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Perception of academics from the Department of Medical Sciences of the Faculty of Medicine and Dentistry of the University of Antofagasta on the importance of formative research in medical education

Percepción de los académicos del Departamento de Ciencias Médicas de la Facultad de Medicina y Odontología de la Universidad de Antofagasta sobre la importancia de la investigación formativa en educación médica

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Summary: Formative research consists of the development of research skills in students. This implies the existence of a teacher who has the necessary skills in the area. The general objective of the research was to describe the perception of academics from the Department of Medical Sciences of the Faculty of Medicine and Dentistry of the University of Antofagasta about the importance of formative research in medical education. Descriptive and cross-sectional study that included 27 academics out of a total of 42 (64.2%). The questionnaire was structured in the following dimensions: formative research in medical education and teaching strategies; and activities related to formative research . T he response category "Very important" obtains the highest value (54%) in the statement that consulted about the Development of research skills in medical students during their undergraduate training. T he response category "Very important" registers the highest value in the statement that consulted about Discussion of clinical cases (79%). Academics value formative research, in accordance with the requirements of the National Accreditation Commission of Chile (CNA), recognizing the role of different milestones, actors involved and teaching strategies.

Keywords: teaching method; undergraduate medical education; students; teaching.

Resumen: La investigación formativa consiste en el desarrollo de habilidades de investigación en estudiantes. Ello implica la existencia de un docente que posea las competencias necesarias en el área. El objetivo general de la investigación fue describir la percepción de los académicos del Departamento de Ciencias Médicas de la Facultad de Medicina y Odontología de la Universidad de Antofagasta sobre la importancia de la investigación formativa en educación médica. Estudio descriptivo y transversal que incluyó a 27 académicos de un total de 42 (64,2%). El cuestionario se estructuró en las siguientes dimensiones: investigación formativa en educación médica y Estrategias de enseñanza; y actividades relacionadas con la investigación formativa. La categoría de respuesta "Muy importante", obtiene el valor más alto (54%) en la afirmación que consultó sobre el Desarrollo de habilidades de investigación en estudiantes de medicina durante su

formación de pregrado. La categoría de respuesta "Muy importante" registra el valor más alto en la afirmación que consultó sobre Discusión de casos clínicos (79%). Los académicos valoran la investigación formativa, concordando con las exigencias de la Comisión Nacional de Acreditación de Chile (CNA), reconociendo el papel de distintos hitos, actores involucrados y estrategias de enseñanza.

Palabras clave: método de enseñanza; educación médica de pregrado; estudiantes; docencia.

1. Introduction

Formative research consists of the development of research skills in students, which implies the existence of a teacher who has the necessary skills in the area, as well as the deployment of teaching strategies that enable said development. Therefore, it is a mutually beneficial activity: both academics and students contribute to the generation of scientific knowledge and/or the improvement of processes based on study results, thus contributing to the improvement of teaching processes.

In the debate on formative research, its pedagogical essence and its impact on the formation of investigative skills are recognized, which include dimensions associated with curricular processes and investigative training strategies, as well as the protagonists of the process (university community) and the conditions institutional. Likewise, it involves axes of intervention and articulation around: I) knowing-doing, practicing appropriately, organized behavior and proactive interaction; II) know-how, efficiently use investigative skills and abilities; and III) knowing-being, expressing attitudes prone to research (1). For the development of formative research, the teaching strategies and activities that are developed within the framework of the former are fundamental, which could constitute a clear opportunity to do research of this nature when the student has the fortune of a demanding advisor. and rigorous that truly fulfills the function of advising the research, that is, when it makes objective and constructive comments, when it forces segments to be reworked, to refine the conceptualization and argumentation and when it guides the comparison (2). The question of articulating research with professional training would also have a theoretically viable solution: it would try to incorporate into the curriculum content related to the research methods and problems specific to the disciplines that support professional knowledge (3).

In the training field of Health Sciences Careers, the graduate will probably not actually carry out research, however, they must have the ability to carry it out when necessary in their professional performance. It is necessary to reinforce the figure of a teacher who promotes scientific research, with communication skills being essential to positively influence students and encourage them to develop quality research (4). Formative research focuses on 3 principles. The first principle: the question, maintains that learning is the product of an active process of knowledge construction by the student. The second principle is teaching non-directivity. Through this principle, it is assumed that the teacher assumes a guiding role, an expert guide who accompanies and respects the different points of view of the students, thus causing autonomous learning in them. Finally, the third principle is related to inductive teaching. In the latter, it is understood that the teacher must promote interdisciplinarity in addressing research problems, since students must be able to articulate diverse knowledge (5).

