you study all learning objectives in physiology?
• Do you focus more on the important topics for an exam? Please elaborate

[Table/Fig-2]: Discussion guide.

RESULTS

Students' responses to the questions on the seven factors are presented below.

Attitude towards Medical Profession

Both high and low achievers agreed that it was by their own interest they had joined the medical school and some of them further explained that their interest and passion towards the subjects learnt, were essential for successful academic performance. All of them felt medical profession as an honourable and a challenging profession. The quotes below support these findings.

> 'I always wanted to become a doctor and I came to medical school by my own interest'. (HA)
>
> 'My parents told me that medicine is a noble profession and they wished that I join medicine, but they never forced me'. (HA)
>
> 'I got into MBBS on my own choice (LA)'

Attitude towards Physiology Teachers (Support for Learning)

Both high and low achievers reported that they required support and guidance of the physiology teachers for their academic success. Low achievers commented that they require more class tests and sample questions to keep them engaged in learning. The quotes below are examples of students' comments.

> 'May be, not 100% guidance from teachers is required for me to learn physiology, but support is definitely required. We definitely require support during Self-Directed Learning (SDL) and Problem-Based Learning (PBL) sessions'. (HA)

'Depending on the difficulty of topic, support is needed'. (HA)

We need support from teachers, we need more class tests and sample examination questions (LA)

Interest in the Subject

Both the groups felt that understanding of physiological concepts is relevant to medicine. High achievers felt that knowledge in physiology would help in better understanding of second year subjects and also assists in building the foundation of knowledge which would be beneficial for their future clinical practice. Low achievers commented that a low level of understanding probably could have been one of the reasons of their failure in first year.

'By learning physiology, we understand how everything works in our body. It's the basis of medicine'. (HA)

'It will help in our future practice'. (HA)

'Physiology needs to be understood thoroughly, then the interest level will be more' (LA)

'I am interested because it is important for medical field' (LA)

Time Management

When asked about the frequency of studying physiology per week, high achievers responded that they did not study physiology every day and studied only when class tests approached. Only one student reported that he studied physiology every day. Some students studied physiology 4 to 9 hours a week. All of them studied anatomy first as they felt it was bulky, followed by physiology and biochemistry. Low achievers commented that they 'browsed through' class notes every day, but studied the topics only when there was a class test. These students also informed that they studied either biochemistry or physiology first as they felt that these were easier subjects, compared to anatomy which they felt was the most difficult subject among the three. Both groups also stated that they did not study physiology, if there were class tests on other subjects in the same week. Both groups reported that they could balance study time and leisure time very well but detailed information on how they managed, was not provided. The quotes below represent these findings.

'I do not study physiology every day, but when tests approach I study thoroughly'. (HA)

'May be 4 times in a week, I review the class notes and read the text book in physiology, not every day'. (HA)

'Whenever there is a class test, SDL or PBL session, I learn physiology. (HA)

'I read physiology every day, but when class tests approach will read more' (LA)

Strategic Studying

Both high and low achievers preferred studying independently rather than in groups. High achievers studied in groups only when there were doubts to be clarified. They reported that they made their own notes, and referred previous question papers and ensured that they learnt all learning objectives before an examination. Low achievers commented that they studied in groups only on the day before an examination as they felt that they could share information among them and they referred lecture notes and senior students' notes. They also said that they focused only on important topics on the previous day of examination.

'I do most of the studying by myself, whenever a doubt arise, I discuss with my friends'. (HA)

'I discuss past year question papers with my friends'. (HA)

'I make notes by myself, class notes are very important; I add that to my own notes'. (HA)

'I study independently, combined study only a day before the examination'. (LA)

Academic Self-Perceptions

High achievers opined that they were not confident of achieving distinction in all blocks, but they were determined to try for it. Low achievers felt that their confidence level of passing in the forthcoming summative examination has been increased, as their scores in class tests and block-end examinations had improved during the refresher term.

