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RESEARCH ARTICLE

# Knowledge and engagement in research activities by medical students: challenges and new opportunities - an institutional survey.

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## ABSTRACT

**Objectives:** to describe participation and knowledge in research programs by medical students from Oswaldo Aranha University Center (Centro Universitário Fundação Osvaldo Aranha, UNIFOA).

**Methods**: it was applied a survey during 2nd Symposium on Clinical Research - focusing on oncology in the South of the State of Rio de Janeiro. The survey was answered by medical students from UNIFOA, encompassing socio-demographic variables, and clinical issues.

**Results**: 73 participants answered the survey, 64.4% (47/73) of them registered up to 3rd semester. Regarding participation in academic research project, 79.5% (67/73) didn't have any participation, more than fifty per cent 56.2% (41/73), tried to participate in a project, but only 23.3% (17/73) got success in this initiative. Concerning general knowledge in clinical research, 80.8% (59/73) affirmed not had any contact with theme up to moment in their graduation course. Questions evaluating knowledge in basic concepts, described that only 50.7% (37/73) of the students know the difference between basic and clinical research, and only 45.2% (33/73) know the steps of approval process involving medical procedures.

**Conclusion:** low engagement of medical students in research activities might explain the low rate of physicians working on this area. Their potential interest should be enabled by medical schools to increase qualified human resources which will accelerate Brazilian participation in clinical trials.

## Introduction

Significant increases in survival rates and disease control have been achieved in medicine in the past decades.[1] Research (basic and clinical) has been the driving force behind such achievements, and for decision-making across the whole spectrum of care, clinical research has been essential.[2] Moreover, Randomized Clinical Trials (RCTs) are the best strategy to modify clinical practice and improve outcomes.[3] Despite the importance of basic and clinical research as a driver for advances in medical care, Brazil, according to GlobalData, has only a 1.7% participation rate in Clinical Trials (CTs) worldwide.[4] One of the areas with the highest number of available clinical trials in Brazil is oncology[5], but even so participation is still much lower than expected, considering the ethnic-racial potential, high cancer incidence rates[6-7], and a large number of high-complexity cancer care units (Unidades de Alta Complexidade em Oncologia, UNACONs and Centros de Alta Complexidade em Oncologia, CACONs) installed throughout the country.[8]

Many barriers hinder Brazil's greater participation in clinical research in various medical specialties, including oncology, such as a scarcity of available clinical trials, long regulatory processes, and a lack of qualified human resources.[9-10] Although reports of participation in research are positive for most of the participants, and most physicians consider clinical research as a strategy of great importance in care[11], the lack of awareness among the Brazilian population about the benefits and lack of engagement by physicians are also issues limiting greater participation in clinical trials.

In oncology, recent data showed that two-thirds of oncologists associated with the Brazilian Society of Clinical Oncology (Sociedade Brasileira de Oncologia Clinica, SBOC) and the Latin American Cooperative Oncology Group (LACOG) invite less than 5% of their patients to participate in clinical trials, and one-third reported having invited less than 1% of their patients, despite agreeing that CTs represent a highly effective care strategy in oncology.[12] Physician engagement is crucial regarding CTs enrollment and recruitment. Thus, physicians must be prepared to work in this field and open to discussing clinical trials with their patients and other physicians. Their opinions often drive decisions and undoubtedly influence the patients and potential participants in clinical protocols; physicians also represent leadership in society, which can help raise greater awareness among the lay audience, clarifying potential biases regarding clinical research.

One of the factors that may impact physician engagement in clinical research is the opportunity to learn about the topic during medical education. Students who come across clinical research during their medical training can develop skills and interest in the area, and the understanding of Evidence-Based Medicine procedures[13]. However, opportunities for learning and training in research during medical education are assorted, ranging from optional or vacation programs to insertion at different levels in the curriculum in various medical schools in Brazil and worldwide. Therefore, greater emphasis on basic and clinical research in undergraduate education could mitigate issues related to physician engagement in this scenario.

