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Special article

Research methodology workshop: recommendations of the student scientific group of the University of Medical Sciences of Cienfuegos

Taller de metodología de la investigación: recomendaciones del grupo científico estudiantil de la Universidad de Ciencias Médicas de Cienfuegos

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ABSTRACT

The scientific-investigative preparation plays a transcendental role in the training of future health professionals, hence the importance of conducting a systematic training workshop on research methodology. The aim of this article was to describe the preparation, organization and implementation of a research methodology workshop for medical students. Five topics were defined and taught by students and professionals with research accomplishments and experience. The development of practical sessions, led by professionals together with students with extensive experience, allowed the content to reach the students as easily as possible. The students' motivation for research and the use of good research practices prevailed.

Keywords: Health Sciences; Students; Research; Scientific Research and Technological Development; Qualitative research; Methodology.

RESUMEN

La preparación científico-investigativa juega un papel trascendental en la formación del futuro profesional de la salud, de ahí la importancia de la realización de un taller de formación sistemática en metodología de la investigación. El objetivo de este artículo fue describir la preparación, organización y puesta en práctica de un taller de metodología de la investigación para estudiantes de las ciencias médicas. Se definieron 5 temas impartidos por estudiantes y profesionales con resultados y experiencia en la investigación. El desarrollo de sesiones prácticas, guiadas por personal especializado, de conjunto con estudiantes de vasta experiencia, permitió que el contenido llegara al estudiante con la mayor facilidad posible. Primó la incentivación de las estudiantes por la investigación y el empleo de las buenas practicas investigativas.

Palabras clave: Ciencias de la Salud; Estudiantes; Investigación; Investigación Científica y Desarrollo Tecnológico; Investigación cualitativa; Metodología.

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INTRODUCTION

Scientific-research preparation plays a transcendental role in the formation of theoretical and practical skills in the future health professional. It requires the establishment of the student-university binomial for the consolidation of these skills, always complemented with the putting into practice of the knowledge acquired.

The research process begins with the formulation of a scientific question that leads to a search for information on the subject. The subsequent collection and analysis of the information allows the analysis of the content, information that is captured in a final report, which should be socialized[1]. The development of a research should be aimed at solving problems of social impact and based on intervention projects, thus achieving a better visualization and scope of the results.

Toala-Toala *et al.*[2] refers to the importance of undergraduate research training. Training in the field of scientific research begins when the student joins the university; in the particular case of the universities of medical sciences (UCM), it is projected as one of the curricular strategies to be developed. The first encounter is achieved through the subjects of Research Methodology and Biostatistics, included in the D and E curricula for undergraduate training[3,4].

As a whole, the main mission of the student scientific group (GCE) of each UCM is to promote and watch over the development and management of the scientific activity of the students[5]. This function is materialized through the development of student scientific conferences (JCE) and training and improvement courses in scientific research.

However, common and reiterative errors persist during the stages of the research process, both in the preparation of the final research report and during the editorial process, which have been pointed out by authors such as Hernández Vega *et al.*[6] and Molina-Gómez *et al.*[7]. For their part, Orellana-Fonseca *et al.*[8] state, among the main factors that justify these errors, the lack of knowledge of research methodology.

The authors of this research, from their trajectory as secretaries of teaching and research and presidents of the CCE of the UCM of Cienfuegos, consider necessary the periodic realization of courses and/or workshops on research methodology. It is of vital importance to direct the topics on the basis of the most innovative in terms of the scientific work of students, so the main deficiencies that are collected in the CCE and the literature on the subject should be taken into account.

This special article seeks to describe the preparation, organization and implementation of a research methodology workshop for medical science students.

DEVELOPMENT

Workshop organization

A qualitative research and documentary review was conducted on the conception and organization of the research methodology workshop for students of medical sciences, developed at the UCM of Cienfuegos from June 7 to July 7, 2022, for a total duration of 5 weeks.

The team of speakers was composed of professors and students with extensive research results; professional, teaching and scientific categories (in the case of professors); scientific trajectory, merits and recognitions achieved. Each proposal was evaluated by the Department of Science and Technological Innovation (DCIT).

The workshop was structured in 5 modules (given at a frequency of one per week). The topics were defined according to the results presented by research on production and/or student scientific activity[9,10,11,12], scientific writing, methodology applied to health sciences[13,14,15,16,17,18] and editorial management[19,20,21,22] and previous methodology courses. Once the modules and the topics to be developed in each one were defined, they were evaluated by the DCIT of UCM Cienfuegos.

