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Application of the Emergency Response Framework by a WHO country office during an acute-onset emergency

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In November 2023, a 6.4-magnitude earthquake struck western Nepal, its most powerful since 2015, causing severe destruction in the Jajarkot, Rukum, and Salyan districts. The disaster left 154 dead, thousands homeless, and over 75 health facilities non-functional. In response to government's request for support, World Health Organization (WHO) Nepal applied the Emergency Response Framework (ERF) 2.0 to structure its operations, demonstrating how a WHO country office could operationalize ERF protocols during an acute-onset emergency. Through the activation of a whole-of-office incident management team (IMT), including an active field-level presence, WHO Nepal met key ERF performance standards such as staff safety, rapid situation analysis, and coordinated action. This experience addresses the limited documentation on the practical application of the ERF at the country level and offers insights into the preconditions necessary for its effective use in real-world emergencies. Following the Jajarkot response, the WHO country office institutionalized ERF-recommended practices across operational units, creating a model that was successfully replicated during the 2024 floods and landslides affecting three provinces. This experience underlines the idea that, while the ERF provides a strong structural foundation for emergency response, its effective implementation hinges on institutional readiness, specifically a capacitated and trained workforce, functional coordination mechanisms, and established operational infrastructures. WHO Nepal's response demonstrates how structured frameworks like the ERF can enhance preparedness and enable scalable, flexible responses in disaster-prone settings, offering a replicable approach for other WHO country offices and partners working in similar contexts.

KEYWORDS

earthquake, emergency, Emergency Response Framework, Nepal, response, WHO

Introduction

The World Health Organization's (WHO) Emergency Response Framework (ERF), developed in 2013 and revised in 2017 and 2022 (1), provides a standardized, all-hazards approach for managing public health emergencies. It emphasizes rapid response, coordination, and accountability and serves as the operational backbone for the WHO

Health Emergencies Programme (WHE), including the use of the incident management system (IMS). Though ERF version 2.1 was released in early 2024, WHO Nepal's response to the 2023 Jajarkot earthquake was guided by ERF 2.0, as most immediate actions predated the latest revision (2). Despite global adoption of the ERF, field-level documentation of its application by WHO country offices (WCOs) in sudden-onset emergencies remains limited. The Jajarkot earthquake, Nepal's strongest since 2015, presented an opportunity to apply and reflect on the ERF's practical value in guiding a comprehensive health emergency response. The ERF adopts an all-hazards approach, making it relevant to all types of public health events, is supported by WHO's emergency standard operating procedures, and aligns with interagency emergency protocols and commitments (2).

This paper describes how WHO Nepal operationalized ERF 2.0 during the 2023 Jajarkot earthquake through the activation of an incident management team (IMT), resource mobilization, and coordination with national health authorities and humanitarian partners. The earthquake severely impacted the Jajarkot, Rukum, and Salyan districts, destroying over 75 health facilities and displacing thousands. WHO Nepal's whole-of-office approach to IMT establishment, including field-level engagement, ensured that ERF performance standards would be upheld. The institutionalization of this model enabled its replication during the 2024 floods and landslides, demonstrating the ERF's flexibility and scalability. By analyzing Nepal's experience, this paper contributes critical insights into the enabling conditions for effective ERF implementation, such as trained personnel, pre-established coordination mechanisms, and operational infrastructure, offering a replicable model for strengthening emergency response systems in other disaster-prone settings.

