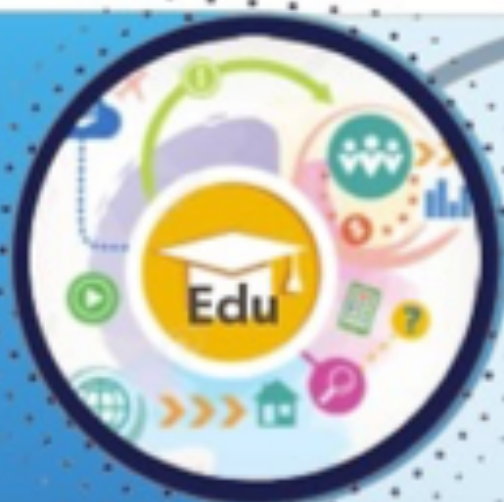


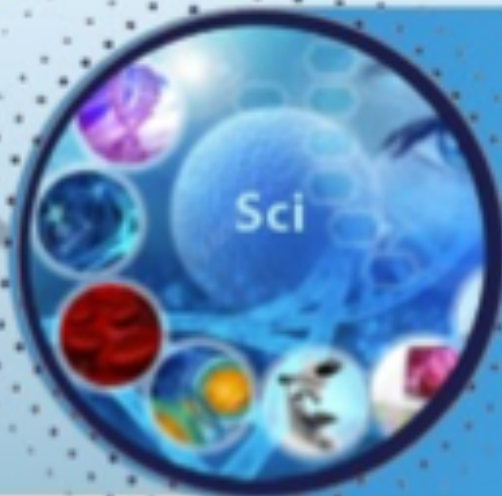


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A Scientific Career in Medicine Begins in Student Years

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ABSTRACT

In the context of modernization of the system of higher medical education in Uzbekistan, the formation of research motivation among students of medical universities is of particular relevance. The scientific activity of students at the early stages of training is not only a factor in deepening professional knowledge, but also the basis for sustainable personnel growth in the scientific and clinical fields. The article discusses the key aspects of the inclusion of students in research activities, analyzes the existing organizational forms - from student scientific circles to participation in scientific conferences and competitions. It is shown that the formation of scientific thinking and research competence in student years is an important link in the training of future doctoral students (PhD) and researchers. The main difficulties faced by young researchers are outlined, and ways to integrate the scientific component into the educational process are proposed. The need for institutional support for young people at all stages of the scientific trajectory, from students to doctoral studies, is emphasized.

Keywords: medical science, student scientific community, training of scientific personnel, PhD studies, research activity of students

INTRODUCTION

The development of science is a key condition for the progress of the healthcare system, and the staffing of the scientific sphere directly depends on the consistent training of researchers at all stages of professional development. In this regard, the formation of scientific thinking among students of medical universities, which are a potential reserve for future doctoral studies and academic medicine, is of particular importance. A scientific career, contrary to popular belief,

does not begin with a PhD degree, but is formed much earlier — in classrooms, laboratories, and student circles.

In the context of reforming higher education in the Republic of Uzbekistan, aimed at integrating with international standards and supporting scientific initiatives of young people, the issue of creating a favorable environment for the early inclusion of students in research activities is becoming more and more relevant. The modern paradigm of training a doctor re-

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quires not only clinical competence, but also the ability to think analytically, critically evaluate scientific information and participate in the creation of new knowledge. In this context, student science acquires the status of an important element of the educational process and becomes the first step towards the formation of full-fledged scientific personnel in medicine.

Despite the presence of some successful practices, the participation of students in scientific work in medical universities in Uzbekistan is often episodic and depends on personal initiative, and not on systemic support. The lack of sustainable mechanisms to support the scientific trajectory, limited access to research resources and weak integration with doctoral studies limit the opportunities for young people to realize their potential in the field of medical science.

The purpose of this article is to analyze the current state of student scientific activity in medical universities in Uzbekistan, to identify barriers and prospects on the way to the formation of young researchers, as well as to substantiate the need for institutionalization of scientific training, starting from the stage of basic medical education.