Intending to describe levels of knowledge and interest in research among medical students in our region, we conducted a survey with questions focused on the topic. This study took place during the "2nd Symposium on Clinical Research - focusing on oncology in the South of the State of Rio de Janeiro," held at UNIFOA campus. During the symposium, we applied the questionnaire and subsequently conducted the analyses described below.

## Methodology

A cross-sectional study (survey) was conducted at UNIFOA in Volta Redonda, RJ, in March 2023. Data was collected through an anonymous questionnaire containing 22 questions covering sociodemographic, academic, and clinical research issues. The entire process was carried out during the "2nd Symposium on Clinical Research of the South of the State of Rio de Janeiro - focusing on oncology" after displaying a QR code that provided access to Google Forms, the platform used to present the questions. The study was completely voluntary, and confidentiality was observed at all times, as no personal information was recorded in the results of the research. Participation involved students who were at the symposium, mainly medical students from UNIFOA.

The first eight questions addressed participants' sociodemographic issues, previous undergraduate courses, and participation in scientific production. In the second part, six miscellaneous questions about academic research were asked, and finally, eight questions about clinical research.

The estimated time to complete the questionnaire was 10 minutes. Initially, there was a brief explanation of the research with the objectives, demographic, and ethical information. No financial incentive was offered to respondents. The ethics committee of Oswaldo Aranha Foundation (UNIFOA, Rio de Janeiro/Brazil) approved the study (Approval protocol number CAAE:.2.0000.5237) 67638623.

Qualitative data variables were expressed through percentage frequency and were related to each other.

## Results

Seventy-three students responded to the survey, of which 87.67% (64/73) were medical students. The median age was 22 years (ranging from 17 to 54). Most of the participants were female (63%; 46/73), did not have a degree in another undergraduate course (78%; 57/73), were from municipalities in the countryside of the state of Rio de Janeiro (95.89%; 70/73), and were enrolled up to the 3rd semester (64.4%; 47/73) - (Table 1). Regarding participation in academic research, 79.5% (58/73) of the audience had not participated in any projects, and 91.8% (67/73) had no publications in indexed medical journals.

Table 1 – Sociodemographic Characteristics

| Question | Responses | |
|---|---|---|
| Age | Median:22 | Min: 17 / Max: 54 |
| Gender | Female - N: 46 (63%) | Male – N: 27 (37%) |
| State of Origin | Rio de Janeiro - N: 70 (95,89%) | Others – N: 3 (4,1%) |
| Course | Medicine- N: 64 (87.7%) | Others- N: 9 (12.32%) |
| Period | 1st-3rd - N: 47 (64,38%) | 4th-12th - N: 47 (64,38%) |
| Have taken another undergraduate degree? | Yes - N: 16 (21,9%) | No - N: 57 (78,1%) |

Regarding general knowledge in research (basic and clinical areas), 80.8% (59/73) declared they were formally in contact with the subject at least one time during the course and 61.7% (45/73) were able to apply their concepts in other disciplines. Opportunities to participate in research projects were considered insufficient for 28.8% (21/73), 39.7% (29/73) had few opportunities, 19.2% (14/73) noted an abundance of opportunities and 12.3% (9/23) refrained from contributing due to unfamiliarity. (Figure 1).