Context

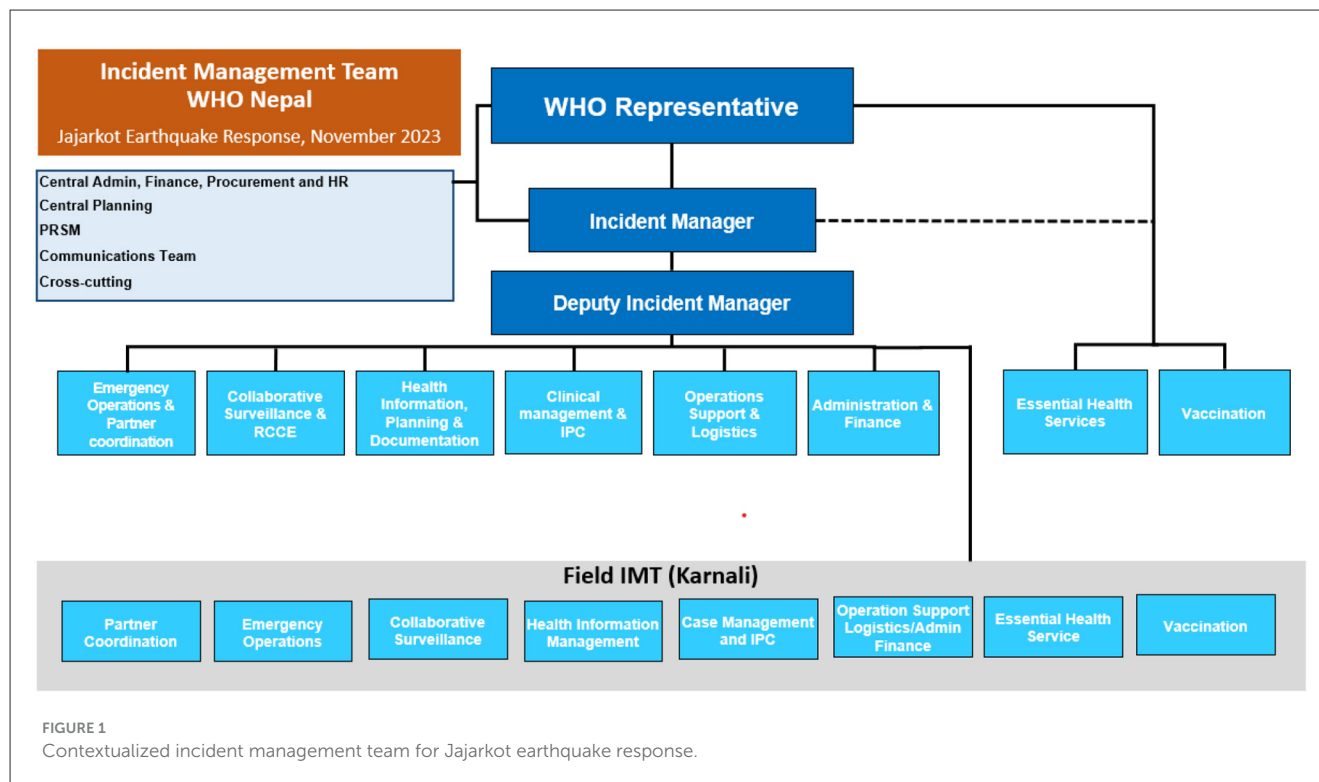
Nepal, a landlocked country in South Asia, lies between China and India (3). Jajarkot, a remote district in the Karnali province of western Nepal, lies in a seismically active zone (4). On November 3, 2023, a devastating earthquake struck Karnali province, followed by a series of aftershocks. The disaster severely affected the Jajarkot, Rukum, and Salyan districts, resulting in a tragic loss of 154 lives. In Jajarkot alone, 101 people perished, while in Rukum 42 individuals lost their lives (5). The earthquake caused extensive damage to residential structures, with 19,423 homes destroyed and 39,369 partially damaged. Additionally, over 75 were impacted, rendering them structurally non-functional and in need of upgrading or retrofitting in the Jajarkot, Western Rukum, and Salyan districts (5).

Details to understand key programmatic elements

The structured application of the ERF in the Jajarkot earthquake response was centered on WHO's performance standards for emergency response ([Supplementary material S1*](#)).