HISTORICAL AND ORGANIZATIONAL CONTEXT

The training of scientific medical personnel in Uzbekistan has a long-standing tradition, rooted in the system of post-war higher education, when scientific medicine developed within the framework of departments, clinical bases and specialized institutes. In recent decades, the Tashkent State Medical University, the largest educational and scientific center of the country, formed as a result of the merger of the Tashkent Medical Academy, the Tashkent State Dental Institute and the Tashkent State Pediatric Institute, has played a key role in this process.

The university has research laboratories, dissertation councils, student scientific circles, master's and doctoral studies PhD and DSc. The institution actively participates in the implementation of the state strategy for the development of science, medical technologies and training of scientific personnel, including integration into the international scientific and educational space.

With the transition to a multi-level system of training researchers based on the European model (PhD – DSc), the previous form of postgraduate studies was abolished in the Republic of Uzbekistan. Currently, young scientists go from basic higher education through master's and doctoral PhD studies, with subsequent possible continua-

tion of scientific activities in the form of DSc doctoral studies or competition. This approach allows you to build a systematic scientific career, starting from an early stage, provided that you have the appropriate scientific training and research skills acquired in your student years.

The formation of a scientific reserve of the medical industry is unthinkable without the active involvement of leading universities, among which Tashkent State Medical University occupies a priority position both in terms of the number of students involved in scientific activities and the number of defended dissertations and implemented scientific projects.

STUDENT MOTIVATION AND PARTICIPATION IN SCIENCE: A LAUNCHING PAD

The beginning of the scientific career of a future doctor is increasingly determined not after graduation, but during the period of study in junior and senior years. It is the student audience that is the first and most flexible target group capable of perceiving and mastering the research methodology in the presence of an appropriate educational environment, motivation and mentoring. Students' participation in science contributes to the development of clinical thinking, the formation of a culture of evidence-based medicine, and also lays the foundation for preparation for further studies in master's and doctoral studies.

In medical universities of Uzbekistan, the main structural mechanism of early scientific activity remains student scientific circles operating at the departments. As part of their activities, students master the skills of scientific analysis, preparation of presentations, compilation of theses and articles, participate in university, republican and international conferences. Of particular importance are thematic circles in priority areas — surgery, immunology, endocrinology, transfusiology — where it is possible to integrate theoretical knowledge with practical research and elements of scientific modeling.

A positive factor in recent years has been the growing interest in scientific activities among junior students. Early involvement of students in project and research work allows them to form not only a stable scientific motivation, but also basic skills of critical thinking, search and analysis of information, and work with sources. This, in turn, facilitates the transition to the next educational stages, especially in the context of competitive selection for master's and doctoral PhD programs.

Along with this, certain difficulties remain. In many cases, the scientific activity of students is optional and

depends on the personal initiative of the teacher or student. Access to research facilities, laboratory equipment, and biostatistical support is not always provided, which makes it difficult to conduct full-fledged scientific research. In addition, the lack of a system for recognizing and encouraging scientific activity at the level of a university or faculty reduces the motivational component.

Nevertheless, the accumulated experience shows that with organizational support, accessible infrastructure and clear continuity between the student, master's and doctoral levels, it is early involvement in scientific work that becomes the most important factor in a successful scientific career in medicine.

FROM MASTER'S DEGREE TO SCIENCE: FORMATION OF THE SCIENTIFIC CORE

Master's degree in the modern system of medical education in Uzbekistan plays a key role as a transitional stage between basic academic training and professional scientific activity. Unlike clinical residency, which is focused mainly on the development of practical skills, the master's degree creates conditions for the systematic development of the basics of scientific methodology, statistical data processing, project activities and publication activity.

The inclusion of a research component in master's programs allows not only to deepen knowledge in the chosen specialty, but also to form full-fledged scientific competencies in students: formulating hypotheses, choosing research methods, interpreting the results, formatting scientific articles and preparing presentations. It is in the master's program that students first master the principles of academic integrity, peer review and scientific citation, which makes this stage critically important for preparing for PhD studies.

However, the full realization of the potential of the master's program as an "incubator" of future researchers requires certain institutional conditions. In particular, it is necessary to provide access for undergraduates to modern laboratories, databases, biostatistics programs and academic scientific platforms. Also important is the mentoring system, in which the supervisor not only supervises the preparation of the dissertation, but also involves the undergraduate student in current departmental or interdisciplinary research, thereby ensuring involvement in the real scientific environment.

