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Original article

Level of knowledge about Medical Bioethics from the biomedical sciences in the Medicine degree

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SUMMARY

The quality of medical care, in its three dimensions—technical-professional, interpersonal, and environmental—offers a bioethical approach. In this sense, medical universities in Cuba work to fulfill this social mandate and introduce significant changes in the dynamics of the teaching-learning process for the medical degree. With the objective of determining the level of knowledge about Medical Bioethics from the perspective of basic biomedical sciences among students and faculty in the basic cycle of the medical degree, a qualitative action research study was conducted between January 2023 and January 2025 at the Celia Sánchez Manduley Faculty of Medical Sciences in Manzanillo. The study population consisted of first- and second-year students and professors of basic biomedical sciences, and the sample was selected

using a proportional representation of 30%. The variable "level of knowledge" was studied through surveys and evaluated using a Likert scale. The surveys showed no and partial knowledge among first- and second-year medical students, respectively. Among teachers, knowledge was sufficient but partial, which allowed for the identification of existing shortcomings.

Keywords: Teaching and learning process; Medical bioethics; Level of knowledge.

ABSTRACT

The quality of medical care, in its three dimensions—technical-professional, interpersonal, and environmental—offers a bioethical focus. In this sense, the medical university in Cuba works to fulfill its social mandate and introduces significant changes in the dynamics of the teaching-learning process for the Medical degree. With the objective of determining the level of knowledge on Medical Bioethics from the basic biomedical sciences in students and teachers during the basic cycle of the Medical degree, qualitative action research was conducted from January 2023 to January 2025 at the Celia Sánchez Manduley Faculty of Medical Sciences in Manzanillo, involving first- and second-year students and teachers of basic biomedical sciences, who constituted the study population. The sample was selected by proportional affixation of 30%. The variable level of knowledge was studied through surveys and evaluated using a Likert scale. The surveys revealed null and partial knowledge among first- and second-year Medical students, respectively. Among teachers, knowledge was sufficient and partial, which allowed the identification of existing deficiencies.

Keywords: Teaching-learning process; Medical bioethics; Level of knowledge.

SUMMARY

The quality of medical care, in its three dimensions - technical-professional, interpersonal and environmental - offers a bioethical approach. In this sense, the medical university in Cuba works to fulfill its social mandate and introduces significant changes in the dynamics of the teaching-learning process of the Medicine course. With

the objective of determining the level of knowledge on Medical Bioethics from the basic biomedical sciences in students and teachers of the basic cycle of the Medicine course, a qualitative research was carried out, such as research-type research, in the period from January 2023 to January 2025, at the Celia Sánchez Faculty of Medical Sciences Manduley de Manzanillo, with first and second year students and professors of basic biomedical sciences, who constitute the population of the study. The sample was selected by proportional affixation of 30%. At various levels of knowledge it was studied by means of questionnaires and evaluated by a Likert scale. The questionnaires will reveal null and partial knowledge to students of the first and second year of the Medicine course, respectively. For teachers, either knowledge was sufficient and partial, or it made it possible to reveal existing deficiencies.

Key words: Teaching-learning process; medical bioethics; Knowledge level.

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Introduction

The quality of medical care, in its three dimensions—technical-professional, interpersonal, and environmental—offers a bioethical approach, which constitutes the catalyst of the Cuban national health system. This system is structured by levels of care and organized through comprehensive medical care, including clinical, educational, and research aspects. It is worth noting that several medical universities internationally incorporate courses related to medical bioethics into their curricula. (1,2)

The medical university in Cuba, in accordance with international trends and demands, works to fulfill its social mandate, and in this sense, advocates for an integrated approach to content and the development of professional self-education skills, those linked to methods of thought, logical-intellectual, logical-dialectical, and ethical-humanistic skills, linked to bioethical principles and foundations, as required by the study plan. (3-7)

The integration of content is developed in each of the places where the teaching-care process occurs, so that significant changes have been introduced in the dynamics of the teaching-learning process (TLP) for the Medicine degree, related to a better transdisciplinary and interdisciplinary approach, the application of active methodologies, and the incorporation of students, from the beginning of the degree, into real work scenarios. (8-10)

