



OPEN Developing a culturally adapted competency framework for community paramedicine practice in Saudi Arabia

Ebrahim Abdullah Algosaiibi¹, Murdhi H. Alanazi¹, Mohammed Algabgab², Riyadh A. Alhazmi¹, Abdullah M. Alobaid³, Saqer M. Althunayyan³, Mohammed A. Abahussain¹, Ahmed M. Al-Wathinani¹✉, Krzysztof Goniewicz⁴✉, Juan Gómez-Salgado^{5,6} & Abdulmajeed M. Mobrad¹

Community paramedicine (CP) has emerged globally as a model for extending healthcare access, but little evidence exists on how it can be adapted to the sociocultural and systemic context of Saudi Arabia. This study aimed to develop a culturally tailored competency framework for CP to inform education, practice, and policy. A qualitative design using semi-structured interviews with 15 experts from diverse regions and professional roles in Saudi Arabia was adopted. Thematic analysis was conducted to identify the core competencies. To complement the qualitative synthesis and explore structural patterns among the identified domains, exploratory factor analysis (EFA) was applied to expert ratings of competency importance, enabling validation of interrelationships between themes. Twelve interrelated competency domains were identified, including: chronic disease management, communication and cultural competence, leadership and decision-making, community engagement, system integration, telemedicine and digital health, mental health and palliative care, public health and prevention, simulation-based and rural training, policy and governance, ethical and legal awareness, and research and evidence-based practice. The EFA revealed three principal axes: (1) interpersonal and cultural competencies, (2) operational and clinical preparedness, and (3) policy and research orientation. Together, these dimensions highlight the balance between culturally embedded care, clinical readiness, and strategic policy integration. This study presents the first comprehensive and culturally adapted competency framework for CP in Saudi Arabia. The framework demonstrates how context-sensitive training can address rural–urban healthcare disparities by equipping paramedics with both clinical and culturally grounded skills. It also underscores how education and accreditation pathways can overcome sociocultural barriers to care. By linking clinical competencies with policy and governance structures, this framework provides strategic guidance for training, accreditation, and system integration, supporting Saudi Arabia's national health transformation goals.

Keywords Community paramedicine, Emergency medical services, Healthcare equity, Competency framework, Qualitative research, Chronic disease management, Cultural competence, Telemedicine

Abbreviations

EMS	Emergency medical services
ED	Emergency department
CPD	Continuous professional development

¹Department of Emergency Medical Services, Prince Sultan bin Abdulaziz College for Emergency Medical Services, King Saud University, 11451 Riyadh, Saudi Arabia. ²Department of basic sciences, Prince Sultan bin Abdulaziz College for Emergency Medical Services, King Saud University, Riyadh, Saudi Arabia. ³Department of Accidents and Trauma, Prince Sultan bin Abdulaziz College for Emergency Medical Services, King Saud University, Riyadh, Saudi Arabia. ⁴Department of Security Studies, Polish Air Force University, 08-521 Deblin, Poland. ⁵Department of Sociology, Social Work and Public Health, Faculty of Labour Sciences, University of Huelva, 21007 Huelva, Spain. ⁶Safety and Health Postgraduate Programme, Universidad Espíritu Santo, 092301 Guayaquil, Ecuador. ✉email: ahmalotaibi@ksu.edu.sa; k.goniewicz@law.mil.pl

EOL	End-of-life (care)
MIH	Mobile integrated healthcare
DMAT_HCP	Disaster management assessment tool for health care practitioners
SDGs	Sustainable development goals
KSA	Kingdom of Saudi Arabia

Community Paramedicine (CP) has emerged internationally as a response to the rising complexity of healthcare demands and persistent disparities in access to care. Across high-income countries, aging populations, the growing prevalence of chronic diseases, and increasing emergency medical service (EMS) call volumes have highlighted the limitations of hospital-centered systems in addressing non-urgent yet essential health needs^{1,2}. CP initiatives extend the role of paramedics beyond emergency transport, integrating them into primary care and community health delivery to improve continuity of care and reduce avoidable emergency department visits^{3,4}.

Evidence from countries such as Canada, the United States, Australia, and the United Kingdom demonstrates that CP can enhance patient outcomes, alleviate hospital overcrowding, and improve cost-efficiency by addressing low-acuity cases in community settings^{5,6}. For instance, CP programs have been associated with reduced ambulance transports, fewer hospital readmissions, and improved patient satisfaction, especially in rural and underserved regions^{7,8}. Nevertheless, challenges remain, including sustainable funding models, policy alignment, integration with broader health systems, and public understanding of the paramedic role^{9,10}.

Importantly, the implementation of CP globally has also revealed critical barriers faced by paramedics that extend beyond clinical responsibilities. Cultural and religious sensitivities, gender dynamics, technological adoption, and geographic constraints significantly influence service delivery^{11,12}. For example, in contexts where gender concordance between patient and provider is socially expected, or where trust in healthcare institutions is limited, the effectiveness of CP depends on paramedics' ability to navigate sociocultural norms^{13,14}. Addressing such barriers is essential to ensure equitable and context-sensitive healthcare delivery.

