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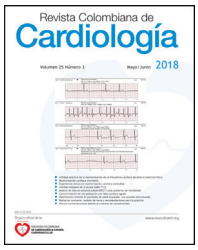

EDITORIAL

Research and innovation for health: Perspectives and commitments

Investigación e innovación para la salud: perspectivas y compromisos

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The need for all the results of academic and scientific processes to be recognized and published dates from the 17th century,[1] and has developed into a significant tendency. Today, publishing has become an indicator of a societyś development, resulting in this topic being marked by ideas related to productivity and competitiveness.

In the Latin American community[1] in particular, this information dissemination is measured according to the number of publications in scientific journals, especially those that are qualified and measured both nationally and internationally. The amount of collaboration on the publication and the number of times the article is cited are also taken into account.

This type of indicators has started to be used in conjunction with others such as the countryś gross national product and research investment index to assess the impact which scientific production could have on the countryś economic development. The foregoing justifies the review of some topics related to the measurement of scientific production in Colombia.

The first fact to be analyzed is related to the *Scimago Journal & Country Rank* assessment. This is a platform which in addition to offering a wide range of scientific journals, also provides various types of analysis and classification of countries, regions of the world and areas of knowledge with regard to document production.

According to this platform,[2] in 2017, Colombia was in fourth place in Latin America after Brazil, Chile and Mexico, respectively, with regard to its health professions document publication there, with 122 documents and an H index of 36. In that same year, Colombia was in fifth place for published documents in the medical field, with 2,957 articles and an H index of 185, after Brazil, Mexico, Argentina and Chile, respectively.

The national production in medicine obviously surpasses the ''general health'' production, giving it an edge over other similar areas. Likewise, the effort put forth in this regard by medical professionals and specialists, as well as institutions of higher learning, is evident, thus improving the country's international visibility.

Considering local measurement parameters, the latest Publindex classification of 2017[3] registered 246 journals classified as A1, A2, B and C, distributed among six areas: Medical and health sciences, Agricultural science, Social sciences, Humanities, Natural science, and Engineering and technology (Table 1).

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Table 1 Indexed journals in the Publindex classification, by areas. 2017.

Area	Number of journals	Percentage (%)
Social sciences	112	45.53
Humanities	39	15.85
Medical and health sciences	33	13.41
Engineering and technology	30	12.20
Natural science	18	7.32
Agricultural science	14	5.69
Total	246	100.00

The table shows how health and medicine are combined in the national classifications, while the *Scimago Journal & Country Rank* separates them. In addition, medical and health sciences place third in the number of journals registered and rated by Publindex. In this classification, out of 33 scientific journals indexed in medical and health sciences in 2017, none of them were classified as A1, two (6.06%) were classified as A2, 11 (33.33%) were in category B and 20 (60.61%) were category C, including the *Revista de la Sociedad Colombiana de Cardiología*.

This highlights one of the most important points to be addressed, since the knowledge area ''Medical and health sciences'' is 32.12 percentage points lower than ''Social sciences''. Also, given the number of opportunities for generating knowledge and stimulating its uptake, specifically in medicine, the opportunity to strengthen the areaś research groups and scientific journals is great.

This type of exercise is just one way to visualize scientific production, since over the last several years bibliometric assessments have begun to be developed aimed at analyzing this subject from a research perspective. An example of this is the article ''*La producción científica colombiana en SciELO: un análisis bibliométrico*'' [Colombian scientific production in SciELO: a bibliometric analysis],[4] which estimates that 61.5% of the articles published are related to universities. This same document,[4] states that between 2002 and 2013, most publications were produced after 2008, with the highest peak in 2012. However, of these documents, 77.74% have not been cited in other publications, and a large number of these productions only have Colombian authorship; that is, they do not have international collaboration.

From 2002 to 2013, the two journals with the most publications were *Biomédica* and *Revista de Salud Pública*, bearing in mind that this analysis included all the disciplines. In addition, 81.91% of Colombian production is published nationally, a figure which indicates how little scientific production is projected internationally.