In particular, the PEA of basic biomedical sciences, in the basic cycle of the Medicine degree, constitutes an inexhaustible opportunity to promote the integrality of the student, with this perspective, the systematic incorporation of Medical Bioethics is validated, from the contents of the biomedical sciences with basic-clinical significance, in the classrooms and in the scenarios where the student develops his activity, and provides knowledge that transcends the biological, in such a way that, they offer the development of convictions, values, and an integrative scientific foundation, however, it is valid to point out that deficiencies persist.(6)

It is noted that, although the relationship between education and instruction, and education in the workplace, constitute a fundamental premise of the training of medical professionals in Cuba, there is no comprehensive, theoretical-practical link on Medical Bioethics as a science that regulates human conduct in the field of life and health, from the biomedical sciences. (11, 12)

The level of knowledge about medical bioethics, in relation to its integration and application in the morphophysiological processes of basic-clinical significance from the biomedical sciences in the basic cycle of the Medicine degree, shows deficiencies, and this is confirmed by the diagnostic study carried out by the authors, through the surveys applied to first and second year students of the Medicine degree and professors of the basic biomedical sciences of the same degree.

The content of Medical Bioethics is not currently addressed within the framework of the basic biomedical sciences curricula. Therefore, the authors of this research emphasize the need to incorporate these topics into the curricula, a matter that remains unresolved. It is important to note that the ethical and humanistic orientation

of the objectives is present in the curricula of public health programs in general, and in medical programs in particular.

The deficiencies in knowledge about medical bioethics, from the basic biomedical sciences in the basic cycle of the Medicine degree, show the need to implement strategies that favor the integration from the morphophysiological contents of basic-clinical significance, for the comprehensive care of the individual, the family, the community and the environment.

The objective of this research is to determine the level of knowledge about medical bioethics from the basic biomedical sciences in students and teachers in the basic cycle of the Medicine degree.

Methods

A qualitative research study, of the action research type, was conducted at the Celia Sánchez Manduley Faculty of Medical Sciences, in Manzanillo, Granma, during the period between January 2023 and January 2025.

The universe consisted of the 445 first-year students and 387 second-year students of the Medicine degree, for a total of 832, and the 60 professors of the subjects of the basic cycle of the degree, 39 of Morphological Sciences and 21 of Physiological Sciences.

The teachers and students who were part of the sample were selected by stratified sampling, using a proportional affix method of 30%. The sample consisted of 134 first-year students and 116 second-year students, as well as 12 teachers of morphological sciences and 6 of physiological sciences.

Theoretical methods were used

Analytical synthetic: in the analysis of scientific literature, the precision of the theoretical assumptions that underpin the solution to the problem, as well as in the analysis and interpretation of the results obtained.

Historical-logical: for the study of the evolution over time, given by the stages that the teaching-learning process of basic biomedical sciences has gone through, and the relationship with the trends in the teaching of medical bioethics.

Inductive-deductive: in the characterization of the object and the field, to integrate the general and the particular in the analysis of the theoretical conceptions that constitute the foundations of the research and its concretization in the particular case of medical bioethics from the contents of the basic biomedical sciences.

Systemic-structural-functional: in the conception of the research.

Empirical methods

Survey: direct, standardized, with mixed questions, to students and teachers for the diagnosis of the current state of the level of knowledge and practical application on the foundations and principles of medical bioethics.

Statistics: Descriptive statistical techniques were applied to process the data obtained from the application of the diagnostic instruments, which were presented in tables with absolute frequencies and percentages.

Consent was requested from the participants, and a survey was administered to first and second year medical students who were receiving content related to basic biomedical sciences, and another survey was administered to professors of basic biomedical sciences in the basic cycle of the medical degree.

The authors initially assumed a gap or deficiency in bioethical skills in the early stages of basic education and defined the variables, dimensions, and indicators derived from the criterion.

The dichotomous nominal variable academic year (for students) referred to the year of study within the basic cycle, first or second year, of the Medicine degree.