In Saudi Arabia, disparities in EMS provision are especially visible between urban and rural regions. Urban centers benefit from advanced infrastructure, trained personnel, and comprehensive medical services. In contrast, rural and remote areas experience longer response times, workforce shortages, and geographic isolation¹⁵. Further complicating service delivery are sociocultural expectations: with EMS personnel predominantly male, female patients may face barriers in accessing timely and culturally appropriate care¹¹. These systemic gaps undermine the ability of EMS to provide equitable, accessible, and trusted care nationwide.

While international CP frameworks provide useful reference points, they are not directly transferable to the Saudi context. Competency frameworks, defined as structured sets of knowledge, skills, and attitudes that underpin professional practice, guide training, accreditation, and workforce development in healthcare⁹. However, frameworks developed in Western systems often overlook culturally specific considerations such as Islamic health perspectives, gender norms, rural–urban healthcare divides, and the logistical realities of serving dispersed populations^{16,17}. Without cultural adaptation, imported frameworks risk limited applicability and acceptance among both practitioners and communities.

Therefore, there is a pressing need for a culturally adapted competency framework for CP in Saudi Arabia, one that reflects both international best practices and local sociocultural, religious, and systemic realities. Such a framework would support educational institutions in designing relevant curricula, inform accreditation bodies in establishing standards, and assist policymakers in aligning CP with the Kingdom's Vision 2030 health transformation goals¹⁸.

This study aimed to develop a contextually relevant and culturally adapted competency framework for community paramedicine in Saudi Arabia. Drawing on the perspectives of EMS experts, healthcare educators, and policymakers, we sought to identify the essential domains of knowledge, skills, and attitudes required to strengthen CP practice in underserved and rural communities. By situating CP within the Saudi sociocultural context, the proposed framework aspires to reduce healthcare disparities, improve service integration, and enhance trust in prehospital and community-based care.

Study design

This study employed an interpretive qualitative design, using semi-structured interviews to explore the perspectives of healthcare experts on the competencies required for community paramedicine in Saudi Arabia. An interpretive descriptive approach was selected because it enables the systematic exploration of professional experiences while allowing researchers to identify both explicit and implicit meanings in participants' responses¹⁹. This design was particularly suitable for our study aim of developing a contextually relevant competency framework, as it allowed us to interpret participants' narratives within the cultural and systemic realities of Saudi Arabia.

Semi-structured interviews were chosen due to their flexibility in guiding conversations while enabling participants to freely express their insights on key issues. This method also facilitated probing for clarification, which ensured depth and authenticity in the collected data²⁰. The interview guide was informed by prior literature and expert consultations, and it focused on themes relevant to CP practice, including clinical preparedness, communication, cultural considerations, healthcare integration, and technological adaptation.

Participants' answers were interpreted using thematic analysis, in which their narratives were coded inductively, grouped into categories, and subsequently synthesized into broader competency domains. The interpretive approach allowed us not only to capture what participants said but also to contextualize their responses in light of cultural, religious, and systemic healthcare challenges.

Study setting and duration

The study was conducted across five regions of Saudi Arabia (Central, Eastern, Western, Northern, and Southern) to ensure geographic and systemic diversity in participant perspectives. These regions were chosen because they represent distinct differences in healthcare infrastructure, EMS organization, and population distribution, with central and urban areas generally having more advanced resources and rural/peripheral areas facing greater access challenges. Including participants from these varied settings provided a more comprehensive understanding of the competencies required for community paramedicine within the Saudi context.

The overall study period spanned twelve months. Although the number of participants was relatively small ($n = 15$), the extended timeframe was necessary due to practical considerations such as scheduling constraints of senior experts, geographic dispersion across regions, and cultural obligations that limited availability at certain times of the year (e.g., Hajj season and national holidays). This duration also allowed sufficient time for iterative recruitment and analysis, ensuring the credibility of the findings and the inclusion of perspectives from multiple healthcare sectors.

Statistical analysis participants

A total of fifteen experts participated in the study. We adopted a purposive sampling strategy, which is widely used in qualitative research to ensure that participants possess relevant expertise aligned with the study objectives. This approach allowed us to deliberately select individuals with in-depth knowledge of community-based healthcare and EMS in Saudi Arabia.

Eligibility criteria required that participants: (1) had documented professional experience in EMS or community healthcare delivery; (2) had served in roles such as EMS provider, healthcare educator, consultant, or policymaker; and (3) were directly involved in the development, implementation, or evaluation of healthcare initiatives. Individuals who did not meet these criteria were excluded.