Each session included a general introduction to the topic to be covered in each module. This introduction explained the purpose of the topic and its relationship with the previous content taught in the previous modules and sessions. Lectures and/or informative media prepared by the speakers were used; they were reviewed and validated by the DCIT, together with the institution's Methodological Department. Brainstorming techniques were used through discussions generated from the lectures and practical activities, in order to establish a theory-practice relationship.

For the final certification as workshop participants, a questionnaire structured in 2 sections was applied.

The ethical norms for research in Cuban health sciences and the principles of the II Declaration of Helsinki were complied with. The institution's ethics committee approved the study. The information was used for research purposes.

Workshop development

The research methodology workshop for medical science students was held for one academic month during the 2022 academic year.

The course was held twice a week (Tuesdays and Thursdays), except for module 4, which was held three times a week, at times that did not interfere with the students' teaching process. The day and time of the development of the activities were selected by the course participants.

In conjunction with the planned modules, 2 special modules (SM) were taught, covering various topics related to the stages of the research process (Table 1). The EMs were directed to a specific group of students: student members of the GCE and the editorial team of the Revista Científica Estudiantil (RCE) INMEDUSR. The rest of the students also participated.

Table 1. Modules and topics taught in the workshop

Modules	Topics
	Inauguration of the course
Module 1	Information search and management Databases. Boolean operators. Use of descriptors in health sciences.
Module 2	Types of studies. Verbs for the approach of the objective according to types of studies. Samples (sample size calculation, types of sampling: probabilistic and non-probabilistic, sampling techniques). Processing techniques according to types of studies. Data collection techniques and instruments
Module 3	Descriptive statistics Calculations and processing according to type of investigation Chi-square test (χ)2 Statistical significance tests Inferential statisticians Use of IBM SPSS statistical software
Module 4	Bibliographic reviews (historical works) Systematic reviews and meta-analyses Free subjects (original works and finished products) Case presentations
Special module 1	Organization of face-to-face scientific events Organization of virtual scientific events through the Centro de Convecciones en Salud (CENCOMED).
Module 5	Editorial management in scientific journals Plagiarism in scientific research (types of plagiarism and how to detect it) Types of articles published (methodology for the different types of articles) Peer review of articles (main errors found in the review according to type of articles) Editorial management in scientific student journals Types of articles published (methodology for the different types of articles) Peer review of articles (main errors found in the review according to type of articles) Student scientific journals in the health sciences
Special module 2	Use of the Open Journal System (OJS) for the management of online scientific journals.
	Closing of the workshop

There were a total of 11 speakers (6 professors and 5 students). In the selection of the professors, the teaching and research categories were taken into account (senior category of master and/or doctor of science, teaching category of assistant professor or full professor, and assistant researcher or full researcher category). Likewise, the professors were members of the scientific societies of Cienfuegos, directors of departments and/or heads of projects related to scientific activity. In the selection of the students, the scientific research trajectory was taken into account: teaching and research secretaries, presidents of UCM Cienfuegos CCE of previous courses (2018-2020 and 2021-2022) and directors of the RCE INMEDSUR.

Each module was developed in 2 working sessions. The first session was an introduction to the main topic to be covered in the module (through a lecture); they were given by professors and/or students depending on the complexity of the topic. In the second session it was proposed to apply the theoretical knowledge acquired in the first meeting or to give continuity to the topic.

For the final workshop certification, a questionnaire was administered on the topics taught, organized in 2 parts

(not including the EMs). The first part was structured in 5 multiple-choice and error selection questions. They were reviewed and evaluated by the course lecturers. A pass mark was considered for over 70 % of correct answers. The second part was aimed at measuring the participants' interest in scientific research and was structured in 7 items based on the Likert methodology[23].

Activities performed

In module 1, the first session was based on an initial and introductory lecture that covered aspects related to the analysis and processing and selection of bibliographic sources for a research project (Table 1). In the second meeting, a practical exercise was developed on the use of descriptors in health sciences in Spanish (DeSC) and English (MeSH) for the definition of terms or key words for research, their relationship based on *Boolean* operators, databases for the search of information (SciELO, PubMed, Scopus, Chocrane, Lilacs and others).

