

Academic Profile of Students Who Transferred to Zagreb School of Medicine from Other Medical Schools in Croatia

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Aim. To assess the academic performance of students who transferred to the Zagreb School of Medicine from other three medical schools in Croatia.

Methods. Academic performance of medical students who moved from Rijeka, Osijek, or Split University Medical Schools to the Zagreb University School of Medicine at the second or third year was compared with academic performance of students enrolled at the Zagreb University School of Medicine. Using the Zagreb Medical School's registry, we made a list of 57 transfer students to Zagreb Medical School in the 1985-1994 period. Control group was formed of students enrolled at the Zagreb School of Medicine in the same period, whose names followed in alphabetical order after the names of transfer students. Students' performance was analyzed according to their grade average before transfer, grade average in the first year after transfer, total grade average after transfer, overall grade average, and duration of studies. We also analyzed the proportion of students in each group who did not pass the admission test at the Zagreb School of Medicine in the year before the enrollment in Zagreb, Osijek, Rijeka, and Split Medical Schools. Nineteen transfer students, transferred between 1985 and 1988, and their controls were excluded from the analysis because of incomplete data.

Results. Transfer students had significantly lower grade average before transfer (3.2 ± 0.6 vs 3.5 ± 0.7 , $p = 0.03$, Student t-test), lower grade average in the first year after transfer (3.2 ± 0.6 vs 3.5 ± 0.7 , $p = 0.03$), lower total grade average after transfer (3.6 ± 0.5 vs 4.0 ± 0.6 , $p < 0.001$), and lower overall grade average (3.5 ± 0.5 vs 3.9 ± 0.6 , $p < 0.001$) than control students. Median time to graduate for transfer students was 7 years (range, 5-9) and 6 years (range, 5-9) for control students ($p = 0.375$, Mann-Whitney test). There were significantly more students among transfer students who did not pass the admission test at the Zagreb School of Medicine in the year before the final enrollment than their controls ($15/38$ vs $4/38$, $p = 0.009$, chi-square test).

Conclusion. Transfer students had poorer academic performance than students who passed the admission test and were enrolled at the Zagreb School of Medicine from the first year of studies.

Key words: achievement; Croatia; education, medical, undergraduate; schools, medical; students, medical

Student mobility shows an increasing trend today. As students are interested not only in gaining necessary knowledge during their academic education, but also in widening their social and cultural horizons, many find appealing the opportunity to pay a student visit to some university abroad (1). With the purpose to promote international cooperation between different universities, many student associations were founded, such as the International Federation of Medical Students' Associations (IFMSA), founded in 1951 (2). In Europe, one of the largest programs for student exchange is the European Community Action Scheme for the Mobility of University Students (ERASMUS) Program, launched in 1987 with the idea of exchanging culture, people, and knowledge within the European continent (3). The exchange of students and young scientists can especially contribute to the advancement of science in de-

veloping countries (4). International student exchange is not the only form of student mobility – there is also student exchange between different universities in the same country.

We studied student mobility among medical schools in Croatia. Among the four university medical schools in Croatia – in Zagreb, Rijeka, Split, and Osijek – the Zagreb University School of Medicine is the oldest (founded in 1917) and the largest medical school in Croatia (5). Because of that, it is attractive not only to candidates applying for admission, but also to students already enrolled into other medical schools in Croatia. We wanted to determine whether students who transferred to the Zagreb School of Medicine from other three medical schools in Croatia academically differ from students who enrolled into Zagreb School of Medicine from the beginning of their medical education.

The reasons for transfer from one university school to another may be private, such as change of family's place of residence, but may also arise from students' belief that it would be better to graduate from a university school other than the one they have enrolled (6). We wanted to see whether some of these transfer students were students who failed to enroll to the Zagreb Medical School because they could not pass the admission test. They could have entered other medical schools to be able to transfer later to the Zagreb University and graduate from the oldest and largest medical school in Croatia.