The final sample included EMS professionals, academic faculty specializing in EMS education, consultants with expertise in healthcare systems, and policymakers engaged in national or regional health planning. Although the number of participants was relatively modest ($n = 15$), the panel represented a wide range of geographic regions across Saudi Arabia. Moreover, thematic saturation was achieved: after the thirteenth interview, no new competency domains emerged, confirming that the sample size was adequate for capturing the breadth of perspectives required^{21,22}.

Participant recruitment was conducted through institutional channels. Potential participants were identified via professional networks, academic affiliations, and organizational directories. They were contacted directly by the research team using institutional emails and official phone calls. Each expert was provided with an information sheet detailing the study objectives, voluntary nature of participation, and ethical safeguards. Those who agreed to take part scheduled interviews at their convenience. To preserve confidentiality, all responses were anonymized, and each participant was assigned a unique study code.

Data collection

Data were collected through semi-structured interviews conducted by the principal investigator, each lasting between 60 and 90 min and audio-recorded with the prior consent of participants, then transcribed verbatim to ensure accuracy. An interview guide, developed in consultation with experts in EMS education and community health and piloted with two participants for clarity and flow, included open-ended questions such as “What do you consider the most important competencies for community paramedics in Saudi Arabia?”, “What are the current gaps in EMS training and practice that CP could address?”, “How do cultural, religious, or gender-related factors influence the work of paramedics in community settings?”, and “What systemic or organizational challenges need to be overcome to implement CP successfully?”. Interviews were held either in person or virtually, depending on participant preference and geographic location; in-person sessions took place in private offices at King Saud University or designated professional facilities, while virtual sessions were conducted via secure institutional platforms (Microsoft Teams or Zoom). Scheduling was coordinated directly by the principal investigator with participants, typically during working hours or early evenings to accommodate professional commitments. Informed consent was obtained prior to each interview, with written consent signed on site for in-person sessions and electronic consent forms completed and returned for virtual sessions, followed by verbal confirmation at the start of the interview. Thematic saturation was reached after the thirteenth interview, when no new codes or domains emerged, and two additional interviews were conducted to confirm saturation and strengthen the robustness of the findings.

Data analysis

The qualitative data were analyzed using a two-stage process that combined thematic analysis with exploratory factor analysis (EFA) to enhance the rigor of interpretation. First, interview transcripts were imported into RStudio and coded inductively by the principal investigator and an independent co-coder, who met regularly to compare coding decisions, refine the codebook, and resolve discrepancies through discussion, thereby ensuring inter-coder reliability. Peer debriefing with two senior qualitative researchers was conducted at critical points to foster reflexivity and minimize bias. Thematic codes were grouped into broader categories and subthemes, producing an initial framework of competency domains. To further examine the interrelationships among these domains, the coded data were converted into a matrix and subjected to exploratory factor analysis. In this context, EFA was not used as a stand-alone statistical method but rather as a supportive technique to identify latent structures that aligned with the qualitative themes, thereby validating and organizing them into higher-order dimensions. Factor loadings and communalities were examined to determine how strongly each code contributed to the emerging constructs, and model fit indices were assessed to ensure the robustness of the

structure. This sequential approach ensured that the analysis remained grounded in participants' narratives while leveraging EFA to strengthen the internal coherence of the competency framework.

Ethical considerations

Ethical approval for the study was obtained from the Institutional Review Board of King Saud University under project number E-25-9533. The informed consent process was facilitated by the principal investigator, who provided all potential participants with an information sheet detailing the study objectives, voluntary nature of participation, and the right to withdraw at any stage without consequences. Participants were given a minimum of one week to review the materials and ask questions before making their decision. Written consent was obtained for in-person interviews, while electronic consent was obtained for virtual sessions, followed by verbal confirmation at the beginning of the interview.

To protect anonymity, all transcripts were anonymized by removing names, institutional affiliations, and other identifying details. In reporting, participants' voices were authentically represented through the inclusion of direct quotations, coded only by participant number. Data were stored on encrypted, password-protected institutional servers, accessible only to the principal investigator and two co-investigators. In accordance with institutional policy, all data will be securely stored for five years after publication and then permanently deleted.

To address potential bias and power imbalance, the interviewer adopted a neutral stance, emphasized the voluntary nature of participation, and created a respectful and collegial interview environment. Cultural and religious norms were carefully respected; for example, interviews with female participants were scheduled at times and in formats consistent with their preferences, and all interactions adhered to Saudi ethical and cultural guidelines. Member checking was incorporated by offering participants the opportunity to review their transcripts for accuracy, and minor clarifications suggested by participants were integrated into the final dataset. No financial or transport-related compensation was provided, in alignment with institutional ethical policies, but participants were formally acknowledged for their time and contributions.