Country office actions as per the ERF performance standards

1. A centralized IMT, co-led by the WHO Representative and Health Emergencies Team Lead, integrated all WCO departments. Field personnel were embedded in provincial IMTs, enabling real-time decision-making. (*ERF Performance Standard 2**)
2. Trained cadres: the success of the response was enhanced by pre-trained cadres on ERF, emphasizing the need for continuous capacity building using tools like the Learning Resource Tracker. (*ERF Performance Standard 2**)
3. WCO coordinated with Southeast Asia Regional office and headquarters to implement the Health Resources and Services Availability Monitoring System (HeRAMS) for the first time in Nepal (6); as an added innovation, the team integrated an additional component for injury rehabilitation and disability inclusion in the assessment tool. This inclusion showcased the team's commitment to adaptive and context-specific solutions. (*ERF Performance Standard 3**)
4. As a way to strengthen the early-warning system, alert, and response, an approach to syndromic surveillance was piloted in affected areas, and surveillance associates were made available for quick deployment and continuous support for event-based surveillance through media monitoring of major health events. Along with the establishment of an indicator-based surveillance system demonstrated the value of data-driven decision-making in emergencies. (*ERF Performance Standard 3**)
5. The earthquake response was coordinated under the guidance of existing national frameworks such as National Disaster Response Framework 2018 (7), which defined the government-led response, complemented by the WHO ERF. This strong collaborative network between the Ministry of Health and Population and the WCO was further informed by lessons from previous coordination experiences, including insights from the article "Effectiveness of health partners coordination for COVID-19" (8). Several of these lessons, drawn from the COVID-19 response, were applied during the coordination meetings. (*ERF Performance Standard 4**)
6. The WHO team quickly conducted a public health situational analysis (even though Public Health Situation Analysis (PHSA) was developed for the first time as no repository was maintained for previous disasters such as Nepal Earthquake 2015) and prepared an operational plan and used it as an investment case to securing funds from the Southeast Asia Regional Health Emergency Fund (SEARHEF) (9) and Contingency Fund for Emergencies (CFE) (10), which was significant when it came to the replenishment of stock, procurement and logistics, and mobilization of human resources (existing + surge). (*ERF Performance Standard 5**)
7. The WHO consistently assisted with the management and operation of health information at both the federal and provincial levels, publishing 41 situational reports and sharing health-related data and statistics. (*ERF Performance Standard 6**)



8. Strengthening of health cluster coordination and training before the earthquake proved significant in ensuring the personnel on the ground were well-versed in effective response. (*ERF Performance Standards 9 and 11**)
9. Members of health clusters at both the federal and provincial levels were given orientation on Preventing and Responding to Sexual Misconduct (PRS). (*ERF Performance Standard 11**)
10. The WHO prepositioned supplies (e.g., trauma kits, Interagency Emergency Health Kits), maintained emergency stockpiles in an emergency medical logistics warehouse, and set up humanitarian staging areas at strategic locations. (*ERF Performance Standard 14**)