In careers in the health field it is possible to identify subjects, teaching strategies and activities that would contribute to the development of research skills. These are conceived as all those skills that empower the student so that they can carry out quality research.

They are considered as a set of actions that regulate and guide the research process (5). However, there are strategies and activities in the teaching and learning process whose ultimate goal is not necessarily to generate quality research, but to bring the student closer to that. Due to the importance of training research, what the Chilean National Accreditation Commission (CNA) proposes regarding the quality of training processes and institutional accreditation must be taken into consideration. Said body defines that the university undertakes and develops research and/or innovation actions on its teaching experience that positively impact the training process, disciplinary and pedagogical, in accordance with the institutional project (6). Therefore, formative research can be developed directly or indirectly within the framework of the teaching-learning processes of the different subjects of the curriculum, which depends on the teaching strategies and activities proposed by the teacher(s).

On the other hand, it is interesting to know contributions that separate formative research from what is called investigative training, creating two different, although complementary, aspects of research. The first will be understood as that which implies joint work between teachers and students for the generation of knowledge, although from a less formal basis, incorporating the researcher facet as part of the teacher's role; while the second concept - research training - refers to content incorporated in subjects that consider specific teaching strategies, which lead to the formulation of research projects (7). An interesting aspect is the importance of soft skills in the development of formative research by students (8).

The general objective of this research was to describe the perception of academics from the Department of Medical Sciences of the Faculty of Medicine and Dentistry of the University of Antofagasta about the importance of formative research in medical education. The specific objectives consisted of investigating the perception of academics regarding the importance of the development of skills in formative research in medical students considering the following elements: teaching strategies; future professional performance; existence of scientific student groups; and skill development without necessarily considering the instances mentioned above; as well as investigate the perception regarding the importance of certain teaching strategies and activities in the development of formative research skills in medical students.

2. Methods

Descriptive and cross-sectional study that included 27 academics out of a total of 42, belonging to the Department of Medical Sciences of the Faculty of Medicine and Dentistry of the University of Antofagasta. The sample of academics was non-probabilistic for convenience and included all those who voluntarily responded to the questionnaire from the total number of academics from the regular staff of the Department of Medical Sciences. The inclusion criteria of the study were the following: Academics from the Department of Medical Sciences of the Faculty of Medicine and Dentistry of the University of Antofagasta, regardless of their profession, hierarchy and seniority in teaching. Teachers hired on an honorary basis were excluded, that is, those who only perform specific tasks.

The data collection technique was based on a questionnaire, validated in content by academic experts in university teaching and medical education. Regarding the data collection procedure, said instrument was created through the forms virtual platform and sent to the academics by email, contemplating informed consent. Since it was a questionnaire, there was no intervention by the research team when the teachers responded to the questionnaire, so it was a self-administered instrument. The questionnaire was structured in the following dimensions: formative research in medical education and

Teaching strategies and activities related to formative research. In both, the following Likert response scale was considered, which measured the following degrees of importance: Very Important, Important, Indifferent, Little Important and Not Important at all. The results were obtained automatically through the forms virtual platform, using descriptive statistics to identify trends or distributions. The study was carried out during the first half of 2023.

The research was approved by the Ethics and Scientific Research Committee of the University of Antofagasta.

3. Results

3.1 Degree of importance of phenomena in the teaching-learning process that enable the development of formative research

In this section, the total number of responses collected in the research was obtained (27 out of a total of 42, equivalent to 64.2% of the total academic staff of the Department of Medical Sciences). The percentage was obtained from the total responses received in relation to the number of teachers who responded to the online questionnaire sent. The results in Table 1 indicate that the responses are concentrated in the highest degrees of importance on the Likert scale ("Very Important" and "Important"). In the case of the first response category ("Very important"), the highest value is recorded in the statement that consulted about the Development of research skills in medical students during their undergraduate training (54%), while the lowest for the same category was recorded in the following statements: Use of teaching strategies in subjects that stimulate knowledge and development of research and Existence of scientific groups of students that allow the development of research skills, both with a 42%.