Results

Characteristics of sample

Table 1 summarizes the characteristics of the 15 experts who participated in the study. Most were men (10/15; 67%), with women representing 33%. Professional roles included EMS providers (8/15; 53%), consultants (4/15; 27%), and policymakers (3/15; 20%). Participants represented all five regions, Central (5/15; 33%), Eastern (4/15; 27%), Western (3/15; 20%), Southern (2/15; 13%), and Northern (1/15; 7%). Regarding professional experience in EMS or healthcare, most had ≥ 6 years: 6–10 years (3/15; 20%), 11–15 years (4/15; 27%), 16–20 years (3/15; 20%), and ≥ 21 years (3/15; 20%), while two participants (13%) had ≤ 5 years. Overall, the panel comprised experienced professionals with broad geographic coverage, consistent with the study's purposive expert sampling.

Competency domains for community paramedicine in Saudi Arabia

Figure 1 illustrates the twelve core competency domains identified as essential for the effective implementation of community paramedicine in Saudi Arabia. At the center lies a holistic framework that integrates clinical expertise, cultural competence, and system-level coordination.

Variable	n	%
Gender		
Male	10	67
Female	5	33
Professional role		
EMS providers	8	53
Consultants	4	27
Policymakers	3	20
Practice region		
Central	5	33
Eastern	4	27
Western	3	20
Southern	2	13
Northern	1	7
Years of experience (years)		
0–5	2	13
6–10	3	20
11–15	4	27
16–20	3	20
≥ 21	3	20

Table 1. Demographic and professional characteristics of study participants (n = 15).

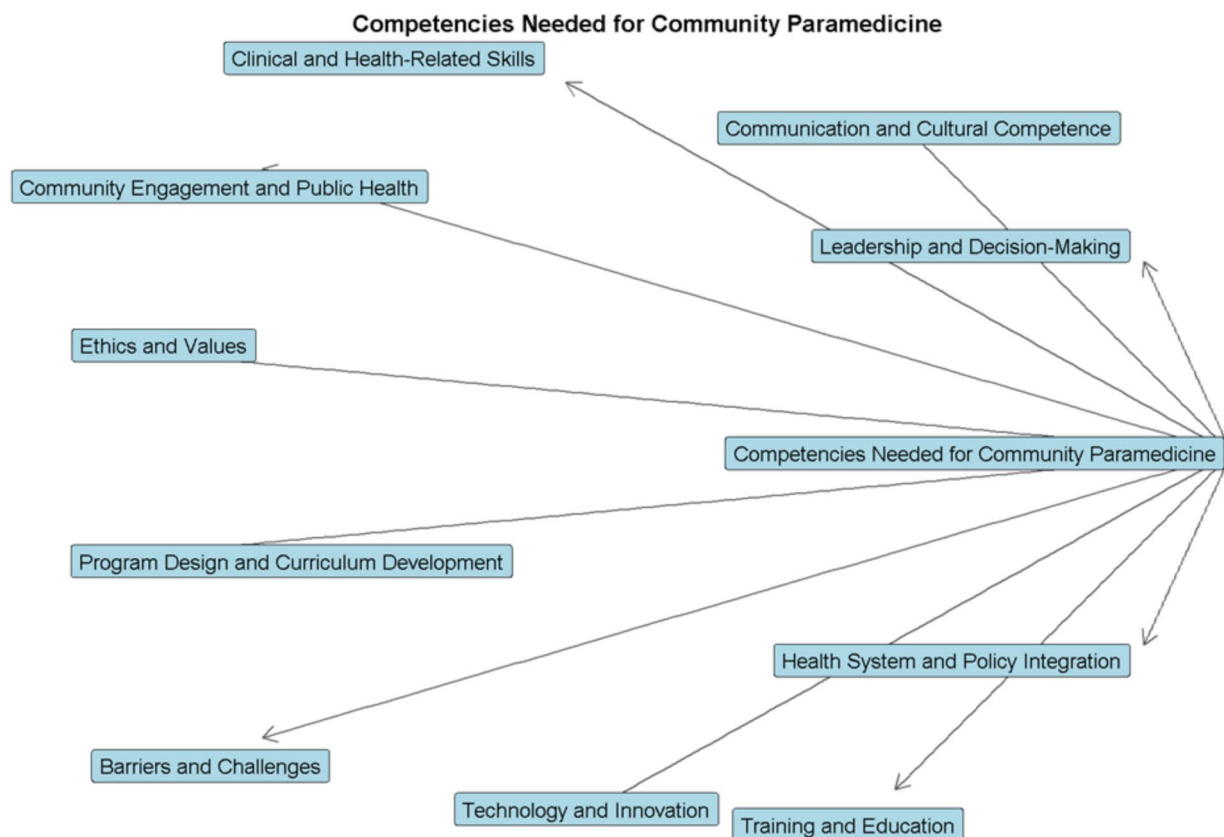


Fig. 1. Core competency domains for community paramedicine in Saudi Arabia.

