Impact of a research mentorship program on the performance coefficient of Dentistry students

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ABSTRACT

This observational, case-control type study evaluated the impact of participation in a Research Mentorship Program (RMP) on the academic performance coefficient (PC) of undergraduates of a dentistry course. Students from a private higher education institution (HEI) located in Campinas (SP) were divided into two groups: case (CGs; who participated in the RMP between 2013 and 2016) and control (CTGs, enrolled students and/or graduates who met the inclusion criteria). The PC of the participants was calculated, considering the study hours of the subjects. Those of the CGs were based on the semesters prior to participation in the RMP and those taught concurrently or after first participation in the program. For the CTGs all semesters studied were considered. A total of 58 students were linked to the RMP, with 15.5% (9) in the 1st edition (2013-2014); 27.6% (16) in the 2nd (2014-2015); 29.3% (17) in the 3rd (2015-2016) and 27.6% (16) in the 4th edition (2016-2017). A total of 60 students were randomly selected for inclusion in the CTG. It was found that there was a significant increase in the calculated PCs of the CGs (p<0.0001, paired t test) from before (7.73 ± 0.49) to after the RMP (7.89 ± 0.46). CG students had a higher PC than students of the CTG (7.45 ± 0.56), both before and after their participation in the RMP (p<0.0001, one sample t-test)). It can be concluded that research mentorship stimulus through the establishing of academic programs makes a difference to the scholastic performance of the participants.

Descriptors: Educational Assessment. Research in Dentistry. Dentistry Students.

1 INTRODUCTION

The current challenge facing universities is to train individuals who, in addition to seeking knowledge, are able to use it in a rational manner. In this context, problem-solving activities become important tools in student training[1]. Requisites for a complete academic training include, in addition to teaching and extension course activities, concurrent participation in research activities[2], directly linked to the creation and mastery of knowledge[3], leading to the possibility of a career involving research,

whether in the academic environment or the productive sector[4].

From this perspective, the early insertion of the undergraduate student in a research mentorship (RM) program is a valuable tool to develop the desired qualities in the higher education professional[5], as well as stimulating and awakening a vocation for research[3,6,7]. This allows the early guiding of students towards post-graduate *stricto sensu*[8,9] studies with lower dropout rates [4].

Generally speaking, it is undeniable that research mentorship results in better training as competences that are not usually dealt with in the classroom are required; in addition to the fact that, to participate in such institutional programs, students must achieve and maintain satisfactory scholastic performance. Silva and Martins (2014)[10] confirmed this premise for chemistry students from a Brazilian federal public university, based on the evaluation of school records and interviews with former and current scholarship students from a RMP.

Scientific research provides students with closer integration with the institution and the course content, culminating in better academic performance and more comprehensive training. Souza and Marques (2011)[11], confirmed this relationship from the perception of undergraduates, as most of the Chemistry students who participated in RM programs said they had achieved a significant improvement in their academic performance. This finding was also verified in other studies that sought to identify students' perception of the four teaching and research areas of UNICAMP: the arts, the humanities and the biological and hard sciences, as well as the benefits of RM[12], and also identified a greater ability to work in the current job market[13].

Strategic decisions aimed at stimulating and developing scientific research are historically more rare in private institutions, with a greater frequency of such activities in public institutions[3]. More recent data indicate that private institutions accounted for less than 20% of the total number of papers presented at an Annual Meeting of the Brazilian Society of Dental Research (SBPqO)[14]. Massi and Queiroz (2010)[5] indicate that studies of RM activities in Brazil is incipient and, in addition, for students of Dentistry, the impact of RM on academic performance has not been previously evaluated, in terms of the measurement of the proposed academic indicator.

There is therefore a need to improve the current available knowledge. As such, the objective of the present study was to evaluate the impact of participation in a RMP in terms of the academic performance coefficient (PC) of undergraduate students in Dentistry.

2 METHODOLOGY

This observational case-control study was conducted according to the precepts determined by Resolution 422 dated 12/2012 of the National Health Council of the Ministry of Health and approved by the Research Ethics Committee, in accordance with CAAE 61651516.1.0000.5374.