3.2 Degree of importance of the following teaching strategies and activities in generating research skills in medical students

In Table 2, a greater distribution of the results can be seen in the response categories of the different statements, if compared with those obtained in Table 1. In the case of the first response category ("Very important"), The highest value is recorded in the statement that consulted about *Discussion of clinical cases* (79%) , while the lowest for the same category were recorded in the following statements: Project-Based Learning (33%) and *Essay Preparation* (25%). The "Important" response category gets the highest mentions (54%) in the following statements: *More Service Learning* and *Project-Based Learning* . Furthermore, the statement *Preparation of Essays* obtains 46% in the "Important" response category. However, the latter, as an educational activity, obtains the highest percentage of indifference (21%). Finally, the response category "Not Important" obtains mentions for the first time in the study, although low (4%), in 5 of the 6 statements raised.

Table 1. Degree of importance of phenomena in the teaching-learning process (Not at all important: NI; Little Important: PI; Indifferent: I; Important: Imp; Very Important: MI).

	NI	PI	I	Imp	MI
Development of research skills in medical students during their undergraduate training	0%	8%	0%	38%	54%
Use of teaching strategies in subjects that stimulate knowledge and research development	0%	8%	0%	fifty%	42%
Utility of basic research skills for the professional performance of the doctor	4%	4%	0%	46%	46%
Existence of scientific groups of students that allow the develop-	0%	0%	8%	fifty%	42%

ment of research skills					

Table 2. Degree of importance of teaching strategies and activities in the generation of research skills in medical students (abbreviations as in table 1; PBL, problem-based learning).

	NI	**PI**	**I**	**Imp**	**MI**
PBL	4%	0%	17%	25%	54%
Learning plus service	4%	0%	4%	54%	38%
Discussion of clinical cases	4%	4%	4%	8%	79%
Participation in research as teaching assistants	4%	0%	13%	33%	fifty%
Preparation of Essays	4%	4%	21%	46%	25%
Project based learning	0%	0%	13%	54%	33%

4. Discussion

The discussion will be structured according to the dimensions measured in the information collection process, without prejudice to the integrated analyzes that arise. In addition, it will incorporate the following elements: studies carried out in the field of formative research related to this research; and significance, practical application of results and limitations.

The results concentrated their responses in the categories that refer to high degrees of importance ("Very Important" and "Important") when asked about the perception of the relevance of formative research in various areas and in relation to teaching and didactic strategies. that allow the generation of research skills in medical students.

Degree of importance of phenomena in the teaching-learning process that enable the development of formative research

The teachers of the Department of Medical Sciences positively value the pedagogical essence of formative research , which represents an incentive to agree with the requirements of the National Accreditation Commission of Chile (CNA) regarding the importance of involving students and teachers. in the generation of research that has an impact on the improvement of teaching and learning processes. This is confirmed by the high importance attributed to the role of scientific student groups in the development of investigative skills, a work that the University of Antofagasta's Medicine Department carries out in its academy, training students and promoting collaborative work with teachers. Along with the above, the incorporation of subjects and their teaching strategies in the degree curriculum have allowed students to become familiar with research topics, with teachers demonstrating greater importance to everything that allows an approach to scientific aspects. In the new study plan of the Degree, the subject of Epidemiology and Biostatistics is incorporated in two modalities: the first allows knowing the foundations of the research process, while the second involves the development of a scientific research protocol. However, given the results, it is advisable to socialize in academic faculty regarding the current use of teaching strategies in subjects to highlight formative research in order to increase the degree of valuation/importance on the part of other academics. On the other hand, although the scientific academy of the Career carries out powerful work, greater involvement of teachers in the activities it carries out is necessary, as well as the inclusion of students affiliated with said group in research projects that lead the academics, in order to demonstrate an improvement in the results of assessment/importance of this topic.

Degree of importance of teaching strategies and activities in the generation of research skills in medical students

The percentage of indifference obtained by the response category "Essay" is probably attributable to an unusual use in the field of health sciences, but in any case it allows the student to develop skills in searching and selecting information. when defending an idea in a written text, fundamental elements in the field of research. As for the highest results, they are obtained in teaching strategies such as "PBL (Problem-Based Learning) and "Discussion of clinical cases", which, according to the subject programs of the Medicine Degree, are the most used, especially in the subjects of the professional field of the curriculum and that precisely stimulate the search, selection and analysis of information.