Key domains include Clinical and Health-Related Skills, which emphasize chronic disease management and emergency response, and Communication and Cultural Competence, which highlight the need for effective interpersonal skills and an understanding of Saudi sociocultural norms. As one participant explained, “A paramedic must know not only the clinical protocols but also how to speak to families in a way that earns their trust.” Another critical area is Leadership and Decision-Making, reflecting the importance of autonomous clinical judgments in dynamic and resource-limited environments.

*Additional domains underscore system integration and professional development. Community Engagement and Public Health stresses trust-building and preventive care, while Health System and Policy Integration reflects the importance of coordination across different levels of care. Ethical Awareness, Continuous Education, and Curriculum Development ensure professional integrity and adaptability. Finally, Technology and Innovation (e.g., telehealth), Training and Education for ongoing workforce development, and recognition of Barriers and Challenges, such as public misperception of the CP role, were consistently emphasized. One expert stated, “Until the public truly understands what community paramedicine is, the program will not reach its full potential.”

Taken together, these twelve domains form a comprehensive framework for preparing community paramedics to address the diverse healthcare needs of the Saudi population.

Proposed competency framework for community paramedicine in Saudi Arabia

Table 2 summarizes the thematic competency areas identified through expert interviews, which expand upon the twelve overarching domains presented in Fig. 1. These competencies span clinical expertise, cultural and communication skills, health system integration, technology use, and public engagement. Experts emphasized that cultural sensitivity and patient trust are just as critical as advanced clinical abilities, particularly in rural and conservative communities. Saudi-specific priorities, such as disaster preparedness for Hajj and the integration of telemedicine for remote areas, also emerged as central themes. Collectively, these findings form the foundation of a culturally adapted competency framework for community paramedics in Saudi Arabia.

Factor structure and dimensional analysis of competencies in community paramedicine

To complement the thematic analysis, EFA was applied to the coded data to examine whether the identified competencies clustered into meaningful latent dimensions. This approach was not intended to replace qualitative interpretation but rather to provide an additional layer of validation by exploring underlying statistical associations across the expert narratives. The analysis revealed three principal components (PA1, PA2, PA3), which broadly aligned with the domains derived from thematic coding.

Theme	Subtheme	Definition	Example Quote
Clinical competencies	Chronic disease management	Managing common chronic conditions in community settings	"They must be strong in chronic disease and home care."
Cultural competence	Saudi cultural sensitivity	Respecting religious, family, and social norms in Saudi care	"Cultural awareness, especially Islamic views, must be part of training."
Communication and leadership	Empathy and active listening	Patient-centered and team-focused communication skills	"Community paramedics need to listen before they act."
Training and education	Continuous professional development	Ongoing learning to maintain competence and adaptability	"Their education cannot stop after graduation."
Health system integration	System navigation skills	Coordinating across hospitals, clinics, and home health	"They must know how to move between levels of care."
Community engagement	Trust building in rural areas	Establishing credibility and rapport in diverse communities	"If the community doesn't accept them, nothing will work."
Technology use in healthcare	Telemedicine and digital health	Using remote monitoring and digital tools for patient support	"Telemedicine is essential for rural and remote areas."
Mental health and palliative care	Depression and end-of-life support	Recognizing psychological distress and providing supportive care	"They need to handle both emotional and spiritual needs."
Challenges and barriers	Public awareness and role clarity	Addressing public misconceptions of the CP role	"Most people don't even know what a community paramedic does."
Policy and governance	Defined scope and accreditation	Clear regulations, pathways, and professional recognition	"We need accreditation and a clear job description."
Emergency and disaster preparedness	Mass casualty management	Skills for large-scale emergencies, including Hajj	"Mass events like Hajj require special disaster training."
Public health and prevention	Vaccination and fall prevention	Preventive interventions through education	

Table 2. Thematic competency areas for community paramedics based on expert interviews.

Item	PA1	PA2	PA3	h ²	u ²	com
Chronic disease management	0.15	-0.46	0.22	0.2837	0.7163	1.7
Communication skills	0.42	-0.16	0.32	0.3007	0.6993	2.2
Cultural competence	-0.78	-0.37	-0.22	0.8031	0.1969	1.6
Preventive care and health education	0.53	-0.09	-0.16	0.3151	0.6849	1.2
Leadership and decision-making	0.69	-0.36	-0.32	0.7096	0.2904	2.0
Mental health support	0.16	0.16	-0.50	0.3035	0.6965	1.4
Telemedicine and digital health	-0.41	-0.25	0.10	0.2427	0.7573	1.8
Palliative and geriatric care	-0.27	0.60	0.04	0.4359	0.5641	1.4
Interdisciplinary collaboration	0.42	0.60	-0.13	0.5501	0.4499	1.9
Ethics and religious considerations	-0.92	0.15	-0.03	0.8643	0.1357	1.1
Emergency and acute care	0.06	0.23	-0.48	0.2907	0.7093	1.5
Research and evidence-based practice	0.24	0.20	0.70	0.5940	0.4060	1.4
Simulation-based training	-0.15	0.70	-0.47	0.7394	0.2606	1.9
Training in rural and underserved areas	0.15	-0.70	-0.08	0.5172	0.4828	1.1
Regulatory and structural challenges	0.19	0.72	0.15	0.5761	0.4239	1.2
Public awareness and role clarity	0.01	0.08	-0.01	0.0069	0.9931	1.1
Policy and governance	-0.23	0.19	0.91	0.9175	0.0825	1.2

Table 3. Standardized loadings (pattern matrix) and communalities.