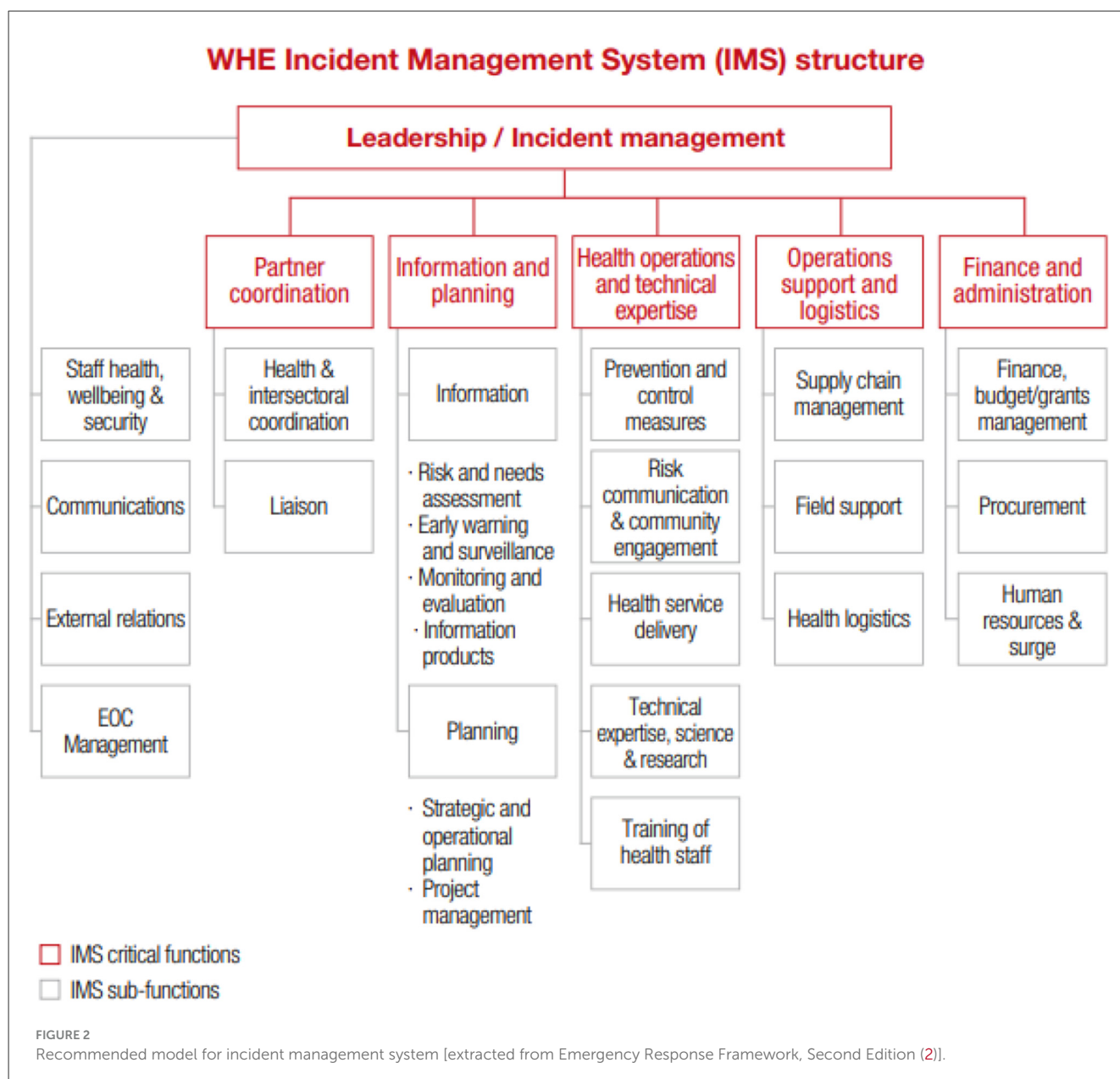
The WCO established strong preexisting capacities to effectively respond to public health emergencies. A well-trained and capacitated WHE team was in place, supported by health cluster training initiatives and personnel trained in the ERF. Complementing these capacities, the WCO has achieved a high level of operational readiness. With an existing field presence, prepositioned logistics, and well-equipped warehouse, the office was prepared to rapidly deploy resources as needed. Emergency response kits were strategically prepositioned, and a trained roster of personnel could be quickly onboarded to provide immediate support in emergency settings. A key strength of the WCO's emergency response was its whole-of-office engagement approach. Under a unified governance structure, various departments, including health system strengthening, immunization and vaccine-preventable diseases, communicable disease surveillance, non-communicable diseases, and WHE, worked together to ensure an integrated and coordinated response. While WHE led the effort to sustain essential health services and the integrate emergency

response into the health system, resources from all divisions were mobilized, exemplifying a comprehensive and collaborative approach. This model was later replicated successfully in flood response operations (11), demonstrating its effectiveness in strengthening resilience and continuity of care.

The response to the 2023 Jajarkot earthquake catalyzed significant operational advancements within WHO Nepal, refining emergency response mechanisms and reinforcing institutional resilience. By systematically applying the ERF, the organization not only addressed immediate humanitarian needs but also initiated transformative shifts in its operation architecture, coordination mechanisms, and long-term resilience strategies. These changes have since set a benchmark for scalable, adaptive emergency responses in Nepal's complex disaster landscape.

