Undergraduate research in medical education

Iniciação científica na graduação médica

Fábio Ferreira Amorim[1]*, Levy Aniceto Santana[1], Ingrid Lazo Toledo[1], Edvar Ferreira da Rocha Júnior[1], Cláudia Cardoso Gomes da Silva[1], Vanessa de Amorim Teixeira Balieiro[1], Karlo Jozefo Quadros de Almeida[1]

[1]Escola Superior de Ciências da Saúde, Brasília, DF, Brazil

Study conducted by Coordenação de Pós-Graduação e Extensão, Escola Superior de Ciências da Saúde, Brasília, DF, Brazil

Article received: 10/4/2017
Accepted for publication: 10/14/2017

***Correspondence:**
Coordenação de Pós-Graduação e Extensão, Escola Superior de Ciências da Saúde
Address: SMHN Quadra 03, conjunto A, Bloco 1
Brasília, DF – Brazil
Postal code: 71908-000
ffamorim@gmail.com

http://dx.doi.org/10.1590/1806-9282.63.12.1017

Constant updating of scientific health knowledge is a great challenge for medical students, and a small part of them choose to pursue their academic career as researchers. However, satisfactorily mastering the scientific method is essential to develop the competency of critical thinking to assess new knowledge and emerging health technologies. Thus, it is important that, during medical undergraduate training, strategies are developed to awaken the vocation of students to become critically capable of analyzing scientific and technological knowledge, in order to contribute to the development of the country.[1,2]

Training activities in scientific research have been included as an integral part of the medical education curriculum in several countries.[3-8] In Brazil, Scientific Initiation Programs (ScIPs) have been the main strategy adopted with the goal of encouraging the scientific training of students through their participation in research projects, awakening the scientific vocation and encouraging new talent for research. These programs are widely offered in Brazilian higher education institutions, especially after the creation of the Institutional Scholarship Program under the responsibility of the National Council for Scientific and Technological Development (PIBIC/CNPq) in 1988.[3-8]

Most of the studies on the impact of ScIPs on the students' academic trajectory assessed their admission and performance in graduate programs. In fact, it has been observed that students who work in scientific research projects during their undergraduate training are more likely to pursue their master's and doctorate degrees, finishing these programs faster and with better academic performance than students who did not participate in research activities during medical school. In addition, studies indicate that although ScIP alumni do not necessarily become researchers, they have demonstrated greater communication and leadership skills, as well as teamwork in their professional activities.[9-21]

The interest of students in scientific activities has increased in medical courses. A study carried out in sixth year students from six Brazilian medical schools showed that only 7% had no interest in research.[12] Also, studies in Brazil and in other countries have shown that the main reasons that lead to participation in ScIPs are to improve the curriculum, learn the scientific method and present research results in scientific meetings and journals.[3-6,11,22-27]

Advisor-advisee interaction seems to be one of the most valuable experiences provided by the ScIP.[8] Accessibility, referral by other students, and scientific knowledge are the most cited reasons for choosing an advisor. The first two factors are directly related to the student's perception of a possible positive relationship with the advisor, which shows the importance of this aspect for the success of scientific initiation projects.[6,23,24] Moreover, the lack of integration between advisor and advisee has been pointed out as the main factor associated with lack of motivation and withdrawal of students from scientific initiation activities.[6,23]

In addition, considering the important role that ScIPs have been playing in the Brazilian medical education, it is important to know the main factors that can restrict access, so that strategies to improve institutional ScIPs are developed. One of these factors refers to the lack of

spare time for research activities, which has been pointed out by students as the main difficulty in developing research projects.[6,22] In this context, some institutions have acted to make scientific initiation a curricular activity, so that the student can have fixed hours reserved to research projects.[6,8,11,28-30]

Finding advisors that meet the students' expectations has also been pointed out as a factor that restricts student access to scientific initiation activities, since, in order to participate in ScIPs, students must have an advisor developing research projects on topics of their interest. Limiting factors may be associated with other aspects, such as deficits in physical infrastructure, lack of financial resources, lack of student motivation and lack of motivation or lack of qualification of the teaching staff, and it is therefore important that institutions adopt measures to encourage faculty members to conduct research activities including undergraduate students.[2,6,8,31]

Conflict of interest

The authors declare no conflict of interest.