It was represented in absolute numbers and percentages, the final sample is obtained by proportional affix of 30%.

The polytomous nominal variable, level of knowledge, refers to scientific information on a given topic; in this study, to determine the level of knowledge about medical bioethics in first and second year students, who receive the content corresponding to the basic biomedical sciences, and teachers who teach the basic biomedical sciences.

The level of knowledge was obtained through the application of the survey with five questions for students, and six for teachers, to which an individual score was given established by the authors, with the Likert Scale, R. (13), five categories were used:

Total knowledge (5), Sufficient knowledge (4), Partial knowledge (3), Insufficient knowledge (2), Null knowledge (1).

The final sum of the rating of each of the questions in the questionnaire gave a level of knowledge of the respondents; for this, a quantitative rating range was established.

For the student survey it was: Total knowledge: 20-25; Sufficient knowledge: 15-19; Partial knowledge: 10-14; Insufficient knowledge: 5-9; No knowledge: less than 5.

For the teacher survey it was: Total knowledge: 25-30; Sufficient knowledge: 20-24; Partial knowledge: 15-19; Insufficient knowledge: 10-14. No knowledge: less than 10.

The variable, teacher of basic biomedical sciences, nominal dichotomous, was defined as teachers of basic biomedical sciences, regardless of their teaching category, who specialized in morphological or physiological sciences, and taught the corresponding subjects.

Statistical processing

The procedures of descriptive statistics allowed the organization and classification of the results obtained in the measurement, revealing through them the level of knowledge of the students of the basic cycle on medical bioethics, in relation to the contents of the basic biomedical sciences, of basic clinical significance, susceptible to being integrated.

In addition, the combination with other methods and procedures was carried out, in the case of the scale, which allowed the assignment of numerical values to the questions of the surveys carried out, facilitating the conversion of qualitative data into quantitative data in order to be able to compare them and reach conclusions about the behavior of a criterion or assessment.

Ethical aspects

The research is conducted in accordance with the ethics of science, pedagogical ethics and the principles of medical bioethics, especially the informed consent of the subjects involved in the study, respect for the confidentiality of the data and the dignity of the persons.

The data were obtained personally by the authors and the current state regulations in the Republic of Cuba for conducting research involving people and communities were taken into account.

It was endorsed by the Scientific Council of the University of Medical Sciences of Granma and the Provincial Committee of Ethics in Research.

Results

Table 1 shows the number of students surveyed, 134 correspond to first year for 53.6% and 116 to second year for 46.4%, out of a total of 250 students representing 100% of those surveyed.

Table 1 Students surveyed by academic year

Academic year	Absolute frequencies	Percentage
1st year	134	53.6%
2nd year	116	46.4%
Total	250	100%

Table 2 shows the percentage results of the survey administered to students, based on a Likert scale with five categories. It can be seen that 51 first-year students (38.05%) have no knowledge of medical bioethics, while of the 116 second-year students, only 38 (32.5%) have no knowledge.

Second-year students show slightly better results in partial knowledge of medical bioethics, 37.06% compared to first-year students, 27.6%, although 32% only have partial knowledge.

Of the second-year students, 84, or 72.4%, correctly identified the bioethical principles.

It is noteworthy that 130 of the students, from the first and second year, for 52%, correctly identified the surveyed aspects regarding informed consent.

98% of the students, in both years, 245 in total, rated the information they receive on medical bioethics at their center of study as insufficient and the need to obtain knowledge on the subject.

Table 2 Basic general knowledge of the principles and foundations of Medical Bioethics in students of the basic cycle of the Medicine degree

Scale	Total knowledge		Sufficient knowledge		Partial knowledge		Insufficient knowledge		Zero knowledge		Total	
Academic year	No	%	No	%	No	%	No	%	No	%	No	%
1st year	0	0	3	2.23	37	27.6	43	32.08	51	38.05	134	53.6
2nd year	either	0	2	1.72	43	37.06	33	28.44	38	32.75	116	46.4
Total	0	0	5	2	80	32	76	30.04	89	35.6	250	100

Scale -CT-5, CS-4, CP -3 CI-2, CN-1

Assessment range. Full knowledge: 20-25; Sufficient knowledge: 15-19; Partial knowledge: 10-14; Insufficient knowledge: 5-9; No knowledge: less than 5.