The RMP of the Faculdade São Leopoldo Mandic was established in 2013 and classes that could enroll in the first four editions of the program were considered in the present study. The names of the enrolled students were obtained through the program secretariat, with nine participants from the 1st edition (2013-2014); 16 in the 2nd edition (2014-2015); 17 in the 3th edition (2015-2016) and 16 from the 4th edition (2016-2017). The first participation of the student in the RMP was considered for the composition and data collection of the case group (CG), resulting in a group composed of 58 students.

The control group (CTG) was selected

based on the list of 147 students enrolled on the Dentistry course who could participate in the selective processes for the referred editions of the RMP. A total of 91 students who participated, as authors of articles, in the Research Mentorship Seminar in any one of the editions from 2014 to 2017 were excluded, resulting in 89 students who could comprise the control group. From this total, by means of a random number table, students were drawn so that the ratio between groups remained at 1:1.

The documentary analysis consisted of the calculation of the PC, calculated by the weighted average of the grades obtained in each subject, with weighting based on the respective timetabled study hours of subjects. For the case group, the PC of the subjects studied before and after participation in the RMP was calculated. When there was participation in more than one edition of the RMP, the first participation in the RMP was considered as a cutoff

point for the calculation of the PCs. For students in the control group, the mean PC of all the semesters studied and completed up to data collection were considered.

The data were obtained and quantified in absolute and relative frequencies. To investigate whether there was difference in the PCs in the case group before and after the RMP, the paired t-test was used. To compare the PCs before and after the RMP with the PC of the control group, the one sample t-test was used. The tests were performed with the Bioestat 5.0 program

3 RESULTS

Table 1 shows the PCs calculated for the CGs before and after participation in the RMP, and describe a significant increase (p<0.0001).

The mean academic performance value of the CG students was always greater than that of those who comprised the CTG (table 2).

Table 1. Case group: Exploratory analysis of the performance coefficients before and after participating in the RMP

	Mean	SD	Minimum	Maximum	Median
PC before	7.73a	0.49	6.77	8.80	7.64
PC after	7.89b	0.46	7.03	8.89	7.83

Means followed by letters differ amongst each other based on the paired student t-test

Table 2. Comparison of PCs between case and control groups

Group		Performance Coefficient
Case	Before RMP	7.73*
	After RMP	7.89*
Control	Mean	7.45
	SD	0.56
	Minimum	6.10
	Maximum	8.21
	Median	0.56

Case group means marked with * differ from control (p<0.0001; one sample t-test)

4 DISCUSSION

Participating in RM during undergraduate studies contributes to the training of competent professionals and should be valued by higher education institutions (HEI), forming part of a complete and critical professional training[2,5,10]. The present study found that students enrolled in the RMP exhibited an improvement in academic performance, both in relation to individual performance, which improved after the program, and in relation to students from the control group, whose PC was always lower than that of the case group. This result confirms the findings of the study by Chisini *et al*. (2017)[2], which stated that the possibility of taking part in RM programs is one of the key opportunities that HEI can offer to their students in terms of integration into the academic environment and suggests that the creation of institutional programs offers a genuine academic advantage.

The literature consulted does not present recent data on scientific production based on the category of the institution, although it has been reported that such production is more common in public institutions[3]. The Report of the Center for Management and Strategic Studies, however, points out that there are also private institutions focused and committed to this activity[4].

In the IES of the present study, the RMP was established in 2013 with the objective of stimulating a scientific vocation and encouraging new talents among undergraduate students, with incentivizing scientific and technical research an essential part of its mission. Along these lines, in addition to the four annual institutional reserved places of the Institutional Scholarship Program of Research Mentorship of the National Council of Scientific and Technological Development (PIBIC/CNPq), the institution provides six additional institutional fellowships, so that more students can receive such financial aid. In addition, although the undergraduate course is relatively recent - the first class began in 2004 - the constant stimulation of research mentorships contributed to obtaining the support of public institutions such as the São Paulo State Research Support Foundation (FAPESP), as well as support from the private sector.

