





The development of the professional skill of epidemiological risk analysis in the medical career**El desarrollo de la habilidad profesional análisis del riesgo epidemiológico en la carrera de Medicina****O desenvolvimento da competência profissional de análise de risco epidemiológico na carreira médica**

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ABSTRACT

Introduction: under the current socioeconomic and ecological conditions, the development of epidemiological risk analysis as a professional skill linked to the epidemiological method acquires special significance in Higher Medical Education during the training of general practitioners in the Medicine career. **Objective:** to determine the level of development of epidemiological risk analysis as a professional skill during the training of general practitioners in the Medicine career. **Method:** during the period November 2022-December 2024, a mixed descriptive research was carried out at the Universidad de Ciencias Médicas de Sancti Spíritus, Cuba, with the integration of theoretical, empirical and mathematical statistical methods aimed at solving the scientific problem: what is the level of development of epidemiological risk analysis as a professional skill during the training of general practitioners in the Medicine career. **Results:** the application of the methods allowed

the authors to understand the theoretical foundations for developing risk analysis as a professional skill in medical students and the need for its development during their training as general practitioners. **Conclusions:** the development of epidemiological risk analysis as a professional skill in medical students is an indispensable and urgent process. A teaching-learning process is required in line with educational and training changes since the guiding principle of Cuban Higher Medical Education: education on the job.

Keywords: teaching-learning; medical education; professional skill; epidemiological method; risk



RESUMEN

Introducción: en las actuales condiciones socioeconómicas y ecológicas el desarrollo del análisis del riesgo epidemiológico como habilidad profesional vinculada al método epidemiológico adquiere especial significación en la Educación Médica Superior durante la formación del médico general en la carrera de Medicina. **Objetivo:** determinar el nivel de desarrollo del análisis del riesgo epidemiológico como la habilidad profesional durante la formación del médico general en la carrera de Medicina. **Método:** durante el periodo de noviembre 2022-diciembre 2024, se realizó una investigación mixta de tipo descriptiva en la Universidad de Ciencias Médicas de Sancti Spíritus, Cuba, con la integración de métodos teóricos, empírico y estadísticos matemáticos orientada en la solución del problema científico: cuál es el nivel de desarrollo del análisis del riesgo epidemiológico como habilidad profesional durante la formación del médico general en la carrera de Medicina. **Resultados:** la aplicación de los métodos permitió a los autores el acercamiento a los fundamentos teóricos para el desarrollo del análisis del riesgo como habilidad profesional en los estudiantes de la carrera de Medicina y la necesidad de su desarrollo durante su formación como médicos generales. **Conclusiones:** el desarrollo del análisis del riesgo epidemiológico como habilidad profesional en los estudiantes de la carrera de Medicina es un proceso indispensable e inaplazable. Se precisa de un proceso de enseñanza-aprendizaje en correspondencia con los cambios educativos y formativos desde el principio rector de la Educación Médica Superior Cubana, la educación en el trabajo.

Palabras clave: enseñanza-aprendizaje; educación médica; habilidad profesional; método epidemiológico; riesgo

RESUMO

Introdução: nas atuais condições socioeconômicas e ecológicas, o desenvolvimento da análise de risco epidemiológico como uma habilidade profissional vinculada ao método epidemiológico adquire especial relevância na Educação Médica Superior durante a formação de médicos generalistas na carreira médica. **Objetivo:** determinar o nível de desenvolvimento da análise de risco epidemiológico como habilidade profissional durante a formação de médicos generalistas na carreira médica. **Método:** durante o período de novembro de 2022 a dezembro de 2024, foi realizada uma pesquisa descritiva mista na Universidade de Ciências Médicas de Sancti Spíritus, Cuba, com a integração de métodos estatísticos teóricos, empíricos e matemáticos, orientada à solução do problema científico: qual é o nível de desenvolvimento da análise de risco epidemiológico como habilidade profissional durante a formação de médicos generalistas na carreira de Medicina. **Resultados:** a aplicação dos métodos permitiu aos autores abordar os fundamentos teóricos para o desenvolvimento da análise de risco como habilidade profissional em estudantes de medicina e a necessidade do seu desenvolvimento durante a formação como médicos generalistas. **Conclusões:** o desenvolvimento da análise de risco epidemiológico como uma habilidade profissional entre estudantes de medicina é um processo essencial e urgente. É necessário um processo de ensino-aprendizagem alinhado às mudanças educacionais e formativas que têm sido o princípio norteador da Educação Médica Superior cubana: a formação no local de trabalho.