Subjects and Methods

Subjects

Transfer students were defined as students who have began their education at the medical schools in Rijeka, Osijek, or Split and then continued their studies at the Zagreb University School of Medicine. To be able to transfer to the Zagreb University School of Medicine, students from Osijek, Rijeka, or Split have to fulfill the criteria defined by the Transfer Policy and Procedures in the Statute of the Zagreb School of Medicine from 1991 (7). Upon the proposition by the School's Enrolment Commission, the School Council makes the decision on the transfer requests and the total number of transfer students. General conditions for transfer are as follows: (a) successfully completed previous academic years; (b) minimum average grade 3.5 (on a 2-5 scale, with 2 – sufficient and 5 – excellent); (c) a student should not have repeated any of the previous academic years; and (d) knowledge of Croatian language. If there are more candidates fulfilling these criteria, preference is given to those with better average grades.

Using the School's Student Registry we identified 83 students who transferred to Zagreb School of Medicine during the 1985-1994 period. The students had to fulfill the following criteria to be included in the study: transfer student had to begin his or her medical education in Rijeka, Osijek, or Split before transfer to the Zagreb School of Medicine at the second- or third-year level. We included only transfer students who graduated before September 10, 2003, when we commenced this study.

Fifty-seven transfer students (35 female and 22 male) fulfilled these criteria. Three transfer students were excluded from the study because they transferred at the fourth year. Ten students dropped out of school. Five students were excluded because they did not graduate until the time of the study and we were unable to analyze all their grades. Data for three students were incomplete. We also excluded five students from the list of transfer students because they passed the admission test in Osijek but started their first year in Zagreb.

Control group was formed from the students fully enrolled in the Zagreb School of Medicine by selecting the first student whose name followed in alphabetical order after the name of each transfer student. They all fulfilled the inclusion criteria.

Methods

Students' academic performance was assessed by five parameters: grade average before transfer, grade average in the first year after transfer, total grade average after transfer, overall grade average, and duration of studies (8,9).

We compared the achievements of transfer students and students enrolled at the Zagreb School of Medicine from the beginning of their medical education. We also compared transfer students from each of the three schools, ie, Rijeka, Split, and Osijek School of Medicine. All examinations that carried a grade were analyzed. Considering the fact that the School's curriculum changed over the years and the fact that not all medical schools in Croatia have identical curriculum, we compared only the exam grades from courses with identical names. Thus, we analyzed students' academic performance in 31 courses. We calculated grade averages from the passing grades for each examination.

Students were compared by three more variables: sex, educational level of their parents, and time period in which they studied. We divided students into two groups regarding the educational status of their parents: the first group included students

whose parents completed high education (university or college) and the second group included students whose parents completed secondary schooling (high or vocational school) or had primary education only. We also divided students in groups with respect to the time period in which they studied: the period before the war (1985-1989) and during the war in Croatia (1990-1994).

We tried to find out whether transfer students had tried to enroll into Zagreb School of Medicine in the year before enrolling the schools in other three cities. Unfortunately, the data were not available for years 1985-1987, and we were able to check this parameter only for 38 transfer students and their controls.

Statistical Analysis

All statistical analyses were performed by using SPSS Version 11.5 for Windows (SPSS Inc, Chicago, IL, USA). Kolmogorov-Smirnov test was used to test the normality of distributions. Distributions of average grades for transfer students and their controls did not statistically differ from normal; therefore, we used parametric statistics (Student t-test) to evaluate the differences between the two groups. The level of statistical significance was set at $p < 0.05$.

Nonparametric statistics was used for all other comparisons due to non-normality of distributions. We tested differences between students from Rijeka, Osijek, Split, and Zagreb using Kruskal-Wallis test and Mann-Whitney test as a post-hoc test. Mann-Whitney test was used for comparison of duration of studying. Chi-square test was used for analysis of differences in proportions of students from both groups who did not pass the admission test at the Zagreb School of Medicine in the year before final enrolment.