'I do not have sufficient confidence to say I will score distinction in physiology but I will strive for the best'. (HA)

'It depends on the block; whether I will be able to feel that I might get a distinction'. (HA)

'I feel that I will pass in the next examination, because my scores have improved this time, so I am confident' (LA)

Test Competence

High achievers took time to understand each subject thoroughly, and most of them correlated physiology with anatomy while studying. Majority referred all recommended learning resources for class tests and block-end exams. They reported that they learnt all learning objectives, and also ensured that they learnt important topics which were emphasized during routine classes, on the previous day of an examination. Low achievers commented that they did not learn all objectives for the block-end examinations and focussed only on important topics. The quotes below confirm these findings.

'I read whatever that is taught in class'. (HA)

'I read everything, don't omit anything before an examination'. (HA)

'I focus in class, and write down everything the teacher says in class'. (HA)

'When I study physiology, I correlate it with anatomy and biochemistry. (HA)

'We will not read everything in physiology for the block examination' (LA)

DISCUSSION

The present study investigated high achieving and low achieving students' perceptions regarding seven pre-reported factors affecting academic success, in physiology. Both student groups in the present study joined the medical course by their own interest and they believed it to be a noble profession. This observation with high achievers in the present study was found to be in line with previous research reporting the importance of students' positive attitude, motivating them to put more effort and thus enhancing their learning process [23].

Reports have stated that students perceive teachers as having strong influence on their learning experience [24,25]. High achievers believed that they had the competence to learn physiology by themselves and required guidance from teachers mostly during SDL and PBL sessions. This could be because of the fact that, SDL and PBL topics are not taught in class through lectures and students have to learn these topics by themselves. The topics are presented by students in small group learning sessions, facilitated by a teacher. Students perhaps would be more confident to learn lecture topics as it would have been already taught in class. However, low achievers mentioned that they required constant support from teachers, irrespective of the context.

An important observation that emerged from this study was that these high achievers were aware about the contexts in which they require guidance from teachers which in turn reflected their active engagement with learning which could have culminated in academic success. This finding is in concordance with a research report by Todres M et al., who stated that the awareness of high

achievers about how they learnt is an indication of their active engagement with learning [26]. Low achievers, compared to high achievers seemed to be more teacher dependent and lacking the confidence to manage their learning. The attitude of both student groups was emphasizing the fact that they required support from teachers for academic success, the difference being high achievers probably a bit more aware of the contexts in which they required support.

Both high and low achievers in the present study understood the relevance of physiology to their future medical practice and both groups were interested to learn the subject. High achievers compared to low achievers seemed to take this realization more seriously and gave much importance for understanding the subject which could have led to more interest in learning physiology and thereby achieve academic excellence. Previous research reports have stated that good time management skills and academic performance have a positive relation [3,26,27]. In the present study, responses from both groups revealed that they were lacking good time management skills, as both student groups did not have systematic studying habits and studied physiology only during the period close to examinations. High achievers used multiple learning resources and correlated content with anatomy, which reflected the importance they had for understanding of concepts and not just superficial learning. They were aware of their own learning strategies which worked well for them. This observation is in line with a previous study conducted at a London medical school, which reported that high achievers were able to provide elaborate descriptions of their learning process, which reflected their active engagement in learning [26]. However, low achievers in the present study did not provide an elaborate description of the learning process, which reflected their minimal engagement in learning.

Both groups seemed to be context driven learners, in the sense, their learning depended upon contexts which demanded a demonstration of learning; high achievers, for e.g., in PBL and SDL sessions, where they have to present a topic in front of the teacher and peers and in case of both groups when examinations approached. Nevertheless, high achievers did ensure that they learnt all the learning objectives before they appeared for an examination, or an SDL or PBL session, thereby, showing high test competence. Low achievers on the contrast seemed to focus only on important topics before an examination, revealing their low test competence compared to high achievers.

