



## Factors Affecting the Performance of Students in Anatomy : A case Study

### KEYWORDS

Student's performance; Anatomy, performance in Biology in the school leaving examination; marks in theory and practical examinations; father's education; food habit.

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**ABSTRACT** Measurement of the academic performance of students is very challenging since a student's performance is dependent on socio-economic, psychological and environmental factors. In this study, the focus is on identifying the factors those affect the performance of a medical student in Anatomy, which is one of the pre-clinical cornerstones of medical education. To this effect, a survey was conducted on the students of NRS Medical College, Kolkata, and the data was analyzed using statistical tools. The results showed that the most important factor that affects a student's performance is his/her performance in Biology in the school leaving examination. A significant positive association was also indicated between a student's performance in the theory and practical examinations in Anatomy. Further, father's education was seen to have significant effect on the performance in theory examination, while food habit was an important factor significantly affecting the performance in practical examination.

### 1. Introduction

Determinants of students' performance have been the subject of utmost importance to educators, instructors and policy makers. Several valuable studies have contributed to this challenging issue. The findings of these studies support the hypothesis that students' performance depends largely on socio-economic, psychological and environmental factors (Hijazi and Naqvi, 2006). Most of these studies have been carried out in advanced developed societies. However, since differences in customs and cultures may have a role in determining the factors influencing students' performance, it is very important to study the impact of these factors in the setting of less developed nations.

Studies have been conducted to identify the factors affecting students' performance in Economics and Statistics; see Devadoss and Foltz (1996), Romer (1993), Kennedy and Tay, (1994), Cohn et al.(1995). There is, however, paucity of data on the factors affecting students' performance in medical subjects.

A very important but difficult subject in medical science is Anatomy. The study of Anatomy is one of the most relevant aspects of pre-clinical training, and a sound knowledge in the subject is essential if the medical practitioner is going to accurately define and successfully treat a patient (Older, 2004). Over the years, the subject has posed as a difficult hurdle for students, perhaps owing to its factual nature and vast syllabus. The present study is designed to evaluate the factors influencing the performance of students in Anatomy and to provide important suggestions to improve students' performance.

### 2. Aims and Objectives

- 1) To explore the factors those affect a student's performance in Anatomy.
- 2) To provide important suggestions to improve performance.

### 3. Methodology

A cross sectional study design was used. As Anatomy is taught in the first year of the medical course, the study was conducted on the first year medical students of NRS Medical College, Kolkata. The data was collected through questionnaire, which consisted of two sets of questions - one relating to personal and family information, such as gender, food habit, medium of instruction in school last attended, board

of school leaving examination, marks obtained in Biology in school leaving examination, parents' education level, parents' socio-economic status, etc., and the other to the study of Anatomy, such as interest in the subject, method of study, difficulty level experienced, whether taken tuition or not, etc. One hundred and twenty-five students participated in the study, of which 97 were males and 28 females. The marks obtained by the students in Anatomy in the University Examination were considered for assessing the performance of the students in Anatomy.

### 4. Results and Discussions

Statistical analysis of the data was performed using MINIT-ABTM Statistical Software (version: 13.31, Minitab Inc. PA, USA). Frequency 2-test and regression analysis were carried out to get an idea of the factors affecting the performance of a student in Anatomy. Test of equality of two proportions was done, wherever applicable. A p-value less than 0.05 was considered to indicate statistical significance.

As per the requirement of The West Bengal University of Health Sciences, a student has to secure at least 50% marks in Anatomy theory examination and viva voce taken together (henceforth to be referred to as theory examination only) and also 50% marks in practical examination, in order to pass in the subject. The data showed that while 9.45% of the students failed in Theory examination, only 0.79% failed in Practical examination. It is, therefore, more essential to explore the factors affecting the marks in theory examination.

The marks obtained in theory examination was found to be significantly dependent on the marks in Biology in the school-leaving examination ( $p$ -value < 0.001), and showed a tendency to be high for high marks in Biology. This is in agreement with Medical schools considering students with high aptitude in biological sciences to be more suitable for medical studies. Passing in theory examination was significantly associated with Biology marks ( $p$ -value = 0.0005) and study habit ( $p$ -value = 0.029). Surprisingly, it was found that passing tends to be associated with studying just before the examination (odds ratio = 0.03, CI=(0, 0.69)).

Anatomy course is taught through cadaver dissection supported by theory lectures. This justifies the significant dependence of theory marks on the practical marks ( $p$ -value < 0.001). Further, a positive relationship between the two was observed (correlation coefficient = 0.634), which indicates that a student

getting high marks in practical is likely to get high marks in theory examination. Also, logistic regression analysis indicated that the only factor significantly effecting a student securing at least 70% marks in theory examination, was his/her marks in practical examination ( $p$ -value=0.001), and it was positively associated with high percentage of marks in Practical examination (odds ratio 1.39, CI=(1.05, 3.33)).

