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METHODOLOGICAL QUALITY, STUDY DESIGNS, AND EPISTEMOLOGICAL PRECISION IN SCIENTIFIC PRODUCTION IN NURSING

QUALIDADE METODOLÓGICA, DESENHOS DE ESTUDO E PRECISÃO EPISTEMOLÓGICA NA PRODUÇÃO CIENTÍFICA EM ENFERMAGEM

CALIDAD METODOLÓGICA, DISEÑOS DE ESTUDIO Y PRECISIÓN EPISTEMOLÓGICA EN LA PRODUCCIÓN CIENTÍFICA EN ENFERMERÍA

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Scientific excellence in nursing does not depend solely on the social relevance of the topic under investigation, the timeliness of the problem, or the sophistication of the analytical techniques employed. It depends, above all, on the coherence among the research question, the epistemological framework, the methodological design, the analytical procedures, and the strength of the conclusions presented. This coherence constitutes one of the core elements of methodological quality. When it is weak, a study may appear formally well structured but produce inferences that are imprecise, overstated, or incompatible with its own investigative architecture.

Nursing, by virtue of its practical, relational, ethical, and technological nature, deals with heterogeneous research objects: human experiences, care needs, clinical interventions, educational technologies, measurement instruments, organizational processes, and care-sensitive outcomes. This plurality requires mastery of different study designs and, above all, discernment to recognize that each design answers a particular type of question. Qualitative studies are especially powerful for understanding meanings, experiences, practices, and contexts. Observational studies allow the examination of frequency, association, risk, and prognosis. Experimental or quasi-experimental trials are appropriate for estimating the effects of interventions. Systematic reviews synthesize evidence based on structured questions and explicit criteria. Methodological studies, in turn, may develop, adapt, or evaluate the properties of instruments and procedures. Confusing these purposes compromises both scientific writing and the usefulness of the evidence.

Methodological quality, in this sense, is not synonymous with mechanical adherence to checklists. Reporting guidelines, critical appraisal tools, and risk-of-bias criteria are indispensable resources, but they do not replace methodological reasoning. Their function is to make a study transparent, reproducible, open to critique, and useful for decision-making. Critical appraisal seeks to determine the extent to which the design, conduct, and analysis of a study reduced biases and support the proposed inferences[1]. Researchers should therefore avoid treating study classification as a mere procedural label. A poorly conducted trial does not become strong because it is called experimental; a narrative review does not become a systematic review because it mentions databases; and a technology development study does not become psychometrically valid because it resorts to the language of validity.

This last issue deserves special attention in contemporary nursing. The term “technology validation” has often been used to describe studies involving the development of applications, booklets, protocols, educational materials, or digital systems, followed by expert review, assessment of appearance, content, usability, or didactic adequacy, and, in some cases, experimental testing of effects. Although such steps may be legitimate and scientifically relevant, they

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do not necessarily belong to the same epistemological regime. Technical review may indicate relevance, clarity, or adequacy of content; didactic evaluation may examine language, pedagogical progression, or suitability for the target audience; usability assessment may investigate interaction, acceptability, and user experience; and an experiment may estimate effectiveness, efficacy, or impact on previously defined outcomes.

The problem arises when all these stages are brought together under the generic label of "validation," often supported by psychometric works. Contemporary validity theory was built from the interpretive perspective of measurement instruments. It refers to the support for inferences made from scores, responses, or results produced by tests, scales, questionnaires, or other measurement instruments[2]. Thus, validity is not an abstract property of a material object, but of the interpretation of its results in a given context of use. Frameworks such as COSMIN are appropriate when the object is the quality of measurement instruments or patient-reported outcome measures, as they organize criteria for evaluating properties such as content validity, internal structure, reliability, and responsiveness[3].

For this reason, there is an epistemological impropriety when the psychometric theory of validity is transposed, by analogy, to technologies whose primary purpose is not to measure a construct. An educational application, booklet, clinical protocol, or care technology may be rigorously developed, theoretically grounded, reviewed by experts, evaluated for usability, and tested in an experimental trial. However, if it does not produce scores whose interpretation is at issue, its evaluation should not be presented as psychometric validation. In such cases, the scientific question should be named more precisely: technology development and evaluation, technical content analysis, usability evaluation, pilot study, feasibility trial, implementation evaluation, efficacy study, or effectiveness trial, according to the central objective.

This distinction is not merely terminological. It delimits the type of evidence that the study actually produces. Agreement among experts does not, by itself, demonstrate that a technology improves clinical or educational outcomes. Good acceptability is not equivalent to effectiveness. Usability does not replace impact assessment. Likewise, a trial that demonstrates an effect on knowledge, adherence, self-care, or patient safety does not prove that the technology has been "validated" in the psychometric sense. It provides evidence of effect under specific conditions of design, sample, intervention, comparison, and measurement. When a study involves an intervention, its methodological logic should be closer to frameworks for the development and evaluation of complex interventions and to trial reporting guidelines than to the validation of measurement instruments[4-5].

Coherence between epistemology and methodology should therefore guide the choice of words from the title to the conclusion. If the objective is to understand an experience, the writing should assume the interpretive nature of the investigation. If the objective is to measure association, it should explicitly address population, exposure, outcome, confounding, and inferential limitations. If the objective is to test an intervention, it should present causal logic, comparator group, allocation, blinding when possible, losses, adherence, analysis, and magnitude of effect. If the objective is to develop a technology, it should describe the problem, the theoretical foundation, the stages of development, the participation of experts or users, and the type of evaluation performed. If the objective is to evaluate an instrument, it should justify the construct, the population, the measurement properties, and the intended inferences.

Excellent scientific writing is born from this precision. The manuscript should allow readers to understand what was asked, why a given method was chosen, what type of knowledge was produced, and how far the findings can be extended. In nursing, this clarity is even more important because research often informs care practices, institutional policies, professional education, and clinical decisions. Methodologically overstated conclusions may lead to the premature adoption of technologies, interventions, or instruments that have been insufficiently evaluated. Conversely, well-named and well-delimited studies strengthen the credibility of the discipline and facilitate the critical incorporation of evidence into practice.

Thus, defending methodological quality in nursing means defending an ethics of precision. It means recognizing that good studies are not defined only by relevant topics, but by the correspondence among question, design, analysis, and inference. It also means resisting the ornamental use of methodological terminology that gives the appearance of rigor without supporting appropriate inferences. The scientific maturity of nursing requires authors to choose study designs with epistemological awareness, describe their methods transparently, and formulate conclusions that are proportional to the evidence produced. Within this horizon, excellence in scientific writing is not merely textual refinement: it is an expression of methodological responsibility toward science, the profession, and the people who depend on nursing care.

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