

EDITORIAL

Nurses in the era of genomics and precision health

Athina Patelarou *Department of Nursing, School of Health Sciences, Hellenic Mediterranean University, Heraklion, Greece*

Precision health, driven by advances in genomic science, is gradually transforming healthcare. Nurses have a crucial role in this new era, as they constitute the largest group of health professionals and provide holistic care across the continuum of care. Based on advances in genomics, such as genomic sequencing, pharmacogenomics, and the use of biomarkers, precision nursing influences all levels of healthcare and has changed prevention, risk management, and treatment in areas such as reproductive health, neonatal care, cardiovascular disease, and oncology. Genomic nursing is an essential component of contemporary nursing which is predictive, preventive, personalized, and participatory (4P). In the age of genomics, nurses are expected to engage with and embrace precision healthcare and its value for individuals and families. At the same time, in the context of precision health, nurses have to be prepared enough to collect family history, identify individuals and family members at risk, provide genomic information, safeguard ethical principles, equality, and confidentiality, and support patients throughout their therapeutic decision-making process (Spanakis et al., 2020).

The literature highlights that nurses adopt a positive attitude towards genomics and precision healthcare, and are willing to implement this knowledge and these practices into clinical practice. Nevertheless, there is evidence in the scientific literature revealing a gap between advances in genomics and nurses' readiness (McLaughlin et al., 2024). Particularly, researchers state that nurses have a low to moderate level of competence in genomics, and that there is a significant knowledge-to-practice gap, as they face difficulty translating genomic knowledge into clinical practice (Yesilcinar et al., 2026; Calzone et al., 2026). Moreover, recent studies highlight that although nurses recognize precision nursing and genomics as fundamental concepts of contemporary clinical practice, they often report insufficient support from their managers and senior staff (Yesilcinar et al., 2026).

As international studies show that nursing personnel report limited genomic knowledge and lack self-confidence in its implementation, genomics education should be considered an urgent educational challenge, making action in this direction imperative. Qualitative and quantitative research has highlighted the limited systematic presence of genomics in nursing curricula, emphasizing the need to strengthen precision health education at both undergraduate and postgraduate levels to enhance students' competences in precision nursing (Giakoumidakis et al., 2025; Silva et al., 2026). Research also suggests that genomic concepts should be embedded across the nursing curricula and at the same time linked to clinical practice throughout nursing education to make students progressively more familiar with precision health and its implementation.

Furthermore, continuing education is essential in this field to help nurses already working in clinical practice support their professional role with confidence. Additionally, further research should focus on nurses' educational needs and the design of effective educational interventions to improve their genomic literacy (Zureigat et al., 2022). At the same time, faculty readiness in genomics is crucial, and continuing professional development and regular knowledge updates are essential to ensure that nurse educators are adequately prepared and can teach with confidence (Silva et al., 2026).

The integration of genomics and precision health concepts into clinical practice and education remains a major challenge in healthcare and requires effective policy-making and close, cross-disciplinary collaboration among educational institutions, healthcare systems, professional organizations, and policymakers (Limoges et al., 2025). Strong collaborative networks linking education, research, clinical practice, leadership, and policy are equally important for advancing genomic nursing. International and cross-sector networks can facilitate knowledge exchange, reduce fragmented efforts, support the sharing and adaptation of educational

resources, and accelerate the translation of genomic advances into nursing practice. Initiatives such as national genomic toolkits and frameworks and international networks, like the Global Genomics Nursing Alliance (G2NA), provide valuable resources for supporting genomic literacy, implementation, and equity across different healthcare contexts (Chiu et al., 2026; Katapodi et al., 2024; Tonkin et al., 2020).

Despite the challenges, embracing genomics and precision health represents a unique opportunity to advance nursing as a global profession and reinforce its contribution to the rapidly evolving precision healthcare landscape.

Prof. Athina E. Patelarou
e-mail: apatelarou@hmu.gr

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