Palavras-chave: ensino aprendizagem; educação médica; habilidade profissional; método epidemiológico; risco

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INTRODUCTION

Global medical education is impacted by worldwide trends oriented to the quality of medical practice and physicians, respect for autonomy, safety, patients' rights and accepted quality standards.⁽¹⁾ As expressed in the Declaration of Malaga 2022; it is necessary to provide future physicians with the best possible scientific, professional and human training to be able to solve health problems, in the itinerary of health knowledge and training.⁽²⁾

These approaches constitute a combination of population and group comparison thinking, in a theory oriented and integrated towards etiology, epidemiological methods and rationality to evaluate the causal relationships of health, the combination of these factors leading to the analysis of epidemiological risk.⁽³⁾

Based on this reasoning, the student in the development of his future professional career should demonstrate cognitive, metacognitive and motivational skills and strategies that guarantee to be competitive in his field of study. It is recognized that the development of well-used skills allows students to perform better in their learning.

It is worth highlighting, then, the ability as the skill evidenced in the conscious execution of a general procedure, applied to a knowledge during the correct performance of an activity, which could be considered indicators to develop and evaluate a problem.^(4,5)

For competency-based training, the development of professional skills is essential, as it constitutes a manifestation of the satisfactory mastery of intellectual actions that guarantee success in the execution of teaching activities with medical practice from the profession.⁽⁶⁾

In this sense, epidemiological risk analysis is understood as a professional skill, determined in the graduate's profile and constitutes the starting point of the professional model.

For the authors of this research, it is pertinent and necessary to maintain that epidemiological risk analysis is a professional skill that general practitioners should possess for their competence in Primary Health Care. Its development during the formative process of medical students constitutes a powerful tool for the assessment and solution of health problems. The derived results influence the quality of integral medical care in the community.

Seen in another way, the current social demands on the Public Health sector require a highly prepared professional to make decisions in a timely manner in the face of a possible health event. The wellbeing of the target population will depend on this, as well as the immediate recovery of living conditions at the community level.

Therefore, it is a priority to develop skills in the training of the medical professional, through the guiding principle of Higher Medical Education in Cuba, education in community work, from a clinical epidemiological approach based on risk analysis as a skill.



Therefore, it is unavoidable to update, adapt and to depend on its contextualization and development to the current epidemiological and sanitary conditions, where an organized social response of the community is required. Then, it becomes of interest what has been investigated in the work of several authors on the development of professional skills in Higher Medical Education^(1,3,4,7,8,9,10) and, in particular, in the career of Medicine.

The preceding analysis exposed in the problematic, orients the research to the following objective: to determine the level of development of epidemiological risk analysis as a professional skill during the training of the general practitioner in the career of Medicine.

METHOD

A mixed research of descriptive type was carried out, contextualized in the Medical Sciences University of Sancti Spíritus, Cuba, in the period from November 2022 to December 2024.

The sample was selected from a universe of 167 fifth year students of the Medicine career (N = 167); due to the complexity of the study in the social field of education and the teaching-learning process of Higher Medical Education, a simple random probabilistic sampling was carried out.

The inclusion criteria were willingness to participate voluntarily, stay in the subject Public Health at the University Polyclinic "Juan Martínez Puente". Students who dropped out during the academic year were excluded. The final structure of the sample was of 33 students of the aforementioned career (n = 33).

The research integrated different theoretical and empirical methods such as: the historical-logical, the synthetic analytical, and the inductive-deductive during the bibliographic review, questionnaire, participative observation guide, pedagogical test and triangulation in the determination of the level of development of the skill; as well as, the potentialities and limitations in the teaching-learning process.

The qualitative evaluation and interpretation of the quantitative results was carried out by means of evaluation matrices, through value scales (0-34), (34-67) and (67-100) establishing three ranges (high, medium and low), used by Cardoso et al.⁽¹¹⁾ from the contribution of Campistrout and Rizo to a qualitatively measure the indicators of educational research; it was also applied the average index for each indicator belonging to the interval [0,100].

The research was structured according to the training model of Cuban Higher Medical Education, the students' performance was observed in the solution of practical problems, where it was necessary to know and implement the indicators drawn for the analysis of epidemiological risk as a professional skill during the education at work in Primary Health Care.