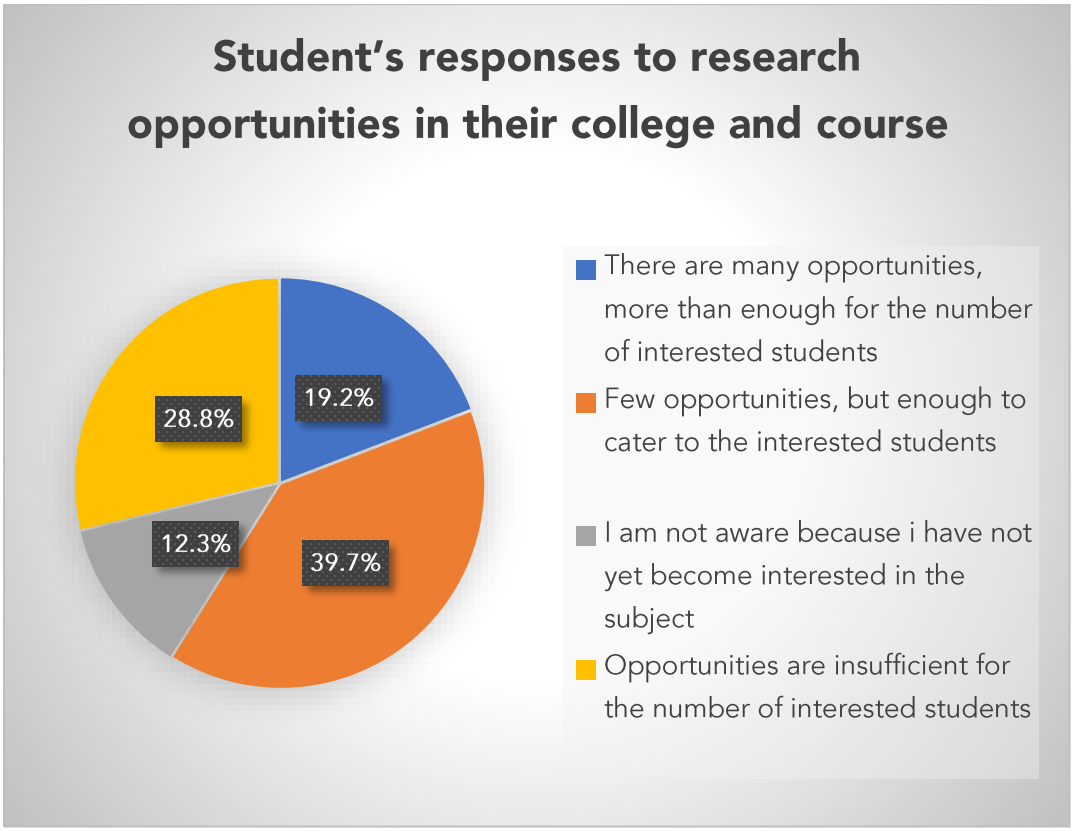


Figure 1: Student's responses to research opportunities in their college and course

Additionally, more than fifty percent (56.2%; 41/73) tried to participate in a project, but only 23.3% (17/73) succeeded. When asked about their motivation to participate in a research project, 26.0% (19/73) responded that it does not apply, because they are not yet interested in this area, but the main reason was the desire to have a publication on their resumé (23.3%; 17/73), followed by the desire to score at residency enrollment processes for residency (17.8%; 13/73), pursue an academic career (16.4%; 12/73), study a specific area (13.7%; 10/73), admiration for the professor leading that particular project (2.7%; 2/73), (Figure 2).