Central to this transformation was the ERF-driven creation of a cross-functional IMT that integrated expertise from all departments within the WCO, which was contextualized for the Jajarkot earthquake response (Figure 1), adapted from the recommended model of IMS as shown in Figure 2 (2). This whole-of-office approach unlocked new levels of teamwork, enabling agile leadership and strategic resource alignment that maximized the earthquake response. This restructuring highlighted the importance of institutional agility, ensuring that the multidisciplinary collaboration would become a cornerstone of WHO Nepal's emergency operations.

Aligning with the grand bargain (12) principles, which commit the response team to putting more resource into the hands of people in need and to improving the effectiveness and efficiency of the humanitarian actions and the pursuit of collective outcomes, WHO Nepal prioritized bridging humanitarian action with development goals. This involved embedding accountability



frameworks into response activities and fostering synergies between emergency interventions and long-term health system strengthening. Operational efficiency was further enhanced by refining coordination mechanisms. The health cluster coordination (13) system was revitalized to ensure alignment among partners, while accountability measures were systematically integrated into response workflows. Additionally, regular coordination meetings with the Health Emergency Operation Center (HEOC) and Provincial Health Emergency Operation Center (PHEOC) (14) established a harmonized chain of command, establishing a real-time data sharing and synchronized deployment of resources across tiers.

The response saw the rapid deployment of prepositioned emergency supplies, significantly reducing response time. WHO Nepal leveraged ERF protocols to mobilize resources efficiently, securing funding and technical support to sustain operations

without compromising response quality. Beyond immediate response, WHO Nepal prioritized systemic resilience through infrastructure and capacity investments. Solarization of health facilities emerged as a key initiative, ensuring uninterrupted power supply for critical medical services during disruptions (15). The establishment of medical camp kits (MCKs) (16) and temporary rehabilitation centers further fortified postdisaster health service continuity, providing modular, rapidly deployable solutions for emergency scenarios (Figure 3).

The earthquake response transcended its immediate purpose, serving as a catalyst for institutional evolution within WHO Nepal. By institutionalizing ERF principles, the organization established a replicable model for scalable, adaptive emergency response while advancing Nepal's progress toward fulfilling the United Nations Sustainable Development Goals (17). The integration of innovation, cross-sectoral coordination, and resilience building not



FIGURE 3

(A) Shot of a health post and the 10 photovoltaic solar panels installed by WHO Nepal in Karnali province. Positioned strategically, these panels serve as a lifeline, ensuring uninterrupted supply for basic lighting and continuous operation of baby warmers. (B) Aerial view of temporary health facility constructed with WHO assistance using medical camp kits in the earthquake-affected Karnali province, Nepal. (C) Site monitoring of damaged health post conducted by WHO personnel.

only addressed immediate needs but also laid the foundation for a more agile and equitable health emergency ecosystem.

Discussion

The Jajarkot earthquake response demonstrated the effectiveness of the ERF when key preconditions were met: institutional readiness (trained teams, whole-of-office engagement), resilient systems (innovative solutions like MCKs and solarized health facilities, adaptive coordination), and community integration, that is, localized decision-making and preexisting female community health volunteer networks (18). The model's scalability was proven during the 2024 floods, and its success was validated by the WHE team receiving the WHO Director-General's Award for Excellence for 2024, highlighting ERF as a blueprint for high-performing emergency responses. The lessons learned emphasize continuous staff training, sustained infrastructure investment, and community trust building for ERF effectiveness.

These lessons emphasize that the ERF is not a standalone checklist but a system requiring

- Precrisis groundwork
- Equity-centered design
- Dynamic leadership

In operational practice, WCOs with established emergency response mechanisms often activate the IMS before formal grading. This approach allows for an immediate, structured response while the grading process, requiring risk assessment and situational analysis, is still under way. Field experience suggests that early IMS activation enhances response efficiency, particularly in settings where teams are familiar with its processes.

Additionally, current performance standards do not explicitly include a grading as a benchmarked milestone. Given its critical role in shaping response actions and resource mobilization, there may be value in exploring whether grading should be incorporated as a performance indicator. This would better reflect the full scope

of emergency response progression and ensure that the ERF's theoretical framework is fully operationalized in practice.