Results

Academic performance of transfer students was significantly poorer than that of the control group. The mean grade average of transfer students before transfer was significantly lower than the average grade of control students ($p = 0.03$), their mean grade average in the first year after transfer was also significantly lower than that of controls ($p = 0.04$), and their mean total grade average after transfer was 3.6 ± 0.5 compared with 4.0 ± 0.6 in the control group ($p < 0.001$; Table 1). The mean overall grade average of transfer students was also significantly lower than that of control students ($p < 0.001$; Table 1). However, it seems that it did not take longer for transfer students to graduate ($p = 0.375$; Table 1).

Transfer students' academic performance differed depending on the medical school from which they transferred. Students who transferred from Osijek had grade average of 2.9 ± 0.4 before transfer, which was significantly lower than that achieved by students from Split (3.5 ± 0.7 ; $p = 0.038$; Table 2).

There was no significant difference in academic performance between the transfer and control students when compared by sex, educational level of their parents, the duration of their studies, and the period in which they studied (data not shown).

Out of 38 transfer students enrolled in the 1988-1994 period, 15 had unsuccessfully attempted at enrolling into Zagreb School of Medicine in the year before enrolling to Rijeka, Osijek, or Split Schools of Medicine. Among their respective controls, only 4 students had tried and failed to enroll to the Zagreb School of Medicine in the year before enrolling into Zagreb School of Medicine (chi-square = 7.018, $df = 1$, $p = 0.009$).

Table 1. Academic performance of medical students who transferred to the Zagreb School of Medicine from Rijeka, Split, and Osijek medical schools at the second or third academic year and control students enrolled at the Zagreb medical school from the first year of their medical education*

Academic performance parameters (mean \pm SD) [†]	Medical students		p [‡]
	transfer (n = 57)	control (n = 57)	
Grade average before transfer	3.2 \pm 0.6	3.5 \pm 0.7	0.03
Grade average in the first year after transfer	3.2 \pm 0.6	3.5 \pm 0.7	0.04
Total grade average after transfer	3.6 \pm 0.5	4.0 \pm 0.6	<0.001
Overall grade average	3.5 \pm 0.5	3.9 \pm 0.6	<0.001
Duration of the studying (years; median, range)	7 (5-9)	6 (5-9)	0.375

*Medical schools had had a 5-year program until 1989, and 6-year program since 1990.

[†]Grade range from 2 (sufficient) to 5 (excellent).[‡]Student t-test.**Table 2.** Academic performance of 57 medical students who transferred to the Zagreb School of Medicine according to the medical school from which they transferred, and control students enrolled at the Zagreb medical school from the first year*

Academic performance parameters (mean \pm SD) [†]	Transfer-students			Zagreb students (n = 57)
	Rijeka (n = 19)	Split (n = 16)	Osijek (n = 22)	
Grade average before transfer	3.2 \pm 0.6	3.5 \pm 0.7	2.9 \pm 0.4 [‡]	3.5 \pm 0.7
Grade average in the first year after transfer	3.2 \pm 0.8	3.4 \pm 0.6	2.9 \pm 0.4 [§]	3.5 \pm 0.7
Total grade average after transfer	3.6 \pm 0.5	3.8 \pm 0.4	3.5 \pm 0.4 [§]	4.0 \pm 0.6
Overall grade average	3.5 \pm 0.5	3.7 \pm 0.4	3.3 \pm 0.4 [§]	3.9 \pm 0.6
Duration of the studying (years, mean \pm SD)	5.8 \pm 1.0	5.9 \pm 1.1	5.4 \pm 0.7	6.5 \pm 1.0

*Medical schools had had a 5-year program until 1989, and 6-year program since 1990.

[†]Grade range from 2 (sufficient) to 5 (excellent).[‡]Significantly different from Split (p=0.038) and Zagreb (p=0.001); Kruskal-Wallis test and post-hoc Mann-Whitney test.[§]Significantly different from Zagreb (p<0.006); Kruskal-Wallis test and post-hoc Mann-Whitney test.^{||}Significantly different from Rijeka (p=0.028) and Osijek (p<0.001). Kruskal-Wallis test and post-hoc Mann-Whitney test.