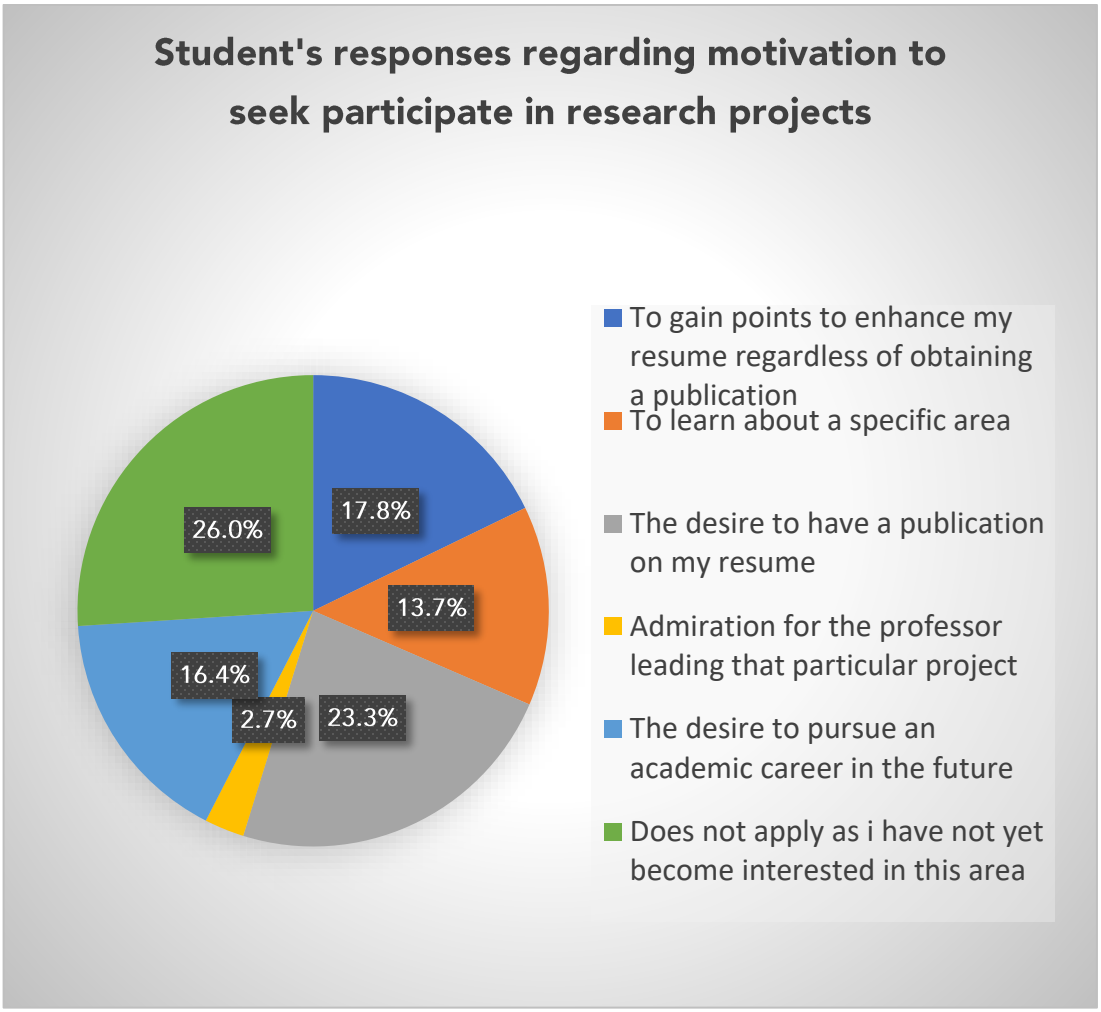


**Figure 2:** Student's responses regarding motivation to seek participate in research projects

Regarding contact and general knowledge about clinical research, 80.8% (59/73) said that they had not learned about the topic so far in their undergraduate course, although 69.9% (51/73) considered clinical research as a possibility for future jobs, even though 57.5% (42/73) reported being aware that clinical research is a relatively unexpressive area in Brazil, limited to opinion leaders. When asked about the benefits of clinical research, 84.9% (62/73) consider clinical research as a form of continuing education for physicians that will represent improvements in clinical practice, and 80.8% (59/73) believe it

represents a greater possibility of access to medical procedures for the general public. The questions assessing knowledge of basic concepts showed that only 50.7% (37/73) of students know the difference between basic and clinical research, and only 45.2% (33/73) know the necessary steps to demonstrate effectiveness and subsequent approval of new medical procedures.

## Discussion

A small percentage of undergraduate students of the medicine program at UNIFOA have shown interest in the clinical research symposium. Among the students interested, there was limited knowledge of basic concepts related to the topic and minimal engagement in the available projects. Out of the 720 students regularly enrolled in the course, including the 12 stages of undergraduate study, only 130 registered for the symposium, despite the extensive promotion through UNIFOA's internal channels and the involvement of two peer-led academic leagues. Only 73 out of the 130 students registered were present when the questionnaire was applied and answered the document, most of them representing students enrolled up to the third period (64.4% out of 73), indicating a growing lack of interest in the topic in the later years of undergraduate study. The median age of 22 years and the majority being at a university in their home state corroborate the predominant profile in the country.[14] It was also registered a significant percentage (22%) of students who had already completed another undergraduate degree, maybe due to the increased number of medical schools. After the implementation of the program by Brazilian government, to increase the number of physicians (Programa Mais Médicos) 13,624 new slots in medical courses were authorized in Brazil from 2013 to 2018, becoming medical education more affordable.[15]

