

## Health is the result of reliable science and responsible care

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Noncommunicable diseases (NCDs) are one of the greatest challenges to global health and country development in this century, despite the negative experience of COVID-19 in 2020, 2021, 2022, and even 2023.

The prominence of NCDs has made them a priority due to premature mortality, reduced quality of life, high cost of treatment, and exponential increase in cases of cardiovascular disease, cancer, diabetes, chronic respiratory disease, their complications and risk factors, and the mental health burden, which account for nearly three-quarters of deaths worldwide, that is, 41 million people each year (World Health Organization, 2020).

The negative effects of NCDs are mainly related to insufficient or ineffective monitoring of associated factors and individual profiles and the inadequate functioning of health systems, often resulting from professionals' poor working conditions and skills. These factors and other underdiagnosed, undertreated, and insufficiently monitored local factors increase the burden on health systems, individuals, and families. NCDs have a significant economic, psychological, and social impact on the quality of life of the population, patients, their families, and their environment. The concern is even greater in low- and middle-income countries, where access to appropriate, affordable, and comprehensive care, timely diagnosis, and treatment is limited and preventive care services are discontinued.

This alarming scenario calls for intersectoral prevention and control measures, involving various agents of transformation. Nurses play a leading role in the front line of care, knowing, monitoring, and intervening in the phenomena of the human being, without reducing or fragmenting them. Their actions are based on a harmonious and unconditional combination of knowledge and practices, caring for the individual in their physical, biological, mental, spiritual, and social dimensions from a systemic and dynamic multidisciplinary perspective of the health-disease process (Ministério da Saúde, Secretaria de Vigilância em Saúde & Departamento de Análise em Saúde e Vigilância de Doenças Não Transmissíveis, 2021; Ministério das Relações Exteriores, (2021). This combination of concepts that determine good health care cannot be sustained without scientific knowledge.

The COVID-19 pandemic was a recent example of the importance of science for the well-being of the populations. This crisis disrupted lives and routines, requiring an immediate investment in science and care organization, thus combining science and care in a dynamic movement of mandatory and unequivocal feedback.

From this perspective, combining care and science is paramount to safe nursing care and helps advance the profession and achieve better health outcomes, even though some scientific advances and technologies are little explored. Science improves quality of life, extends average life expectancy, and fights scientific denialism, obscurantism, pseudoscience, and charlatanism. Basic research is proof of that.

Basic research, which is more than the opposite of applied research, aims to isolate environmental and individual variables to better understand the pathophysiological mechanisms involved in the development of changes or conditions such as NCDs. The results of basic research contribute to prevention, risk identification, and treatment. Basic research, a promising and provocative area of science, is under-researched and

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remains almost like a stigma in nursing, treated as research detached from the essence of care. We will now address the resistance to basic research and its importance for nursing.

Despite the evolution of health sciences, it is known that only a small percentage of therapeutic outcomes such as vaccines, medicines, biocompatible materials, and insulin have not been previously validated with biological or in vivo models. It is undeniable that understanding biological systems is essential for care and mainly based on knowledge derived from experimental models and basic research, in part because the ethical limits of human exposure are specific and appropriate.

Experimental models, or pre-clinical experiments, have a specific purpose and make it possible to isolate variables to develop concepts related to human and animal diseases, functional alterations, cellular and molecular mechanisms that determine behavior, stress, and manifestations. Living beings of different species are used, but mostly rats or mice because they are easy to handle and have good predictive validity compared to human beings. The basic premise for the use of animals in research is to ensure their well-being, not subject them to suffering, and use techniques that are humane, that is, based on the treatment of humans.

Basic research is essential for health, and animal research must comply with three principles: feasibility, knowledge generation, and relevance, similar to clinical research. It must be well planned and well sustained to ensure its application to human health. Basic research distinguishes itself from other research methods due to its original interdisciplinary approach and results (Neiva & Vattimo, 2012).

An example of basic research conducted primarily by nurses is the Experimental Laboratory of Animal Models (LEMA) at the School of Nursing of the University of São Paulo. In this laboratory, nurses collaborate with a multidisciplinary research team to identify non-pharmacological interventions to suppress the morbidity of NCDs using animal models. Based on the World Health Organization's goals to reduce early mortality from NCDs by promoting cessation of tobacco use and alcohol abuse, a healthy diet and physical activity, LEMA has innovated in reproducing laboratory models of chronic diseases, including chronic kidney disease and diabetes mellitus. Physical exercise protocols and a reduction in salt intake are used to assess the extent to which these interventions impact disease progression. The models are developed entirely by nurses in undergraduate, master's, doctoral, and postdoctoral programs.

Studies have confirmed that moderate physical exercise has excellent effects in animals with chronic diseases, significantly reducing morbidity and susceptibility to risk factors. In the medium term, the progression of these diseases has decelerated and the need for highly complex therapies, such as renal replacement therapies, has been delayed or even eliminated. These basic research studies using animal methods of high relevance to human health are developed by nurses for nurses and for the multidisciplinary health team.

To sum up, NCDs remain a threat to human life and require major investments to identify factors and protocols for better prevention. Although controlling these diseases highly depends on individuals, knowledge of the exact conditions is necessary for the best outcomes and is a mandatory condition for safe care. Nurses must be involved in and committed to the entire therapeutic trajectory of individuals with NCDs, mastering mechanisms and interventions, whether through the avid consumption of science or the production of science at every level of research, from basic to clinical.

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