In many cases, the topics of master's theses are not developed in a broader research context, which complicates the formation of thematic scientific schools and leads to fragmentation of scientific training. Bridging

this gap is possible if there is a clear strategic line - from the formation of scientific interest in students to the completion of a large multi-stage research within the framework of PhD doctoral studies.

Thus, the master's degree can and should perform the function of a scientific nucleus, laying the foundations for academic maturity, scientific responsibility and the ability to independent research. Support for this link in the structure of training scientific and medical personnel is one of the key conditions for the sustainable development of science in the republic.

DIFFICULTIES AND CHALLENGES ON THE WAY OF A YOUNG SCIENTIST

Despite significant progress in institutionalizing the training of scientific personnel in Uzbekistan, the path of a young medical researcher is still fraught with a number of systemic and infrastructural barriers. These difficulties arise at different stages – from student initiative to writing a PhD dissertation – and often reduce motivation, complicate the implementation of scientific projects and hinder sustainable professional growth.

One of the main obstacles remains the limited material and technical base for conducting research. Many universities and research centers do not have full access to modern laboratory equipment, diagnostic platforms, licensed statistical and bibliographic programs, and international scientific databases. This not only narrows the opportunities for high-quality experimental and clinical-statistical work, but also deprives young scientists of an important resource — up-to-date scientific information.

The problem of scientific guidance is no less relevant. The lack of systematic training of scientific mentors, the overload of teachers, and the low personalization of the supervision of undergraduates and doctoral students often lead to a formal approach to scientific work. This hinders the formation of a scientific school, reduces the level of publication activity and complicates the continuity of topics and methodological approaches from students to doctoral studies.

Insufficient integration with the international scientific space also remains a problem. Although Uzbekistan is taking steps to support participation in international conferences and exchange programs, young researchers face language barriers, lack of funds for travel, and difficulties in publishing in foreign peer-reviewed journals. Limited access to indexed journals also hinders the full realization of scientific potential.

Finally, the problem of motivation should be noted. Against the background of limited career prospects in the scientific community, uncertainty about further employment after defending a dissertation, as well as the lack of clear incentives and mechanisms for material incentives, there is often a "leak" of promising young specialists from the scientific field to administrative or purely clinical practice.

Overcoming these barriers requires a systematic approach, including strengthening the scientific infrastructure, developing mentoring, active international integration and institutional recognition of the contribution of young people to the development of medical science.

OPPORTUNITIES AND PROSPECTS

Despite the existing difficulties, a favorable environment is being formed in Uzbekistan for the development of youth science, especially in the medical field. State policy in the field of education and science is increasingly focused on supporting young researchers, strengthening the role of universities as centers of scientific growth and integration into the international scientific and educational space.

One of the key factors opening up new opportunities is the development of the PhD system, which provides a clearly structured trajectory for the training of scientific personnel. The emergence of new requirements for scientific publication activity, mandatory participation in conferences, and the passage of research modules — all this creates conditions for the purposeful growth of young specialists. The possibility of moving from a master's degree to a PhD doctoral program within one research team contributes to the continuity of topics, the stability of scientific schools and higher research results.

State and external grant programs funded by the Ministry of Higher Education, Science and Innovation, as well as international funds, remain an important resource. The allocation of grants to support young scientists, the financing of scientific projects, internships and publications in foreign journals opens up access to wider opportunities, especially with the active participation of students and doctoral students themselves.

The digitalization of scientific infrastructure is also gaining momentum. Medical universities are introducing electronic platforms for submitting and reviewing student and master's papers, accessing scientific databases, and registering scientific events. This facilitates the involvement of students in the scientific process and makes it more transparent and manageable.

Support for international mobility deserves special attention. Exchange programs (Erasmus+, DAAD, Indian ITEC, etc.), joint research projects and online conferences allow young scientists of Uzbekistan to expand their horizons, establish contacts and take part in a global scientific discussion. All this contributes to the formation of a new generation of researchers who think on a global scale and are able to introduce modern scientific approaches into domestic medical practice.

Thus, with the systematic implementation of the already established initiatives and further institutional support, student and youth science in medicine can become not only a resource for personnel replenishment, but also an engine for the innovative development of healthcare in Uzbekistan.