Although several points could be highlighted in this article, the main emphasis is on the fact that more than half of the production of scientific articles is related to universities, relegating production recognized by or that should be generated by scientific societies, such as the *Sociedad Colombiana de Cardiología y Cirugía Cardiovascular*. This perspective does not imply that members of scientific societies are not generating scientific documents, but rather that these documents are developed within research groups affiliated with the universities in which they teach, and thus are published under the universityś name rather than in representation of the society to which they may belong.

Jara-Navarro,[1] however, gives an idea of a need which goes far beyond research for health, as he proposes that it is not enough to do research and publish its results. It is also necessary to invest effort and resources in the optimal use and uptake of these results. Based on this proposal, it becomes relevant to envision research not just as a means to divulge scientific production but rather as an area of knowledge in itself.

When considering the need to research and innovate in health care, the immense opportunity available to build interdisciplinary and interinstitutional teams[5] should be assessed, in order to achieve research and innovation results that will serve as a source of social and economic wealth.

Likewise, the pertinence of training healthcare professionals in research,[5] innovation and technology in undergraduate, graduate and continuing education settings is proposed. This would also include strengthening skills in a second language, preferably English, critical reading of scientific literature, and the ability to correctly apply and appropriate the information.

Accordingly, the ''*First Latin American Conference on Health Research and Innovation*'',[6] held in 2008, established some basic guidelines, the most noteworthy of which are set out below:

- Articulation of research and development through the joint work of both governmental and civil actors, as well as work on the training and education of human talent on these topics, emphasizing an education-research-action focus, not just a theoretical focus, in order to maintain these initiatives.
- The formation of interdisciplinary teams rather than just teams with technical and academic strengths in a single discipline, such as medicine. Also, the pursuit of international cooperation and the articulation of research with the productive sectors and work through networks.
- Healthcare challenges can be transformed into opportunities through technological and social innovations that are not necessarily expensive.
- A questioning of publishing as the traditional way to evaluate the results of research and innovation production.
- A proposal of the idea of innovation through discovery using basic research, the development of new and improved tools in preclinical and clinical aspects, and the distribution of products and results to the patients.

In 2011, the ''*Second Latin American Conference on Health Research and Innovation*'',[7] was held, in which some of the proposals made in the first version were complemented, highlighted as follows:

- Innovation does not necessarily mean high investment, but rather profitable, high impact solutions to health issues.
- The concepts of health research and research for health are separated. The first is related to biomedical research and the second to the application of any other area to health.
- There is a need to articulate research with health policies.

- It is essential to foster the training of young researchers in research and development.
- The importance of multidisciplinarity and multisectoriality, which are essential for the successful development of both research and innovation.

Innovation should be thought of not just as the development of new products, but also of new services or processes.

The foregoing shows how activities in Latin America are geared towards strengthening research and innovation but are not adequately and broadly disseminated. This keeps any proposal made in these scenarios from being implemented and applied in the daily practice of medical care workers.

Another way to look at the problem of the low awareness of international efforts in health research and innovation is the scant interest in understanding and participating in these initiatives, due to a tendency to believe that health research and innovation are the responsibility of actors such as universities, research groups, entities, epidemiologists, the industry or others.

On the other hand, it is interesting to note how, in recent years, research has been spoken of in relation to innovation. Although results can be seen in the medical area, it is evident that work on innovation is one of the goals which should begin to be worked towards.

Innovation is presented according to the concept proposed by the Oslo Manual,[8] which considers it to be the introduction of a new or significantly improved product (good or service), process, marketing method or organizational method to the internal practices of a company, its workplace organization, or external relations.

In 2018,[9] the 11th Global Innovation Index was presented. Although this latest version focuses on the development of advances related to the energy sector, it gives an excellent evaluation of global innovation using several indicators which calculate the development of this area by world regions.

The world is divided into seven regions, with Latin America and the Caribbean in fifth place. Chile, Costa Rica and Mexico occupy the first three positions, and Colombia is 63rd of 126 countries, with 33.78 points out of a possible 100.