Discussion

Our study showed that transfer students had poorer academic performance than their peers who passed the admission test and began their medical education at the Zagreb School of Medicine from the first year. This can be ascribed to several factors. The Zagreb School of Medicine is the oldest and the largest medical school in Croatia and the competition for enrollment is greater than at other medical schools. Although the relative competition in Zagreb is greater only than that in Rijeka (proportion of enrolled students vs applicants in Zagreb is 1:2.7, in Split 1:2.7, in Osijek 1:2.5 and in Rijeka 1:1.9), the absolute number of applicants in Zagreb was larger than the number of all applicants in Rijeka, Osijek, and Split together (the average number of applicants for 1988-1994 period was 744 vs 483, respectively). It is probable that transfer students, unable to enroll at the Zagreb School of Medicine, made a detour by enrolling to other Croatian medical schools and then transferring to Zagreb. Our finding that 15 out of 38 transfer students vs 4 out of 38 Zagreb students have failed to enroll directly to the Zagreb School of Medicine in the year before their final enrolment supports this statement. Indeed, according to Prka et al (10), students' rank on the admission test correlates with their later academic success. It is also possible that transfer students who had lower grade average before transfer maintained this trend after moving to Zagreb.

It is also possible that students' performance at the three schools is generally poorer than that of Zagreb students and that the students who transferred were not worse than the respective student populations in the three cities. We could not verify this as-

sumption because these data on the schools were not available.

Lower grades of transfer students cannot be explained by a possibility that they had problems related to the change of social environment, because there was no statistical difference between their grades before and in the first year after transfer.

Osijek and Split Medical Schools were branches of the Zagreb School of Medicine until 1998 and 1997, respectively. This means that the same teachers taught and examined students at these three sites. Considering that fact, we could not expect to find differences in academic performance between students from Zagreb, Osijek, and Split. Thus, the observed difference probably reflects the academic profile of the transfer students.

We did not find any difference in student academic performance between pre-war and war period. This finding contradicts that of Bergovec et al (11), who found that students' grades were worse during the war. However, since we analyzed a rather selected and small group of students, the findings of a larger study do not have to be reflected in our sample.

There was no difference in academic performance between male and female transfer students. Danić et al (12) showed that in academic years 1990/1991 and 2000/2001, men had significantly lower grades than women. This could also be explained with the fact that our sample was rather small.

We found that only transfer students from Split had grade average before transfer required by the transfer criteria of the Statute of the Zagreb School of Medicine, whereas transfer students from Osijek and Rijeka did not fulfill this criterion. This finding is in contradiction with Articles No. 7 and 8 of the Transfer

Policy and Procedures, which clearly state that students who do not fulfill all criteria for transfer do not have the right to transfer regardless of the number of applicants (13). We compared Transfer Policy 1991 with the Transfer Policy 2001 and discovered that criteria for transfer in 2001 were even more strict (grade average needed for transfer was 3.8 or higher). In any case, students must fulfill all these criteria to transfer. In the Article No. 6 of the Transfer Policy 2001, we found that Dean can suggest transfer of three students who have especially justified reasons for transfer. However, these reasons were not specified. This indicates that the prescribed criteria are not precise enough and probably not strictly followed. There is a possibility that during the war, due to war-related circumstances, more students, even those with lower grade averages, could have transferred. The fact that three students, who passed the admission test in Osijek in 1991, started their first year in Zagreb might support this assumption.

We investigated only students who transferred from Rijeka, Osijek, and Split to Zagreb School of Medicine, but not *vice versa*.

Although our study showed that transfer students are academically weaker than the control group, it did not explain all the reasons for transfer, which are obviously complex. Considering the fact that the transfer of students is only one aspect of cooperation between medical schools in Croatia, the Zagreb Medical School's transfer policy should be more precise and followed more strictly. We suggest further research that would describe transfer from Zagreb Medical School to other medical schools in Croatia and compare students' reasons for transfer in both directions.

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