The portfolio - instead of an essay - could be considered a more relevant strategy in the field of health sciences that would collect the student's educational experiences, for which they must deploy skills of synthesis, selection and analysis of information, the use of which could reinforce themselves in subjects of the study plan. Until now, it is used in the first year of the degree (introduction to Medicine subject). The same is true in the case of other strategies that appear with fewer mentions regarding ABP and discussion of clinical cases.

It should be noted that in the professional training subjects of the Medicine Course at the University of Antofagasta, including Epidemiology and Scientific Research I and II; Research Internship (both from the old curriculum defined in learning objectives); Epidemiology and Biostatistics: principles and practice; and Epidemiology and Biostatistics: application to research (both inserted in the new curriculum defined in competencies), teaching strategies were incorporated such as the formulation of preliminary research projects, mainly with an exploratory-descriptive design, which implies that students previously know aspects basics of the scientific method. Furthermore, within the old curriculum – which is currently in force, with progressive elimination – the Research Internship was created, while in the new curriculum its equivalent will be the Public Health Internship. Both boarding schools assume similar characteristics to the epidemiological subjects, with the difference that in these the students carry out field work, that is, the application of information collection instruments, which, due to issues of less time, they are not able to develop in the epidemiological subjects, where this phase is equivalent to a data collection proposal and also because the students handle very basic knowledge of research methodology in that phase of the curriculum. The above would reflect the fulfillment of what some authors have called investigative training, with a transversal approach in the curriculum. However, soft skills would also be deployed, although it would be necessary to explore how they are evaluated in the different subjects or even determine if they are aspects that are considered.

Service-learning, project-based learning, among others, could be incorporated into general training subjects of the curriculum, which would contribute to compliance with the socio-health aspects of the declared graduation profile, in addition to exercising basic skills in the field of research. , such as selection of information, presentation of results, diagnosis and identification of research or intervention problems.

Without prejudice to the above, if the results obtained in Tables 1 and 2 are compared, there is coherence, for example, when consulting on the " Use of teaching strategies in subjects that stimulate knowledge and development of research" and the different strategies consulted in Table 2.

On the other hand, the results obtained in both tables reflect a high importance attributed to formative research by academics; however, there needs to be greater coherence, since the development of research skills in students during the course is positively valued. undergraduate as well as its incorporation in projects directed by teachers, but even so, the role of scientific student groups registers minor mentions with respect to other response categories, which should be reversed in the short term if the importance of said group is highlighted. which is basically the breeding ground for future researchers.

Studies carried out in the field of formative research related to this research

The positive perception of teachers regarding the importance of generating research skills in students is reflected in a study carried out in a group of teachers from the Faculty of Medicine of the University of El Salvador (9), where they consulted about the action educational research training in a chair, where 46.6% stated that they did it "Always", with the response category "Sometimes" occupying second place in the mentions, although much further back, with 25.4%. On the other hand, the curricular importance of training in research was reflected when consulting about the teaching opinion of research competencies in the professions they train (in this case, in the field of health sciences). A majority 45.5% stated that it was an irreplaceable element in training; while 29.7% stated that it was desirable. Together, both percentages represented almost 85% of the total mentions. However, a paradox arises in this study, in that a significant portion of the respondents do not have research training, but nevertheless train students of health professions in this area. This is an aspect that could even be considered a first limitation of said research, where the perception of the relevance of formative research was delved into, but not the training/dedication of the academics surveyed to said tasks, which could be extrapolated to the present investigation.

Relevant information is also provided by a study carried out at the Juárez Autonomous University of Tabasco, Mexico (10), where students and teachers were surveyed who evaluated the institutional program called Summer of Scientific Research (VIC), in which they had participated. The results reflected that both actors have a positive assessment of formative research, which was reinforced precisely by said program, which facilitated interaction and collaboration between both groups. In fact, once this instance was concluded, the students said that academics are transcendental in their scientific training as well as in their extra-classroom training, constituting a motivating agent even to pursue postgraduate studies. These elements, if we extrapolate them, would contribute to strengthening the development of research skills in medical students during their undergraduate training, an aspect considered very important by the academics from the Department of Medical Sciences of the University of Antofagasta who were surveyed.