According to Pires (2009)[7], in 2016 a specific research invitation was issued for the monitoring of undergraduates and graduates of the RMP, including includes an extra reserved institutional place for the evaluation of the program, thus encouraging researchers to follow the professional practice of the undergraduates and graduates of the RMP. The present study formed part of the 1st research invitation and the profile traced by this and similar studies will allow the program to be improved and valued.

The main objective of the RM program is to introduce undergraduates to the world of scientific research[1]. This new environment requires skills which are not learnt in the classroom, such as testing techniques and hypotheses, searching for bibliographies and developing methodologies, so that the final result of this process culminates in an increase in knowledge and scholastic performance, as the need to obtain knowledge beyond the classroom and acquire skills such as time management and autonomy have a direct influence on the learning process[15,16]. The increase in the PC of the students identified following involvement in the program can be considered a reflection of the development and encouraging of these abilities.

In contrast, Silva and Martins (2014)[10], considering the fluctuations in individual performances observed in the initial period of the RM program of a federal HEI, discuss aspects related to the difficulty students experience in reconciling their studies with the phase of adaptation to the activities arising from the new responsibilities demanded by the RMP. Subsequent studies should consider the individual

aspects of the students participating in the RMP, since various types of difficulties can occur in the university context, ranging from the individual problems of the students as well as those related to the new academic requirements and environment, influencing the performance and the psychosocial development of the students[17].

In the same context, entering academic life marks the beginning of a stage filled with expectations, new responsibilities, commitments and the construction of a new identity[18]. Depending on the activities of the course, the academic environment influences each student differently [19] and the assimilation to this new world requires multiple adaptations influenced by the student's own characteristics, the opportunities offered by the institution and the academic performance of each student[20,21].

The improvement of the PC found in the present study can also be explained by the fact that the HEI of the study is a private institution that does not have social programs of scholarships or public financing. The students enrolled on its courses are classified, according to Brito *et al.* (2008)[22] as being of the "classic" type, as they belong to a privileged segment of society which seeks to maintain or improve its social status and has time to study, as well as by the age of the students, an intellectual background that transcends school materials, and the presence of family financial support and socially and culturally diversified activities which meet the academic requirements.

In the context of the present sample, the impacts verified remain short term. Future studies should investigate the impacts of RM in other domains and indicators related to the professional decisions that follow graduation.

5 CONCLUSION

Encouraging initiation into research through the establishing of mentorship programs contributed to improving the academic performance of dentistry students.

RESUMO
Política de estímulo à iniciação científica: impacto no coeficiente de rendimento de graduandos em Odontologia

O presente estudo observacional do tipo caso-controle avaliou o impacto da participação no Programa de Iniciação Científica (PIC) no coeficiente de rendimento (CR) acadêmico de graduandos em Odontologia. Alunos de uma instituição de ensino superior (IES) particular localizada em Campinas (SP) foram divididos em dois grupos: caso (GCs; vinculados ao PIC 2013 a 2016) e controle (GCt estudantes matriculados e/ou egressos que se enquadraram aos critérios de inclusão). Calculou-se o CR dos participantes, ponderado pela carga horária das disciplinas, sendo para o GCs: nos semestres anteriores à participação no PIC e nos semestres letivos cursados em concomitância ou posteriormente à 1ª participação no programa. Para o GCt, considerou-se o CR dos semestres cursados. Vincularam-se ao PIC 58 estudantes, sendo 15,5% (9) na 1ª edição (2013-2014); 27,6% (16) na 2ª (2014-2015); 29,3% (17) na 3ª (2015-2016) e 27,6% (16) na 4ª edição (2016-2017). Dentre os aptos a participar do GCt, sorteou-se 60 estudantes. Verificou-se que houve um aumento significativo (p<0,0001, teste t pareado) nos CRs calculados para GCs antes do PIC (7,73±0,49) e depois do PIC (7,89±0,46). Estudantes GCs tiveram CR mais alto do que aqueles do GCt (7,45±0,56), tanto previamente quanto após sua participação no PIC (p< 0,0001, teste t para uma média). Conclui-se que o estímulo à iniciação científica por meio da institucionalização de programas acadêmicos diferencia o rendimento escolar dos participantes.

Descritores: Avaliação Educacional. Pesquisa em Odontologia. Estudante de Odontologia.

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