Table 3 summarizes the results of the survey conducted among the professors of Basic Biomedical Sciences, all of whom were physicians. Of these, 12 (66.6%) specialized in Morphological Sciences and 6 (33.3%) in Physiological Sciences, out of a total of 18 professors, representing 100% of the sample.

Of the teachers surveyed, four hold the category of assistant professor; for 22.2%, while fourteen are assistants, for 77.7% and six are master of science, for 33.3%.

Table 3 Teachers surveyed. Department of Basic Biomedical Sciences

Teachers surveyed	Absolute frequencies	Percentage
Morphological Sciences	12	66.6%
Physiological Sciences	6	33.3%
Total	18	100%

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Table 4, which shows the results of the survey of basic science teachers on the level of knowledge in medical bioethics, shows that 50% of the teachers have total or sufficient knowledge about medical bioethics, of which 4 know sufficiently, and the same number have partial knowledge for 33.3% in each case.

For Physiological Sciences, the behavior is similar, 2 teachers possess sufficient knowledge, and the same number know partially, for 33.3%.

No teachers were found to have no knowledge. 55.5% of these teachers identified actions consistent with bioethical principles, while 7 of them, representing 38.8%, attributed the highest number of bioethical violations to secondary care.

Table 4 Knowledge of the principles and foundations of medical bioethics among teachers of basic biomedical sciences

Scale	Total knowledge		Sufficient knowledge		Partial knowledge		Insufficient knowledge		Zero knowledge		Total	
Basic Biomedical Sciences	No	%	No	%	No	%	No	%	No	%	No	%
Morphological Sciences	2	16.6	4	33.3	4	33.3	2	16.6	0	0	12	66.6
Physiological Sciences	1	16.6	2	33.3	2	33.3	1	16.6	0	0	6	33.3
Total	3	16.6	6	33.3	6	33.3	3	16.6	0	0	18	100

Scale -CT -5, CS-4, CP-3, CI-2, CN-1.

Rating range. Full knowledge: 25-30; Sufficient knowledge: 20-24; Partial knowledge: 15-19; Insufficient knowledge: 10-14. No knowledge: less than 10.

Discussion

Medical students are linked to on-the-job training in primary health care from the first year of their studies. Therefore, the purpose is to demonstrate the shortcomings in this area and to highlight the validity of basic biomedical sciences for an inexhaustible opportunity to integrate content and develop values, specifically in Medical Bioethics, which helps achieve the educational objectives set out in the medical degree program.

The results of the surveys applied to first and second year students who were taking the first three semesters of the basic cycle, in which they receive the content corresponding to the basic biomedical sciences, show that in the first year the worst epistemological situation was diagnosed, since, in the opinion of these authors, they do not yet present the necessary approach to the knowledge about the principles and foundations of medical bioethics, however, it is not a conclusive statement, even though in both years there is a significant percentage of zero knowledge.

The second-year students correctly identified the bioethical principles; however, they were unable to describe situations in which these principles were evident. This is understandable, as these students have already received some theoretical and fragmented foundations on Medical Bioethics in other subjects, such as Comprehensive General Medicine and Philosophy, and therefore are unable to put them into practice.

When referring to knowledge about informed consent, the authors of this work consider it useful to comment that it is a term that is often used interchangeably with other terms.employed by the population, given the practice of the procedure in situations related to medical assistance, so that encouraging results were obtained in this sense, however, in both years, the majority of students valued as insufficient the information they receive on medical bioethics at their center of study, an essential element when considering the urgent need to work in this sense.

From this perspective, the interest in acquiring knowledge on the subject is evident, which coincides with the studies of Amador, Milás and Cañizares (1-3), who consider it appropriate and motivating to develop strategies, plans and study guides that satisfy the need from the early years of the career, with an integrative approach, since the student faces work in education, frequent contact with the individual, the family, the

community and the environment, and thus puts it into practice at an international level.