In the present study, both groups were found to be comfortable in studying independently most of the time, which is in line with previous findings stating that medical students have their own independent learning methods [28]. Therefore, the responses from both groups regarding strategic studying could not be linked to academic success. Nevertheless, high achievers compared to low achievers could engage in learning without a 'push' from peers or teachers.

CONCLUSION

Therefore, to conclude, there was not much difference in perceptions of both high and low achievers regarding the influence of pre-reported factors on academic success. The perceptions of high achievers on all pre-reported factors, except time management (not studying every day) was found to have a positive link with their academic success, as reflected from their comments. Even though the responses from low achievers regarding medical profession, teachers, and interest in subject were positive, these could not be linked to their low academic performance in first year. Their responses regarding test competence stating that they do not study all learning objectives before an examination seemed to have a positive link with their low academic performance in first year. This study adds evidence to the already existing literature on factors influencing academic success of high and low achievers. This study also gathered evidence for the fact that medical students need to be made aware of and has to be trained in effective time management skills.

LIMITATION

The sample size was less in number and therefore, the results of this study cannot be generalized. Additionally, the study adopted pre-reported factors influencing academic success which would have omitted other factors which were likely to influence academic success in the present academic context. Also, the study could not gather evidence on other parameters which could have contributed to high academic achievement, for example, the physical health of students.

ACKNOWLEDGEMENTS

We remain grateful to all student participants of this study for their time and for providing elaborate responses to the questions in an open platform.

REFERENCES

[1] Arulampalam W, Naylor R, Smith J. Dropping out of medical school in the UK: Explaining the changes over ten years. Med Educ. 2007;41(4):385-94.
[2] Bansal S, Thind SK, Jaswal S. Relationship between quality of home environment, locus of control and achievement motivation among high achiever urban female adolescents. J Hum Ecol. 2006;19(4):253-57.
[3] Kusurkar RA, Ten Cate TJ, Vos CM, Westers P, Croiset G. How motivation affects academic performance: A structural equation modelling analysis. Advan Health Sci Educ. 2013;18:57-69.
[4] Austin EJ, Evans P, Magnus B, O'Hanlon K. A preliminary study of empathy, emotional intelligence and examination performance in MBChB students. Med Educ. 2007;41(7):684-89.
[5] Hojat M, Gonnella JS, Mangione S, Nasca TJ, Veloski JJ, Erdmann JB, et al. Empathy in medical students as related to academic performance, clinical competence and gender. Med Educ. 2002;36(6):522-27.
[6] Kilminster S, Cottrell D, Grant J, Brian J. Effective educational and clinical supervision. Med Teach. 2007;29(1):2-19.
[7] Dzulkifli MA, Alias IA. Students of low academic achievement-their personality, mental abilities and academic performance: how counsellor can help? IJHSS. 2012;2(23):220-25.
[8] West C, Sadoski M. Do you study strategies predict academic performance in medical school? Med Educ. 2011;45:696-703.
[9] Locke EA, Latham GP. A theory of goal setting and task performance. Englewood Cliffs, NJ: Prentice Hall, 1990.
[10] McCoach DB, Siegle D. A comparison of high achievers' and low achievers' attitudes, perceptions, and motivations. Academic Exchange Quarterly. 2001;5:71-76.
[11] Talib N, Sansgiry SS. Determinants of academic performance of university students. PJPR. 2012;27(2):265-78.
[12] Covic T, Adamson BJ, Lincoln M, Denison A, Currie A, Laing M, et al. Good for them or good for us? The role of academic guidance interviews. Med Educ. 2006;40:1188-91.
[13] Abdulghani HM, Al-Drees AA, Khalil MS, Ahmad F, Ponnamperuma GG, Amin Z. What factors determine academic achievement in high achieving undergraduate medical students? A qualitative study Med Teach. 2014;36:S43-S8.
[14] Artino AR, La Rochelle JS, Durning SJ. Second-year medical students' motivational beliefs, emotions, and achievement. Med Educ. 201044(12):1203-12.
[15] Shawwa Al L, Abulaban AA, Abulaban AA, Merdad A, Baghlaf S, Algethami A, et al. Factors potentially influencing academic performance among medical students. Adv Med Educ Pract. 2015;6:65-75.
[16] Stalmeijer RE, Mcnaughton N, Van Mook WN. Using focus groups in medical education research: AMEE Guide No. 91. Med Teach. 2014;36(11):923-39.
[17] Sanders J. Self-regulation theory: Applications to medical education: AMEE Guide No. 58. Med Teach. 2011;33:875-86.
[18] Yiu V. Supporting the well-being of medical students. CMAJ. 2005;172(7):889-90.
[19] McCoach DB, Siegle D. The school attitude assessment survey-revised: A new instrument to identify academically able students who underachieve. EPM. 2003(b);63(3):414-29.
[20] Kleijn WC, Ploeg HM, Topman RM. Cognition, study habits, test anxiety, and academic performance. Psychol Rep. 1994;75:1219-26.
[21] Kirschenbaum DS, Perri MG. Improving academic competence in adults: A review of recent research. J Couns Psychol.1982;29(1):76-94.
[22] Cokley K. An investigation of academic self-concept and its relationship to academic achievement in African American college students. JBP. 2000;26(2):148-64.
[23] ten Cate O. What happens to the student? The neglected variable in educational outcome research. Adv Health Sci Educ Theory Pract. 2001;6:81-88.
[24] Harris L. Delivering, modifying or collaborating? Examining three teacher conceptions of how to facilitate student engagement. Teachers and Teaching. 2010;16(1):131-51.