Module 2 dealt with topics related to methodology applied to health sciences (Table 1). The initial lecture was given in the first meeting. In the second meeting, we worked with different problem situations in which the participants, through brainstorming and group discussions, had to classify the study according to its type, define the universe and sample (sampling techniques), the possible variables to be analyzed and the statistical processing to be applied; in addition to the use of research methods published or presented in scientific events as examples, in conjunction with the book on research methodology in health sciences by Artiles Visbal *et al.*[24] .

Module 3 included activities (group dynamics and exchanges) with the objective of relating previous knowledge (especially types of studies) and the types of statistical processing that can be applied (descriptive, inferential, bibliometric, epidemiological, among others).

The development of module 4, referring to the types of articles, was mostly practical through the development of focus groups, brainstorming and group discussion. The speakers imparted knowledge on the basis of papers that can be presented at scientific conferences of the medical sciences.

The module on scientific publication (module 5) was developed on the basis of lectures that addressed the theoretical aspects of the subject, together with integrative discussions between the participants and the speaker.

At the end of each module, the invariant and important aspects of each topic were highlighted, as well as their practical usefulness.

Authors' assessment and recommendations

The conception and materialization of workshops on research methodology are necessary and still pending tasks to be developed by the different CGEs in each higher education center. Together with the curricular subjects, they allow the formation of research skills, and their main particularity is the realization in an environment according to the characteristics of the student, which facilitates the assimilation of the content.

Prior to the implementation of the workshop, it was necessary to conduct a documentary search on the basis of the main topics to be taught. In this sense, emphasis was placed on those investigations that stated errors or factors that influence scientific research from the undergraduate level. Others referring to characterization of scientific papers presented in events and/or methodological considerations to be taken into account in scientific writing were taken into account. These reasons justify the design of the topics to be taught and their distribution through the different modules that correspond to the stages that integrate the scientific research process. This disagrees with the methodology presented by Blanco Balbeito *et al.*[25], who designed a workshop on the results obtained from a survey applied to nursing students.

It is worth noting that the present research has a common starting point with the previously referenced one. The characteristics of the participating students are taken into account, which is evidenced by the selection of the speakers who give the workshop, as well as the activities developed in each of the modules. This is in agreement with the results presented by Matzumura-Kasano *et al.*[26].

According to the authors' criteria, it is important that there is a commensurate understanding between the parties involved. The use of contemporary mediators allows for a greater degree of empathy on the part of the students.

The development of practical activities in conjunction with the previous theoretical activities allows a consolidation of the content. In this sense, the student can infer the usefulness of the subject in question from the scientific practice. This model of execution is known as inverted learning. Matzumura-Kasano *et al.*[27] used it in order to achieve greater interest and improvements in the research methodology course they developed, and obtained satisfactory results with gradual ascents. This also agrees with the results presented by Espín Falcón *et al.*[28], and is an aspect that justifies the conception of practical activities in this workshop.

In general, according to the authors, research methodology workshops or courses should have three aims and/or objectives: 1) to teach topics of interest to students, 2) to carry out attractive activities, and 3) to carry out activities that promote a practical vision of the topics and easy assimilation of the contents. On the basis of these considerations, greater interest and participation in scientific research is achieved on the part of students in the health sector, and a better formation of men and women of science and conscience is generated.

In this regard, the authors recommend the following:

- To highlight the importance of the development of scientific thinking and research from the undergraduate level, through the stimulation of the student with its benefits for their professional life: acquisition of skills in assistance, greater ability to resolve situations, integrality, among others.
- The topics taught should be based on clear language, without relying on purely theoretical concepts and/or topics.
- Preferably, they should be taught by students with a mastery of the subject and a proven scientific background, with the advice of expert professors in the field.
- The practical usefulness of each content and how it is evidenced in scientific practice should be highlighted.
- Keep in mind and highlight the ethical aspects in each of the research processes. Emphasize their importance in the writing of the final research report in order to avoid undesired practices by the students.

CONCLUSIONS

The development of the research methodology workshop as part of the activities developed by the GCE of the UCM of Cienfuegos included in its conception topics of interest for the students. The realization of practical sessions, guided by specialized personnel, together with students of vast experience, allowed the establishment of a feedback binomial that propitiated that the content reached the student with the greatest possible ease for its assimilation. In its realization, the incentive of the students for scientific research and the use of good research practices prevailed.

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CONFLICT OF INTERESTS
The authors declare that they have no conflicts of interest.

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