For instance, Ethics and Religious Considerations (loading = -0.92 on PA1) and Policy and Governance (loading = 0.91 on PA3) emerged as highly influential, reinforcing the importance of contextual and regulatory dimensions in the Saudi framework. Leadership and Decision-Making also demonstrated strong cross-loadings, reflecting its multidimensional role that spans both clinical judgment and organizational integration. In contrast, Public Awareness and Role Clarity exhibited minimal explained variance ($h^2 = 0.0069$), suggesting either that this competency is conceptually diffuse or that it requires further empirical investigation.

Communality (h^2) values indicated the degree to which each item was explained by the extracted factors, while uniqueness (u^2) highlighted residual variance. Complexity (com) values showed that competencies such as Communication Skills and Leadership and Decision-Making had moderate multidimensionality, confirming their cross-cutting nature across domains.

Table 3 presents the factor loadings, communalities, and related statistics, providing empirical support for the multi-layered competency framework in Saudi Arabia. Rather than reducing the qualitative richness, this hybrid approach enhances confidence in the structural coherence of the proposed framework.

Loadings of proposed competencies for community paramedicine

The factor loadings are visually summarized in Fig. 2, which presents how competencies cluster into three distinct but interrelated dimensions. PA1 appears to reflect interpersonal and professional domains, with strong positive associations for Leadership and Decision-Making (0.69), Communication Skills (0.42), and Interdisciplinary Collaboration (0.42). Interestingly, Ethics and Religious Considerations (−0.92) and Cultural Competence (−0.78) loaded negatively, suggesting that these values-based competencies form a distinct dimension rather than aligning directly with technical leadership skills. This pattern highlights the cultural and ethical nuances that differentiate Saudi CP practice from more conventional Western frameworks.

PA2 emphasizes practical training and system integration. High loadings for Simulation-Based Training (0.70), Regulatory and Structural Challenges (0.72), and Palliative and Geriatric Care (0.60) suggest that this dimension represents operational readiness and the ability to navigate institutional structures. Experts repeatedly stressed the importance of hands-on learning, regulation, and system-level coordination, which aligns with the competencies captured in this factor.

PA3 reflects a policy and strategic orientation, marked by strong contributions from Policy and Governance (0.91) and Research and Evidence-Based Practice (0.70). This indicates a dimension that goes beyond individual practice, emphasizing evidence-informed decision-making, regulation, and the strategic development of community paramedicine initiatives at the national level.

Together, these three dimensions, interpersonal/ethical, operational/systemic, and policy/strategic, provide a structured yet culturally grounded understanding of the competency framework for community paramedics in Saudi Arabia, as illustrated in Fig. 2.

Factor loadings across three principal axes (PA1, PA2, PA3)

The exploratory factor analysis highlighted three principal axes representing distinct clusters of competencies for community paramedicine in Saudi Arabia. The first axis (PA1) encompassed ethical, cultural, and communication-related competencies, underscoring the importance of cultural sensitivity, religious awareness, and community engagement. As one participant noted, “Without respecting family traditions, even good medical advice will not be followed.”