Most respondents (60%) reported that there are research participation opportunities at UNIFOA to meet the expectations of the interested students. However, 80% have not participated in any project yet, and 92% do not have scientific publications. Furthermore, 12% reported being unaware of the availability of such projects because they lacked information. The questions in this section of the survey were focused on basic research projects or retrospective data analysis projects since UNIFOA has not directly involved in conducting CT, reflecting the limited access to clinical research in the country. Several experts mention the difficulty in qualifying the institutions they work for as one of the greatest obstacles to their work in this area.[12]

Medical undergraduate education represents an ideal moment for introducing training in clinical research.[16] According to the American Association of Medical Colleges (AAMC), 62% of medical students show interest in conducting research, and 60% consider access to research (both basic and clinical), as an important or very important issue when choosing a university.[17] This initial interest of the student may turn into future interest among medical professionals in pursuing careers in clinical research and becoming qualified to conduct CTs. The lower percentage of students engaged in research projects observed in this survey compared to American schools can be due to both the early stage of the respondents' course and the chronic underfunding of research in Latin

America. This latter factor has historically contributed to reduced participation in research activities in the region, which may explain the findings.[3,18.]

Training in research skills has also increased in American medical schools, with students reporting a percentage of participation in research with a faculty member of 70% in 2014 and 78% in 2018, demonstrating an awareness of the importance of participating in research as a training tool in medical schools.[16] The University of Hawaii, in partnership with the National Pacific Cancer Institute, described the experience gained with a comprehensive program, including clinical research in undergraduate education. Going from theoretical explanations to practice and clinical research, the undergraduate students' perceptions were recorded through surveys, before and after the implementation of this process. Results indicated that students consider it important to have this training during undergraduate studies. Increased confidence to engage in clinical research, as well as greater awareness and learning about the importance of expanding access to clinical research to deliver higher-quality care, were also reported.[18] Despite the growing global interest in research, the imbalance between physicians dedicated to patient care and researchers remains high. In oncology, for example, most specialists are interested in pursuing clinical practice, and the minority who declare themselves physician-researchers are burdened with obligations, including bureaucratic tasks, and lack time for research within hospitals.[20]

Indeed, analyzing questions asked by the AAMC, in 2018, approximately 90% of students answered that they agreed or strongly agreed that they had the skills to apply knowledge to evidence-based medicine (EBM) practice. This data reinforces the perception that having opportunities to learn about research during undergraduate studies, as the opportunities provided by these universities, also enhances necessary skills within medical practice. In this regard, the physicians feel more prepared to critically interpret the literature. The incorporation of research activities into medical school curriculum involves education in methodology, and subsequent critical evaluation of the literature, which would promote interest in both basic and clinical research as an academic career.[21] Early exposure to clinical research experiences, in subsequent stages of the course, could provide an opportunity to train medical students in using new procedures, making them practitioners of EBM. The incorporation of EBM practices remains a central aspect of decision-making processes, aiming to meet the needs for global and effective healthcare. Therefore, the introduction of subjects related to clinical research in the early years of education, could lead to the acquisition of skills for EBM practice and influence these professionals throughout their careers, minimizing errors and malpractice.[22-23.]