[25] Kreber C, McCune V, Klampfleitner M. Formal and implicit conceptions of authenticity in teaching. Teach High Educ. 2010;15(4):383-97.
[26] Todres M, Tsimtsiou Z, Sidhu K, Stephenson A, Jones R. Medical students' perceptions of the factors influencing their academic performance: An exploratory interview study with high achieving and re-sitting medical students. Med Teach. 2012;34:e325-31.
[27] Vrugt A, Oort FJ. Metacognition, achievement goals, study strategies and academic achievement: Pathways to achievement. Metacognition Learn. 2008;30:123-46.
[28] Al-Mohrej OA, Al-Ayedh NK, Masuadi EM, Al-Kenani NS. Learning methods and strategies of anatomy among medical students in two different Institutions in Riyadh, Saudi Arabia. Med Teach. 2017;39:sup1 S15-S21.

PARTICULARS OF CONTRIBUTORS:
1. Professor, Department of Physiology, Melaka Manipal Medical College (MMMC), Manipal Campus, Manipal Academy of Higher Education, Manipal, Karnataka, India.
2. Associate Professor, Department of Physiology, Melaka Manipal Medical College (MMMC), Manipal Campus, Manipal Academy of Higher Education, Manipal, Karnataka, India.
3. Assistant Professor, Department of Physiology, Melaka Manipal Medical College (MMMC), Manipal Campus, Manipal Academy of Higher Education, Manipal, Karnataka, India.
4. Undergraduate Medical Student, Melaka Manipal Medical College (MMMC), Melaka Campus, Manipal Academy of Higher Education, Melaka, Malaysia.
5. Undergraduate Medical Student, Melaka Manipal Medical College (MMMC), Melaka Campus, Manipal Academy of Higher Education, Melaka, Malaysia.
6. Undergraduate Medical Student, Melaka Manipal Medical College (MMMC), Melaka Campus, Manipal Academy of Higher Education, Melaka, Malaysia.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Reem Rachel Abraham,
Professor, Melaka Manipal Medical College, Manipal Campus, Manipal Academy of Higher Education, Manipal, Karnataka, India.
E-mail: reemabraham@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Jan 15, 2018**
Date of Peer Review: **Mar 25, 2018**
Date of Acceptance: **Apr 18, 2018**
Date of Publishing: **Jul 01, 2018**