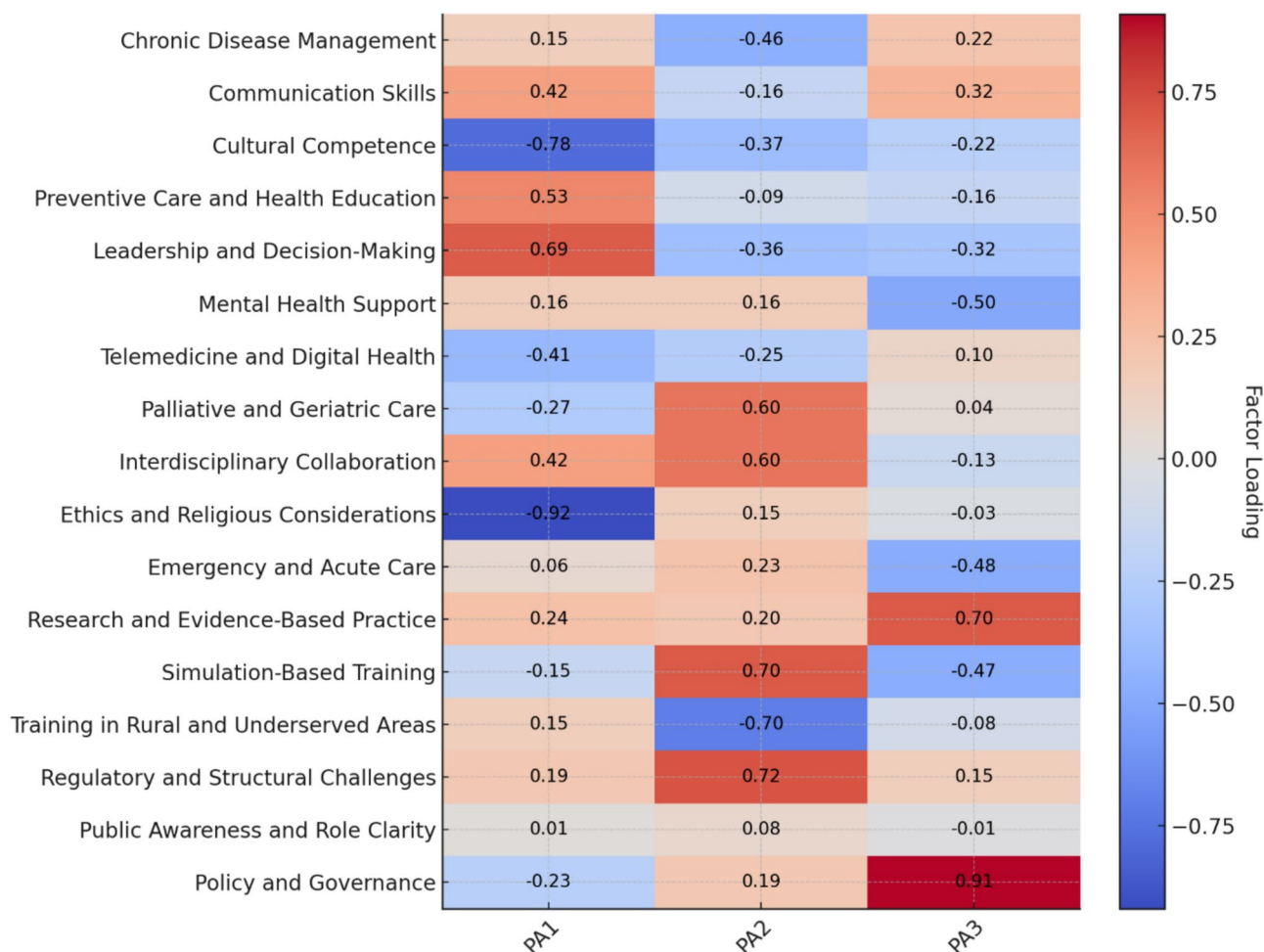


Fig. 2. Factor loadings Heatmap.

Solutions	Description	Quote(s)
Chronic disease management	Training paramedics to manage prevalent conditions such as diabetes, hypertension, and heart disease in home-based settings	Community paramedics in Saudi Arabia need a strong foundation in chronic disease management, Expert 1
Cultural competency	Incorporating cultural awareness, including Islamic views on healthcare, gender roles, and family dynamics into training programs	Training should incorporate cultural awareness modules, Expert 1
Communication and leadership skills	Emphasizing soft skills like patient-centered communication, crisis communication, and decision-making in autonomous environments	Community paramedics must excel in patient-centered communication, Expert 1
Simulation-based learning	Using realistic clinical simulations to build confidence and improve practical decision-making under pressure	Simulation-based learning practice real-life scenarios, Expert 2
Integration with healthcare system	Training on how to coordinate with hospitals, primary care, and emergency systems for continuity of care	Teaching them how to work alongside hospitals, clinics, and home healthcare teams, Expert 1
Telemedicine and digital health	Equipping CPs with skills in remote patient monitoring and virtual consultations	Telemedicine and remote patient monitoring, Expert 1
Palliative and geriatric care	Focusing on end-of-life care, symptom management, and supporting families of terminally ill patients	Key skills include pain and symptom management, Expert 3
Continuous professional development	Ensuring lifelong learning through workshops, certifications, and updated knowledge in clinical practices	There should be continuous professional development (CPD), Expert 1
Research and critical thinking	Embedding research methods, data analysis, and critical thinking into master's curricula for community paramedics	They should have research skills[data collection, analysis, and publication, Expert 12
Emergency preparedness and disaster medicine	Training on disaster response, mass casualty management, and emergency logistics, especially relevant in Saudi contexts like Hajj	Disaster preparedness and response training, Expert 14
Public health and preventive care	Focus on health promotion, screenings, vaccinations, and education to reduce hospitalizations	Preventive care and early intervention, Expert 15
Governance and role clarity	Establishing accreditation, job descriptions, and career pathways to define CPs' roles in the system	Very clear announced accreditation body, Expert 5
Hands-on training and rural exposure	Field-based rotations and practical training, especially in underserved areas, to reinforce skills	Internships or clinical rotations in home healthcare and public health settings, Expert 1
Mental health training	Educating paramedics on how to identify, support, and refer patients with mental health issues	Mental health support "recognizing and responding to anxiety, depression, Expert 1
Ethical and legal training	Training on ethical decision-making, informed consent, DNR policies, and patient autonomy	Ethical and legal aspects of end-of-life care including Do Not Resuscitate (DNR) orders, Expert 3

Table 4. Expert-driven training solutions.

