

Knowledge of research methodology in medical residents: a systematic review

Conocimientos en metodología de la investigación en residentes médicos: revisión sistemática

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Abstract

Research methodology constitutes a fundamental pillar in the training of medical residents, as it supports clinical practice grounded in scientific evidence and promotes the generation of knowledge. Nevertheless, multiple studies have reported persistent deficiencies in residents' methodological knowledge, particularly in areas such as statistics, study design, and critical appraisal, which limits their active participation in academic projects and scientific production. In recent years, structured teaching of Evidence-Based Medicine and the incorporation of innovative pedagogical models, such as the Master Adaptive Learner, have been shown to improve methodological competencies, increase academic satisfaction, and reduce professional burnout. The objective of this systematic review was to analyze the level of knowledge regarding research methodology among medical residents. To this end, a systematic review was conducted in accordance with the PRISMA 2020 statement, including studies published between 2015 and 2025 in databases such as PubMed, Scopus, Web of Science, SciELO, LILACS, and Google Scholar. Original studies evaluating knowledge, perceptions, or educational interventions related to research methodology in residency programs were selected, and a narrative synthesis and methodological quality assessment were performed. The results revealed significant deficiencies in residents' methodological knowledge at a global level, with low participation in systematic reviews and limited formal training in research. Structured educational interventions demonstrated positive effects on knowledge acquisition, academic satisfaction, and resilience. These findings reinforce the need to systematically integrate methodological training as a priority component of postgraduate medical education.

Keywords: research methodology; postgraduate medical education; medical residents; evidence-based medicine; research training

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Resumen

La metodología de la investigación constituye un pilar fundamental en la formación del médico residente, al sustentar la práctica clínica en la evidencia científica y favorecer la generación de conocimiento. No obstante, diversos estudios han señalado deficiencias persistentes en los conocimientos metodológicos de los residentes, particularmente en áreas como estadística, diseño de estudios y lectura crítica, lo que limita su participación en proyectos académicos y en la producción científica. En los últimos años, se ha documentado que la enseñanza estructurada de la Medicina Basada en Evidencias y la incorporación de modelos pedagógicos innovadores, como el Master Adaptive Learner, contribuyen a mejorar las competencias metodológicas, incrementar la satisfacción académica y reducir el agotamiento profesional. El objetivo de esta revisión sistemática fue analizar el nivel de conocimientos sobre metodología de la investigación en residentes médicos. Para ello, se realizó una revisión sistemática conforme a la declaración PRISMA 2020, incluyendo estudios publicados entre 2015 y 2025 en bases de datos como PubMed, Scopus, Web of Science, SciELO, LILACS y Google Scholar. Se seleccionaron estudios originales que evaluaron conocimientos, percepciones o intervenciones educativas relacionadas con metodología de la investigación en programas de residencia médica, realizándose una síntesis narrativa y valoración de la calidad metodológica. Los resultados evidenciaron deficiencias significativas en los conocimientos metodológicos de los residentes a nivel global, con baja participación en revisiones sistemáticas y limitada formación formal en investigación. Las intervenciones educativas estructuradas mostraron efectos positivos en el conocimiento, la satisfacción académica y la resiliencia. Estos hallazgos refuerzan la necesidad de integrar de manera sistemática la formación metodológica como componente prioritario de la educación médica de posgrado.

Palabras clave: metodología de la investigación; formación médica de posgrado; médicos residentes; medicina basada en la evidencia; formación en investigación



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INTRODUCTION

Research methodology constitutes a core pillar in medical residency training, as it ensures evidence-based clinical practice and fosters the generation of scientific knowledge. Nevertheless, significant deficiencies persist in areas such as statistics, study design, and critical appraisal, which limit residents' active participation in academic projects and scholarly publications. Recent evidence highlights that structured teaching of Evidence-Based Medicine and the incorporation of innovative pedagogical models such as the Master Adaptive Learner (MAL) strengthen methodological competencies, increase academic satisfaction, and reduce professional burnout. Integrating these strategies transversally across residency programs is essential to consolidate robust scientific training and to promote critical, ethical, and high-quality medical practice.

OBJETIVE

To analyze the level of knowledge in research methodology among medical residents through a systematic review of the literature.

METHODOLOGY

Study type: Systematic review conducted in accordance with the PRISMA 2020 statement. Databases: PubMed, Scopus, Web of Science, SciELO, LILACS, and Google Scholar. Time frame: 2015-2025. Eligibility criteria: Original studies assessing knowledge, perceptions, or educational interventions related to research methodology in residency programs. Analysis: Narrative synthesis of results and appraisal of methodological quality.

RESULTS

Medical residents exhibit significant gaps in methodological knowledge, particularly in statistics, study design, and critical reading. In Saudi Arabia, the mean knowledge score was 43%, while in Mexico only 12.5% of residents reported participation in systematic reviews. Structured educational interventions and pedagogical models such as the Master Adaptive Learner were associated with improvements in knowledge acquisition, academic satisfaction, and resilience (Figure 1). Despite these advances, global gaps and a lack of validated assessment instruments persist.



Figure 1. Master Adaptive Learner (MAL) Model

CONCLUSIONS

Methodological training during medical residency should be regarded as a structural and priority component of postgraduate medical education. Systematic integration of research methodology teaching through innovative strategies and validated assessments is necessary. Strengthening these competencies enhances academic quality, improves scientific productivity, and promotes a critical, ethical, and evidence-based medical practice.

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