For the development of the research, the level of development of epidemiological risk analysis as a professional skill constituted the study variable, for which it was necessary to establish the following indicators:



- Understanding of the fundamental concepts of descriptive and analytical epidemiology
- Epidemiological reasoning through the formulation of research questions
- Interpretation and evaluation of epidemiological risk
- Determination of epidemiological causality in a health or disease problem in the community
- Ability to use statistical tools for the analysis of epidemiological data
- Interpretation of the results in a critical manner, with proposals for prevention and control actions based on logical thinking from the analysis performed.

The ethical considerations for the pedagogical research were analyzed, evaluated and approved by the Health Research Ethics Committee and the Technical Advisory Board of the Medical Sciences University of Sancti Spíritus. An Informed consent was obtained from the students through written certification of their willingness to participate individually.

RESULTS

The evaluation of the indicators in the instruments applied yielded the following results:

From the questionnaire, it was obtained that the indicators with lower average indexes were: interpretation and evaluation of epidemiological risk; determination of epidemiological causality in a health or disease problem in the community; ability to use statistical tools to analyze epidemiological data; interpretation of results in a critical manner.

The level of development of epidemiological risk analysis as a professional skill in the surveyed students was low. Fifty-nine percent (59%) of the students did not master the methodology.

Table 1 shows that in the pedagogical test applied, only 21% (n=7) of the students had a high evaluation, according to the scale interval applied.

Table 1: Results of the indicators evaluated to the students in the pedagogical test to diagnose the level of development of epidemiological risk analysis as a professional skill.

Rating scale	Frequency	Percentage	Valid Percentage	Cumulative Percentage
High	7	21	21	21
Medium	9	27	27	48
Low	17	52	52	100
Total	33	100	100	

Source: pedagogical test.

The observation made during the on-the-job education allowed identifying that for the methodological and technical approach to epidemiological risk analysis as a professional skill during the teaching-learning process, it is convenient to consider the stages of an epidemiological investigation.



With the information gathered during the research process, the authors determined the potentialities and limitations in the teaching-learning process for the development of epidemiological risk analysis as a professional skill.

Potentialities

- It is stated in the Plan of Study of the Medicine career, in its Methodological Orientations of education at work, the development of epidemiological method skills by the students.
- The structuring of the teaching-learning process from the guiding principle of Cuban medical education, education at work, favors the exchange of the student with the patient, the family and the community, under the supervision of the professor, allowing the linking of theoretical knowledge with practice.
- The development of practical work during comprehensive medical care in the community allows the student to raise the level of research, with a strong emphasis on the development of the study method, guiding the teacher in his methodological preparation towards the development of the necessary skills of the epidemiological method.

Limitations

- The students showed insufficiencies in the stages to be followed in the epidemiological investigation and subsequent risk analysis in the patient, family and community.
- The on-the-job education did not provoke enough group discussion and debate during the analysis of the results of the investigations in Primary Health Care, which limited the epidemiological risk analysis to the student's individual solution.

On-the-job education, it was shown that the methodological procedures used did not motivate the student for the independent search for knowledge and its practical application in the logical professional performance of the general practitioner; it is here where the fundamental approach of the research lies, when considering the essential character of the epidemiological risk analysis as a professional skill.

Based on the analysis that integral medical health care comprises the skills and knowledge that the general practitioner must apply in his professional performance, the analysis of risk from epidemiology acquires vital importance for the quality of the medical service.

The authors maintain that clinical epidemiological reasoning is a logical cognitive process integrated by a set of skills specific to the profession; therefore, epidemiological risk analysis is very useful for the identification of health needs. Through the quantification of statistical and analytical information of qualitative variables, it is possible to predict the severity of an event and guide decision-making and measures to intervene actively in the improvement of the reality detected.



DISCUSSION

In the research, it prevailed that the methodological procedures used do not motivate the student sufficiently for the independent search of knowledge and its practical application in the professional performance logic. When applying the survey to determine the level of development of the skill, 59 % (n=19) did not master the methodology. Of the 33 respondents: 29 students (87.8 %) recognized its importance from the education at work and their professional performance; it was emphasized that although they recognize its importance, they do not master the methodology for its application in the professional medical practice.

The pedagogical test showed that only 21% (n=7) of students had a high evaluation, while 27% (n=9) were medium and 52% (n=17) were low.