Significance, practical application of the results and limitations of the study

Regarding the meaning and practical application of the results, it is essential that the subjects of the curriculum of the Medical Career of the University of Antofagasta, Chile, both in the professional field and in comprehensive training, integrate a variety of teaching strategies that stimulate the search and critical analysis of information, through collaborative learning, where teachers assume the role of counselors, applying the principle of non-directive teaching. For this to be feasible, it is required that academics be trained in university teaching and scientific research and that, together with students, they be allowed to participate in Congresses and scientific conferences, instances in which emerging research works could be presented. product of the teaching and learning processes experienced in the different subjects.

Regarding the limitations of the study, it is necessary to determine which basic and professional subject programs include teaching strategies that stimulate formative research, evaluating their degree of importance and impact on the training process of medical students, in order to implement improvements. .

Also, we can point out the following limitations as limitations: lack of background such as years dedicated to teaching on the part of the respondents; previous training in medical education (which would allow at least estimating familiarization with the importance of formative research); consider as respondents only teachers hired in the Department of Medical Sciences and not on an honorary basis (the latter represent a large proportion). On the other hand, regarding the response scale of the instrument, it would be important not to consider the "Indifferent" category and only those that motivate the respondent to lean towards some degree of importance or little importance regarding the stated statement. Several of the above limitations could facilitate the crossing of variables.

5. Conclusions

- The challenge that inspired the development of the study was to know the importance attributed by academics to formative research in medical education. Considering the results, it is proposed to incorporate this topic in the training in teaching skills developed by the Medical Education Unit of the Department of Medical Sciences.
- Academics attribute a high degree of importance to formative research and recognize the role of different milestones and actors involved, as well as the teaching strategies that concretize formative research. However, those familiar with the field of health sciences education are the ones that obtain the highest mentions, so it is suggested to address the topic of formative research in other subjects - for example, general training -, through of essays, project-based learning and service learning.
- It is essential that the subjects of the Degree incorporate learning and didactics strategies that stimulate the search and critical analysis of information, contributing to the emergence of research ideas and the implementation of the scientific method.

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References

1. Cuadros L, González M, Mango P, Turpo O. Formative research at the university: meanings assigned by the Faculty of a Faculty of Education. *Education and Research, 2020, 46* , 1-19. https://www.scielo.br/j/ep/a/bvYGHxgCpxB8sKNNp6zd3sN/
2. Alatrista Gutiérrez M, De la Cruz Vargas, J. Formative research in medicine and health sciences. *Journal of the Faculty of Human Medicine 2017, 17 (3)* , 70–74. https://revistas.urp.edu.pe/index.php/RFMH/article/view/1070/6094
3. Parra Moreno C. Notes on formative research. *Education and Educators 2004, 7* , 57-77. https://educacionyeducadores.unisabana.edu.co/index.php/eye/article/view/549/642
4. Arista S, García N, Gómez I, Paca N, Valdez I. Formative research in the development of communication and investigative skills. *High Andean Research Magazine 2018, 20 (1)* , 125-136. http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S2313-29572018000100012
5. Valero Anco V. Formative research at the university. *Latin American Magazine Ogmios 2021 , 1 (1*), 7-8. https://idicap.com/ojs/index.php/ogmios/article/view/9/16
6. Soto Suazo M. Formative research. *Journal of Health and Medical Sciences 2022 , 8 (3)* , 139-140. https://revistas.uta.cl/pdf/5/00-editorial%2083.pdf
7. Campos Olazabal P. The importance of formative research as a learning strategy. *Educare et Comunicare Magazine 2020, 8 (1), 88* -94. https://revistas.usat.edu.pe/index.php/educare/article/view/397/1508
8. Costa Zamaniego C, Idrobo A, Ramón Salcedo I, Valle Vargas M. Soft skills in formative research for university students. *Latin American Journal of Social Sciences and Humanities 2022, 3 (2), 1201* -1219. https://dialnet.unirioja.es/servlet/articulo?codigo=9585482
9. Carnero Sánchez M, Mazariego Flores E. Research experience and perception of teachers at the Faculty of Medicine of the University of El Salvador . *Social Development Studies Magazine: Cuba and Latin America 2022, 10 (1),* 371-387. http://scielo.sld.cu/pdf/reds/v10n1/2308-0132-reds-10-01-e29.pdf
10. Medina Morales G. Perception of university teachers and students of early training in scientific research **.** *Investigative News in Education Magazine 2020 , 20 (3)* , 1 – 20. https://doi.org/10.15517/aie.v20i3.43674