This educational environment can also help provide the necessary conditions for medical schools to broadly integrate clinical research, and such institutions would be in line with the proposal to build academic health centers (AHCs), which share research and clinical practice as a natural environment for applying EBM. The Ministry of Health, together with the Ministry of Science and Technology, launched the National Clinical Research Network in

teaching hospitals in 2005, aiming to achieve an institutional model of clinical research based on the best research practices, focused on the needs of the Unified Health System (Sistema Unico de Saúde, SUS) and to convert clinical research activities into benefits in professional training and technical-scientific qualification.[24]

Important examples of the implementation of clinical research into academic environments, helping to form and maintain the AHCs, are the universities of Coimbra, Stanford, and the School of Medicine of the University of São Paulo (Faculdade de Medicina da Universidade de São Paulo, FMUSP). FMUSP is integrated with a clinical hospital, forming the hospital complex (Complexo Hospitalar da Faculdade de Medicina da Universidade de São Paulo, HCFMUSP) located in the state of São Paulo. Since its implementation in 1944, HCFMUSP has been considered one of the most important AHCs in Brazil, promoting the dissemination of technical and scientific knowledge, as well as providing high-quality medical care to users.[25] Clinical Oncology is an area within FMUSP where clinical research has been implemented, as well as at the University of Coimbra and Stanford. The Cancer Institute of the State of São Paulo (Instituto do Câncer de São Paulo, ICESP) is one of the components of the HCFMUSP complex, responsible for training specialists in oncology and research, as well as providing high-quality care to cancer patients in the state.[26]

However, the implementation of programs, including research at all levels within medical schools faces competition with other needs, being the lack of time one of its limiting factors. Medical school guidelines prioritize practice opportunities, where the hospitals are an ideal scenario for practice, pedagogical innovations such as the implementation of active methodologies, and actions within the scope of social responsibility.[27] The introduction of skills in basic and clinical research has the power to strengthen such guidelines, representing practice and innovation, fostering actions with social responsibility as it may help expand access to clinical research for the Brazilian population. From 2023 onwards, UNIFOA is implementing a new curriculum, in which the internship period has been extended from 2 to 3 years, one of the facilitators of this action being the acquisition of a new hospital already accredited by the Ministry of Health for high complexity care in oncology, which in the long run, could lead to the construction of an AHC. In this new curriculum, there is also an encouragement to use active methodologies such as Teams Based Learning and Project Based Learning, in addition to curriculum-based research. Initiatives such as this symposium, have been supported by the institution and have represented a milestone in the awareness and promotion of students and teachers.

Even in this environment with a small percentage of research interest, 70% of students consider clinical research as an option for a future career. Half of the students are unaware of the difference between basic and clinical research; however, the majority of the respondents have very positive opinions about clinical research, associating it with the opportunity to deliver better quality care and access to new procedures for users of the public health system. Although the overall participation of adults in clinical research is around 5% to 8%, the experiences reported by the participants are positive.[28] The positive

feedback from research participants is possibly disseminated through social media targeted at the lay public, and the possibility that students have received information through these media, as well as learned stories of researchers with national or international leadership, are hypotheses that may have contributed to their responses.

The holding of the second edition of this symposium, and the opportunity to learn about students' opinions through the survey corroborates the initial impression that there is little engagement from students and educational institutions in research, which shows the low engagement of physicians in clinical research. Among the actions planned by UNIFOA are the continuation of the clinical research symposium, in its third edition in 2024, the implementation of the new curriculum, and the acquisition of a hospital with a well-established UNACON, which will be a practice environment for students and implementation of clinical research in an academic context.

## Conclusions

The low percentage of students from the UNIFOA medicine program who showed interest in the clinical research symposium, and the small percentage of students involved in projects within the institution, may contribute to insufficient engagement of physicians in clinical research in the future. Other factors such as low government investment, inadequate policies for healthcare professional remuneration, and slow regulatory process could also maintain the current scenario where Brazil plays a secondary role in conducting clinical trials. Students' potential and initial interests should be encouraged and enhanced in medical schools, allowing for the training of professionals with higher qualifications in research and better prepared for medical practice. UNIFOA has been implementing a new medical curriculum since 2023, with a greater emphasis on hospital practice directed by activities that promote the culture and knowledge of research. Such initiatives could lead to an increased number of doctors in the future with interest and qualifications to work in the field, which can help change the current scenario.

## Conflict of Interest Statement:

The other authors have no conflict of interest.

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