In addition to the questionnaire, the indicators with the lowest average indexes were: interpretation and evaluation of epidemiological risk (24.2), because 16 (48.4 %) performed it partially, 17 (51.5 %) did not perform it; determination of epidemiological causality in a health or disease problem in the community (24.2), because 16 (48.4 %). I need help 17 (51.5 %) did not determine causality; ability to use statistical tools to analyze epidemiological data (28.7) because 1 (3.0 %) used the tools, 17 (51.5 %) received help, 15 (45.4 %) did not show skill; and in analyzing data and interpreting their results critically (31.8) because, 3 (9.0 %) interpreted it critically, 21 (63.6 %) needed prompting, and 9 (27.2 %) did not perform analysis.

The triangulation applied to the information gathered made it possible to evaluate the level of skill development as low.

In the research conducted by Naranjo,⁽⁶⁾ he refers that in the activities of education at work, the formation of professional skills does not start from a previous diagnosis, he points out that teaching-learning takes place following a logic of knowledge and not of skill; therefore, the necessary stages and interdisciplinary relations are not taken into account.

In this sense, the study of Mora⁽⁷⁾ determined in his research that the students evidenced little knowledge and development of professional skills; in the link between theory and practice, insufficient integration of the knowledge of education activities at work is perceived; insecurity of the students in the identification of health problems; and the application of the epidemiological method and its procedure for the solution of community health.

In relation to the exposed problematic, Alvares⁽¹²⁾ is pointed out for the concordance of his research for the formation and development of professional skills through the epidemiological method as a teaching method in Higher Medical Education, and its usefulness in the analysis of the health situation, epidemiological surveillance, causal research and analysis of programs, services and technologies.



Leyva⁽⁸⁾ determines in his research that medical students should initially know the epidemiological method, from his study he considers that epidemiological skills are to diagnose the health-disease process of individuals, family and collectivities and to analyze the health situation at the first level of care.

Ruth⁽¹³⁾ states that the epidemiological method is a particular application of the scientific method, from the identification of a problem, disease or health phenomenon and the review of existing knowledge, a hypothesis and objectives are formulated, data are collected according to the pre-established research design and, once analyzed and interpreted, conclusions are obtained that allow modifying or adding new knowledge to the existing ones, starting a circular sequence or levels of organization for the achievement of an objective.

Thus, from the conception of analytical epidemiology and its teaching-learning method, it is possible to implement the new pedagogical model in the training process of Cuban Medical Education, with the linkage of research, social insertion, interdisciplinarity and transdisciplinarity of its practices and scientific subjects in, and through the strategies of Primary Health Care.⁽⁹⁾

Hanne⁽¹⁴⁾ in his study states that in education and the competence is understood as a set of interrelated knowledge, activities, values and skills that allow acting on some aspect of personal, social, natural or symbolic reality. In addition, involves reflection on the learning process itself; elements that transform the development of the skill into professional competence to work effectively in the health system, understanding the health-disease process from the health determinants.

Rivera et al.⁽¹⁰⁾ investigated the relationship between skills and professional competencies, considering that a skill should be oriented to the mode of professional performance (competence), taking into account the logic of the profession and science and its contribution to the solution of health problems; through the application of its epidemiological clinical methods it allows to diagnose, treat, rehabilitate, promote and prevent diseases.

Compello et al.⁽¹⁶⁾ in their study, observed that 50% of the students agreed that they are capable of developing skills during their performance in on-the-job education; only two students are capable of performing adequately in this activity. Thirty five percent (35.71 %) think that teachers adequately fulfill their functions in the process of on-the-job education.

From this information it was determined that the students show great insecurities due to the debt they have in the development of professional skills in previous subjects and the insufficient number of patients they have managed to attend. For these same reasons the teachers, when observing the inaccuracies they have, are afraid to leave them alone in the practical activity and this contributes to limit the student's independence.



CONCLUSIONS

Methodological difficulties are determined in the teaching-learning process from education at work for the independent search of knowledge and its practical application in the analysis of epidemiological risk.

The research demonstrates the need for pedagogical and didactic transformations in the organization and development of the teaching-learning process, leading to theoretical and practical proposals that enhance the formation of professional skills in students and, consequently, the development of epidemiological risk analysis as a professional skill in the career of Medicine.

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Conflicts of interest:

The authors declare that there are no conflicts of interest.

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