In this document, work on innovation is formulated through five axes:

- Institutionality, on governmental, regulatory and corporate levels.
- Human capital and research, emphasizing education, research and development.
- Infrastructure.
- Market sophistication, referring to financial feasibility through loans, investment and economic competition.

Corporate sophistication, with regard to knowledge workers, alliances for innovation and knowledge uptake.

Two additional categories are proposed, regarding results. The first is related to knowledge and technology, in which aspects of creation, impact and dissemination are disaggregated. The second has to do with creativity results aimed at intangible assets, creative goods and services, and creativity through virtuality.

These innovation needs are measured by world regions, of which there are eight. Latin America and the Caribbean are in fifth place in institutionality, seventh in human capital and research, sixth in infrastructure and market sophistication, fifth in corporate sophistication, seventh in results related to knowledge and technology, and sixth in creativity results.

In todayś context, innovation is seen as a key factor in economic development, competitiveness and the transformation of societies.[10] Although research is undoubtedly linked to political systems due to health itself being a right and an objective of sustainable development, it is precisely this dilemma which has invited other disciplines to intervene in research and innovation processes for health.

As was mentioned, discussing innovation without contextualizing it within the national reality is useless. Therefore, it is important to present one of the operative axes of the Modelo Integral de Atención en Salud (MIAS) [Comprehensive Healthcare Model],[11] which is precisely the strengthening of research, innovation and knowledge uptake, under the guiding principles of interdisciplinarity, pertinence and effectiveness. Within the model, six challenges are also proposed from the perspective of innovation for health:

- Establishment of the governing body of the healthcare system.
- Strategies to guarantee the financial sustainability of the healthcare system.
- Efficient management of healthcareś human resources.
- Strengthening of effective and efficient information systems.
- Effective mechanisms for transferring knowledge into public policies.
- Research regarding access to, and the use and quality assurance of, healthcare services provision.

This once again shows how groundwork for innovation and research has been proposed at the institutional and governmental level and how this groundwork has not been appropriately managed by healthcare professionals, and even less by medical professionals and specialists. This is seen in the fact that the MIAS[11] has been widely socialized and addressed, but this operative axis has been one of the least disseminated and noted.

Having thoroughly discussed the subjects of research and innovation in the health context, with an emphasis on the existing related needs, we agree with Zárateś position,[5] which proposes that health research processes and topics are dynamic and multifactorial. This makes them suited for an innovation approach and defines the great opportunity available to all medical professionals and specialists with regard to these topics.

This opportunity should be taken full advantage of, and this depends directly on the existence of educated and well-trained professionals who are motivated and have the ability to develop research and innovation projects aligned with the countryś needs. These projects should always be focused on the continual growth of health and medicine in light of each professionalś daily occupational or academic responsibility within this context.

This editorial is thus an invitation to continue working on processes and various high-quality research and innovation sectors. It is not proposed as a practice ideal, but rather as a reality and a necessity for professional growth, going beyond ''paper'' research studies aimed at publication, and rather

being motivated by the desire to build knowledge, prompt critical thinking and stimulate a better use of the available opportunities.

Finally, clinical research is a good example of the research and innovation themes.[12] Despite many years of implementation in the country, there is still stigma and disapproval attached to it by many people, even healthcare and medical professionals, disregarding that this research represents an economic, academic and social driving force for the country, and that it provides access to and development of research and innovation competencies.

Thus, both at the government and private levels, various entities such as MINSALUD, INVIMA, Foreign Trade, the Asociación Colombiana de Centros de Investigación Clínica (ACIC) [Colombian Association of Clinical Research Centers], the Instituto de Evaluación Tecnológica en Salud (IETS) [Institute for Technological Health Evaluation], AVANZAR and AFIDRO carry out constant efforts to strengthen clinical research. However, in light of this struggle, the responsibility is precisely to take full advantage of these opportunities and thus position the country as a model of research and innovation for health.

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