References

1. Bradley P, Nordheim L, De La Harpe D, Innvær S, Thompson C. Systematic review of qualitative literature on educational interventions for evidence-based practice. Learning in Health and Social Care. 2005; 4(2):89-109.
2. Burgoyne LN, O'Flynn S, Boylan GB. Undergraduate medical research: the student perspective. Med Educ Online. 2010; 15:5212.
3. van Eyk HJ, Hooiveld MH, Van Leeuwen TN, Van der Wurff BL, De Craen AJ, Dekker FW, et al. Scientific output of Dutch medical students. Med Teach. 2010; 32(3):231-5.
4. Detsky ME, Detsky AS. Encouraging medical students to do research and write papers. CMAJ. 2007; 176(12):1719-21.
5. Murdoch-Eaton D, Drewery S, Elton S, Emmerson C, Marshall M, Smith JA, et al. What do medical students understand by research and research skills? Identifying research opportunities within undergraduate projects. Med Teach. 2010; 32(3):e152-60.
6. Oliveira CC, de Souza RC, Abe EH, Silva Móz LE, de Carvalho LR, Domingues MA. Undergraduate research in medical education: a descriptive study of students' views. BMC Med Educ. 2014; 14:51.
7. Massi L, Queiroz SL. Studies on undergraduate research in Brazil: a review. Cad Pesqui. 2010; 40(139):173-97.
8. Tenório MP, Beraldi B. Iniciação científica no Brasil e nos cursos de medicina. Rev Assoc Med Bras. 2010; 56(4):375-93.
9. General Medical Council UK. Tomorrow's doctors: outcomes and standards for undergraduate medical education. London: The General Medical Council; 2009. Available from: https://www.gmc-uk.org/10a_annex_a.pdf_25398162.pdf
10. Scottish Deans Medical Education Group. The Scottish Doctor: learning outcomes for the medical undergraduate in Scotland: a foundation for competent and reflective practitioners. 3. ed. Edinburgh: Scottish Deans Medical Education Group, 2009.
11. Cardoso GP, Silva Junior CT, Carvalho Netto ALC, Touça AS, Mattos ACMT, Pacheco AB, et al. Dez anos de iniciação científica: o que aprendemos? Experiência da disciplina de iniciação cientifica do curso de medicina da UFF. Pulmão RJ. 2005; 14(2):131-6.
12. Nogueira MA, Canaan MG. Os "iniciados": os bolsistas de iniciação científica e suas trajetórias acadêmicas. Revista TOMO. 2009; 15(1):41-70.
13. Marcuschi L. Avaliação do Programa Institucional de Bolsas de Iniciação Científica (PIBIC) do CNPq e Propostas de ação [report]. Recife: Universidade Federal de Pernambuco; 1996.
14. Aragón VA, Martins CB, Velloso JR. O Programa Institucional de Bolsas de Iniciação Científica: PIBIC e sua relação com a formação de cientistas [report]. Brasília: Núcleo de Pesquisa sobre o Ensino Superior da Universidade de Brasília, Universidade de Brasília; 1999.
15. Neder RT. A iniciação científica como ação de Fomento do CNPq: o Programa Institucional de Bolsas de Iniciação Científica – PIBIC [dissertation]. Brasília: Centro de Desenvolvimento Sustentável, Universidade de Brasília; 2001.
16. Cabrero RC. Formação de pesquisadores na UFSCar e na área de educação científica do CNPq [thesis]. São Carlos: Centro de Educação e Ciências Humanas, Universidade Federal de São Carlos; 2007.
17. Pires RCM. Iniciação científica e avaliação na educação superior brasileira. REXE. 2007; 1:125-35.
18. Costa D, de Souza DG, Gil MSA, Jamami M, Correia MA, Aguilera F. Iniciação científica e pós-graduação: perfil do pós-graduando relacionado à sua iniciação científica. Educação Brasileira. 1999; 21(43):95-109.
19. Does research make better doctors? Lancet. 1993; 343(8879):1063-4.
20. Russell SH, Hancock MP, McCullough J. The pipeline. Benefits of undergraduate research experiences. Science. 2007; 316(5824):548-9.
21. Varki A, Rosenberg LE. Emerging opportunities and career paths for the young physician-scientist. Nat Med. 2002; 8:437-9.
22. Oliveira NA, Alves LA, Luz MR. Iniciação científica na graduação: o que diz o estudante de medicina? Rev Bras Educ Med. 2008; 32(3):309-14.
23. Hunskaar S, Breivik J, Siebke M, Tømmerås K, Figenschau K, Hansen JB. Evaluation of the medical student research programme in Norwegian medical schools. A survey of students and supervisors. BMC Med Educ. 2009; 9:43.
24. Bridi JCA. A iniciação científica na formação do universitário [dissertation]. Campinas: Faculdade de Educação, Universidade Estadual de Campinas; 2004.
25. Gonzalez C. Undergraduate research, graduate mentoring, and the university's mission. Science. 2001; 293(5535):1624-6.
26. Sarinho SW, Kovacs MH, Santos FGLP, Beltrão RCIC, Santiago RRS, Alencar AS. Perfil da produção de iniciação científica dos alunos de medicina na Universidade de Pernambuco. An Fac Med Univ Fed Pernamb. 2003; 48(2):106-10.
27. Vujaklija A, Hren D, Sambunjak D, Vodopivec I, Ivanis A, Marusić A, et al. Can teaching research methodology influence student's attitude toward science? Cohort study and nonrandomised trial in a single medical school. J Investig Med. 2010; 58(2):282-6.
28. Jaccobs CD, Cross PC. The value of medical student research: the experience at Stanford University School of Medicine. Med Educ. 1995; 29(5):342-6
29. de Crasto MCV, Neves DP, Pires MLE, Nascimento LP, Vieira LPV, Serafim EP. O ensino de iniciação científica no curso de graduação em medicina. Pulmão RJ. 2007; 16(1):12-620.
30. Cardoso GP, da Silva Junior CT, Carvalho Netto ALC, Touça AS, Brígido DC; de Mattos ACMT, et al. Visão geral de um programa de iniciação científica em medicina: uma experiência do curso de medicina da Universidade Federal Fluminense. Pulmão RJ. 2004; 13(3):174-81.
31. Cardoso GP, Cyrillo RJT, da Silva Júnior CT, Setúbal S, Velarde LGC, Bittencourt EM, et al. Características pessoais de alunos de um curso de graduação em Medicina participantes e não participantes de um programa de Iniciação Científica. Pulmão RJ. 2009; 18(1):19-22.