The authors of this work consider it essential to achieve an academic balance between instruction and bioethics education in order to equip students with the desired skills in medical bioethics. In this regard, teachers play a vital role in the teaching-learning process; therefore, regarding the results obtained from the surveys administered to teachers of basic biomedical sciences, it is gratifying that no professor was found to have no knowledge of the subject.

The sources of information do not show significant differences; they are varied. What these authors note is that a group of the teachers surveyed, slightly less than half of the total number of respondents, whose age range is between 45 and 55 years, received the knowledge during their studies in Medicine, in the subject of Ethics and Medical Deontology, which provided essential foundations in that sense, but did not go beyond the theoretical presentation, which coincides with authors who assert about the value of implementing workshops, subjects, courses, diplomas and master's degrees.(6,11,14)

The results demonstrate the validity of including Medical Bioethics as a subject; however, they disagree with the authors of this research, who consider its incorporation for learning medical bioethics to be unproductive, given current trends in medical education internationally and in Cuba. They infer the importance of implementing strategies from the content of the subjects, and specifically from the biomedical sciences in the basic cycle of the medical degree, and then extending them to the rest of the disciplines, work-based learning, and subsequent academic years, as shown in the studies carried out by Milás, Cañizares, Ferrer, and García. (2, 3, 6, 11)

When asked about the location where they had observed the most ethical violations, basic science teachers surveyed answered hospitals. The authors of this work acknowledge that secondary care is under immense pressure, often due to organizational problems and misinterpretations of the importance and function of primary care. However, problems may also persist in values formation, a lack of knowledge of medical bioethics and the application of its principles, regardless of

working conditions. Studies by Ferrer, González, García, and Llorens concur with this reflection. (6,8,11,12)

According to Villalobos, Ceballos and collaborators (14,15), the teacher needs to constantly renew his level of knowledge, and at the same time, his human values and those specific to the profession; his own social example is essential to contribute decisively to the educational and instructional training of the students.

Bioethics has its own epistemological status, so it is assumed, and required, that the professor be able to teach from the clinical and legal perspective, from the philosophical foundation of ethics, and with the methodology and scope of bioethics, in a way appropriate to the cultural and social circumstances of his own context, in this case, Latin America and specifically Cuba.This is the argument put forward by Maldonado and Mendieta,[16,17]a position with which the authors of this work agree.

It is useful to clarify that, although bioethics respects the way of thinking and acting according to religions, states establish the legal regulatory framework and it is not because the ethical values are explained very well that the student will incorporate them rationally, an indirect action is needed, so that it is the student himself who will "discover" these values, the nuances they present in clinical action, the impacts of each of them on his own personal actions, and it coincides with the proposal of García and Llorens.(11,12)

The results show that teachers of basic biomedical sciences, in general, possess a certain level of knowledge; however, it is necessary to work more in this regard, from the methodological preparation of the basic subject itself; autonomously, or from postgraduate preparation.

The study revealed limitations among students in the first three semesters of medical school, related to their ability to integrate and apply medical bioethics knowledge to basic clinically significant morphophysiological processes; the process of health record management; the characterization of individual and collective health; the identification of environmental risk factors; the application of the scientific method through clinical and epidemiological methods; and the use of information and communication

technologies to benefit comprehensive care for the individual, family, community, and environment.

Conclusions

The study results show the level of knowledge regarding the principles and foundations of medical bioethics. First-year and second-year medical students, respectively, demonstrated either no knowledge or partial knowledge. Among faculty members, knowledge was sufficient but partial, revealing existing shortcomings that hinder the integration of bioethics content into the basic biomedical sciences curriculum of the medical degree program.

Recommendations

It is recommended to develop and implement a curricular strategy that contributes to raising the level of knowledge about medical bioethics in students and teachers of basic biomedical sciences, and that favors integration from the morphophysiological contents of basic-clinical significance, based on comprehensive care for the individual, the family, the community and the environment.

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Conflict of Interest

The authors declare no conflict of interest.

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