This analysis is not intended to challenge the validity of the ERF but rather to highlight practical observations that could inform future refinements in implementation strategies. By aligning field practices with the framework's principles and incorporating lessons learned, the ERF can continue to evolve as a dynamic and effective tool for managing public health emergencies.

The response to the Jajarkot earthquake offers several insights into the real-time application of ERF:

- Whole-of-office model: multisectoral engagement across WHO departments proved essential for an integrated response.
- Scalability and replicability: the same IMT model was later used during the 2024 floods and landslides affecting three provinces.
- Coordination and accountability: regular meetings with HEOCs and inclusion of accountability mechanisms (e.g., PRS training) built trust and operational efficiency.
- Innovation in practice: context-specific innovations, such as HeRAMS rehabilitation modules and solarized health infrastructure, proved crucial for service continuity.

However, practical challenges also emerged. While ERF grading was applied, it remains underutilized as a performance benchmark in field operations. Its inclusion as a formal indicator could improve strategic decision-making and resource allocation. Additionally, despite robust efforts, the absence of a pre-disaster public health situational analysis repository made retrospective planning more difficult. Further, several field-level challenges influenced both the implementation of the ERF performance standards and the interpretation of results. First, responders faced significant constraints in obtaining timely health-related data during the initial days because of disrupted access routes, damaged communication networks, and the limited availability of field staff who were themselves affected by the disaster. This led to reliance on secondary information that continued to fluctuate as new assessments emerged, affecting early decision-making and planning. Second, logistical challenges, including limited transport

options, delayed delivery of supplies, and difficulties deploying trained personnel to remote sites, affected the pace at which certain standards could be implemented. Third, evolving priorities at the provincial level, combined with uncertainty in the absence of complete situational information, created hesitancy in agreeing on early risk communication and disease control priorities. Finally, the response capacity and overall performance were influenced by preexisting provincial strengths, such as recent trainings and available stockpiles, which may not be present in other contexts. Collectively, these local constraints and operational realities shape the findings and, therefore, limit their broader applicability without careful consideration of contextual differences.

Limitations

The analysis presented here is based on a single incident, so generalizability may be influenced by local capacity and context-specific conditions. Furthermore, the incident took place within a particular temporal and operational context shaped by local leadership, existing infrastructure, and concurrent public health priorities, which may not be replicated in other jurisdictions. As a result, caution should be exercised when extrapolating these findings to broader national or regional scenarios without accounting for these contextual differences and the potential variability in system performance.

Conclusion

Nepal's 2023 Jajarkot earthquake response demonstrates that WHO's ERF can be effectively implemented, and 15 out of 17 performance standards were met within the prescribed timeframe. The preexisting institutional enablers, such as pre-trained teams, prepositioned logistics, strong coordination structures, and multidepartmental engagement, facilitated the successful implementation of the framework. The replication of the IMT model during the 2024 flood response further confirmed its scalability. For future ERF implementations, WCOs may consider prioritizing routine ERF training, conducting a public health situational analysis, and advocating for the integration of grading as a measurable performance standard.

Data availability statement

The original contributions presented in the study are included in the article/**Supplementary material**, further inquiries can be directed to the corresponding author.

Author contributions

RP: Supervision, Conceptualization, Writing – review & editing, Writing – original draft. AGov: Writing – review & editing, Supervision, Writing – original draft, Conceptualization. DS: Writing – original draft, Writing – review & editing. SN: Writing – original draft, Writing – review & editing. DG: Writing – original draft, Writing – review & editing. SS: Writing – original

draft, Writing – review & editing. PD: Writing – original draft, Writing – review & editing. KP: Writing – review & editing, Writing – original draft, Conceptualization. AGoc: Writing – review & editing, Conceptualization, Writing – original draft, Supervision, Validation, Resources, Methodology.

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Correction note

This article has been corrected with minor changes. These changes do not impact the scientific content of the article.

Generative AI statement

The author(s) declared that generative AI was not used in the creation of this manuscript.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/femer.2025.1697272/full#supplementary-material>

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