CONCLUSION

A scientific career in medicine is not an episodic choice, but is formed as a progressive and interrelated process that begins in student years. It is during this period that the foundations of research thinking are laid, the first skills of critical analysis, public presentation of results and participation in academic discussion are formed. Student science is not an optional addition to education, but a strategically important element in the training of future masters, doctoral students and scientific leaders in healthcare.

In the context of the transformation of the higher education system in Uzbekistan, with an emphasis on innovation and international integration, the active involvement of students in scientific activities is becoming one of the key conditions for the sustainable development of domestic medicine. At the same time, institutional efforts are needed to overcome infrastructure and personnel barriers, form a system of scientific mentoring, develop grant support and integrate student science into the structure of the university research environment.

The formation of the scientific potential of the future generation of doctors and researchers is not only an investment in the development of science, but also the most important component of the modernization of the national health care system. It is through the support of the student initiative that the path to modern, evidence-based and clinically oriented medicine of the future begins.

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**TIBBIYOTDA ILMIY KARERA TALABALIK
DAVRIDAN BOSHLANADI**

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**TOSHKENT DAVLAT TIBBIYOT UNIVERSITETI
ANNOTATSIYA**

O'zbekistonning oliy tibbiy ta'lim tizimi modernizatsiyalash sharoitida tibbiyot OTMlari talabalari orasida tadqiqotga bo'lgan motivatsiyani shakllantirish alohida dolzarblik kasb etmoqda. Ta'limning dastlabki bosqichlarida talabalar ilmiy faolligi nafaqat kasbiy bilimlarni chuqurlashtirish omili, balki ilmiy va klinik sohalarida barqaror kadrlar o'sishining asosi bo'lib xizmat qiladi. Ushbu maqolada talabalarning ilmiy-tadqiqot faoliyatiga jalb etilishining asosiy jihatlari ko'rib chiqiladi, talabalar ilmiy to'garaklari, ilmiy konferensiyalar va tanlovlardagi ishtirofi kabi mavjud tashkiliy shakllar tahlil qilinadi. Talabalik davrida ilmiy fikrlash va tadqiqot kompetentligini shakllantirish kelajakdagi PhD darajasidagi doktorantlar va ilmiy xodimlarni tayyorlashda muhim bo'g'in hisoblanishi asoslanadi. Yangi tadqiqotchilar duch keladigan asosiy muammolar yoritiladi hamda ilmiy komponentani ta'lim jarayoniga integratsiya qilish yo'llari taklif etiladi. Ilmiy yo'nalishda harakatlanayotgan yoshlarni — talabalikdan doktoranturagacha bo'lgan bosqichlarda — institut darajasida qo'llab-quvvatlash zarurligi ta'kidlanadi.

Asosiy so'zlar: tibbiy fan, talabalarning ilmiy jamiyati, ilmiy kadrlar tayyorlash, PhD doktorantura, talabalar tadqiqot faoliyati

**НАУЧНАЯ КАРЬЕРА В МЕДИЦИНЕ
НАЧИНАЕТСЯ В СТУДЕНЧЕСКИЕ ГОДЫ**

БАЙМУРАДОВ Ш.А., ОХУНОВ А.О.

**ТАШКЕНТСКИЙ ГОСУДАРСТВЕННЫЙ
МЕДИЦИНСКИЙ УНИВЕРСИТЕТ**

АННОТАЦИЯ

В условиях модернизации системы высшего медицинского образования Узбекистана особую актуальность приобретает формирование исследовательской мотивации у студентов медицинских вузов. Научная активность обучающихся на ранних этапах обучения выступает не только фактором углубления профессиональных знаний, но и основой для устойчивого кадрового роста в научной и клинической сферах. В статье рассматриваются ключевые аспекты включения студентов в научно-исследовательскую деятельность, анализируются существующие организационные формы — от студенческих научных кружков до участия в научных конференциях и конкурсах. Показано, что формирование научного мышления и исследовательской компетентности в студенческие годы является важным звеном в подготовке будущих докторантов (PhD) и научных сотрудников. Обозначены основные трудности, с которыми сталкиваются молодые исследователи, а также предложены пути интеграции научной компоненты в образовательный процесс. Подчеркивается необходимость институциональной поддержки молодёжи на всех этапах научной траектории — от студенчества до докторантуры.

Ключевые слова: медицинская наука, студенческое научное сообщество, подготовка научных кадров, докторантура PhD, исследовательская деятельность студентов