It is generally observed that vegetarians cannot tolerate the sight of raw fish and meat, or their odour. Cadaver dissection therefore is likely to pose a problem for such students. To overcome it, they may have the tendency to concentrate more on dissection than other students. This is reflected in the significant dependence of marks in practical examination on food habit ( $p$ -value = 0.008). Negative coefficient in regression analysis (coefficient = -1.5165) indicated that higher marks in practical examination tend to be associated with vegetarian students. Also for male and female students taken separately, significant dependence of marks in Practical examination on food habit ( $p$ -value 0.049,  $p$ -value = 0.006) was noted, and the marks showed the tendency to be high for vegetarian students.

Generally, higher level of father's education shows greater likelihood of his involvement with children's education. Father's involvement predicts higher educational attainment and applies to both girls and boys (ESRC 2001). This supports our finding that marks in theory examination is significantly dependent on father's education ( $p$ -value = 0.010), and tends to be high for high education level of father. Also, scoring 70% or more in practical examination depend significantly on the father's education ( $p$ -value = 0.001;  $p$ -value = 0.024), and shows positive association with higher education level of father. For males students, theory marks showed significant dependence on father's education ( $p$ -value = 0.003), but not so for female students ( $p$ -value = 0.624).

For a female student, marks in practical examination was significantly dependent on food habit ( $p$ -value = 0.006), study habit ( $p$ -value = 0.035), difficulty level ( $p$ -value = 0.012), mother's education ( $p$ -value = 0.007) and theory marks ( $p$ -value = 0.001). With regular study habit a female student showed tendency to perform better. Her performance also tend to be better for lower education level of her mother. The reason may be that less educated mothers are generally housewives who can devote more time to the care of their children. Also, mother's low education and occupation may motivate a female student to set high goals and achieve high standards of excellence. On the other hand, for a female student, scoring at least 70% in practical was significantly associated with high score in Biology ( $p$ -value = 0.010) and high difficulty level faced by the student ( $p$ -value = 0.039). The reason for dependence on difficulty level may be attributed to a female student viewing high difficulty level as a challenge rather than an obstacle. So, with active effort to overcome the difficulty, she tends to performance better.

Anatomy poses quite a hurdle for many medical students, perhaps owing to its huge syllabus. Passing in Anatomy theory examination is in itself an achievement for some students. A comparison of the percentages of students failing in theory examination under different levels of the factors considered showed that the % failing is significantly higher among

- (a) non-vegetarian students than among vegetarian students ( $p$ -value <0.001);
- (b) students of Vernacular medium schools than among those who studied in English medium schools ( $p$ -value <0.001);
- (c) students passing from the ISC/CBSC Boards than among students who passed the school leaving examination from the West Bengal Board ( $p$ -value <0.001);
- (d) students who attributed their disinterest in the subject owing to uninteresting teaching than those who found teaching interesting ( $p$ -value < 0.001). It was noted that while 21.9% of the students found teaching to be interesting, only 7.8% found it uninteresting, and the difference is significant ( $p$ -value = 0.001);
- (e) students who found Anatomy to be very difficult than those who found the subject to be just difficult ( $p$ -value < 0.001) or moderately easy ( $p$ -value < 0.001);
- (f) students staying away from home than students staying at home ( $p$ -value = 0.002);
- (g) students whose fathers are undergraduates than students with professional fathers ( $p$ -value = 0.007), post-graduate fathers ( $p$ -value=0.016), and graduate fathers ( $p$ -value=0.026);
- (h) students whose mothers are undergraduates than among students with professional/ post-graduate mothers ( $p$ -value < 0.001), and graduate mothers ( $p$ -value=0.020), and the percentage is insignificantly lower corresponding to mothers who are professionals/ post-graduates than that corresponding to graduate mothers ( $p$ -value =0.037).

## CONCLUSION

Based on the findings of the study, it is apparent that Biology at the school level plays an important role in a medical student's performance in Anatomy. Also, stress should be placed on cadaver dissection, and students should be encouraged to participate actively in practical classes. Teachers should also try to make their teaching interesting and involve students in discussion forums to grow their interest. Further, as a considerably good knowledge of English is essential for passing, students with poor understanding of the language should be encouraged to enroll in private English classes. Interestingly, the economic status of a student's family is not found to significantly affect his/her performance.

The study can be extended to include all medical colleges in and around West Bengal.

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