The second axis (PA2) reflected operational readiness and system-level integration, including competencies in simulation-based training, geriatric and palliative care, and preparedness for rural practice. This aligns with expert views emphasizing the need for practical training, as one EMS provider explained: *"Realistic simulation is the only way to prepare paramedics for events like Hajj."*

The third axis (PA3) emphasized strategic and policy-oriented competencies, particularly governance, research, and public awareness. Policymakers highlighted the necessity of defining clear roles and establishing regulatory frameworks, with one expert stating: *"Without a clear scope of practice, community paramedics will not be fully recognized within the health system."*

Together, these three dimensions provide a structured yet contextually grounded framework that integrates cultural values, clinical preparedness, and strategic policy development into the role of community paramedicine in Saudi Arabia.

Strategic training solutions to enhance community paramedicine competencies

Expert interviews highlighted a set of strategic training solutions designed to strengthen the competencies required for community paramedicine in Saudi Arabia (Table 4). These solutions cluster into five broad domains.

The first cluster relates to clinical preparedness, covering competencies in chronic disease management, palliative and geriatric care, mental health support, and emergency preparedness. These are particularly relevant given Saudi Arabia's increasing burden of noncommunicable diseases, its aging population, and the unique demands of mass gatherings such as Hajj. As one expert explained, "Community paramedics in Saudi Arabia need a strong foundation in chronic disease management and preventive medicine."

The second cluster emphasizes communication, leadership, and cultural competence. Effective patient-centered communication, crisis communication, and autonomous decision-making were consistently identified as priorities. Experts also highlighted the necessity of integrating cultural and ethical training rooted in Islamic values to ensure both social legitimacy and patient trust. One participant stated, "Without cultural awareness and respect for family traditions, patients will not fully accept the care provided."

The third cluster underscores educational and experiential development, including simulation-based learning, continuous professional development, hands-on field training, rural exposure, and research skills. These strategies ensure that CPs acquire not only theoretical knowledge but also practical expertise and the capacity for evidence-based practice. As summarized by an educator, "Simulation-based learning and rural rotations provide the real-life experience that paramedics need to perform with confidence."

The fourth cluster addresses health system integration and digital readiness, highlighting the importance of system navigation, collaboration with hospitals and primary care, and proficiency in telemedicine and digital

health. This reflects the ongoing digital transformation in Saudi healthcare and the drive toward more integrated, patient-centered services.

Finally, the fifth cluster involves structural clarity and public health orientation. Solutions such as role definition, governance, and accreditation were considered essential for professional recognition, while preventive care training was viewed as critical for reducing avoidable hospital admissions through vaccination, screening, and education. One policymaker noted, “Community paramedics must have a very clear accreditation pathway and scope of practice if they are to be fully embedded in the health system.”

Together, these expert-driven solutions provide a comprehensive roadmap for aligning community paramedicine training with Saudi Arabia’s health priorities and sociocultural context.

Discussion

The findings of this study highlight both universal and context-specific challenges in defining the competencies necessary for community paramedicine in Saudi Arabia. As introduced earlier, our framework was informed by Batt et al.’s systems-thinking approach, which emphasizes the integration of individual, organizational, and policy-level perspectives in shaping healthcare innovations⁹. By applying this approach, we were able to structure competencies across multiple levels of the Saudi healthcare system, from patient-facing skills to systemic governance.

The twelve domains identified in this study form a comprehensive competency framework. Clinical competencies such as chronic disease management, mental health support, and palliative and geriatric care echo the global shift of CP programs toward managing long-term conditions outside hospitals²³. Communication and leadership skills emerged as critical for building trust with patients and guiding teams in autonomous field settings, consistent with prior international evidence²⁴. Cultural competence and ethical practice were especially emphasized by Saudi experts, underscoring the unique requirement to integrate Islamic health perspectives, gender norms, and family-based decision-making into paramedic practice. Health system integration and policy alignment were also prominent, reflecting the need for CPs to navigate between primary care, hospitals, and community-based care providers. Educational and training-related competencies, including simulation-based training, continuous professional development, and research literacy, reflect a strong push toward professionalization and evidence-based practice. Community engagement, public awareness, and preventive care remain central to ensuring that CPs are both trusted and effective in their roles. Finally, emergency and disaster preparedness, tailored to the unique challenges of Saudi Arabia such as Hajj mass gatherings, differentiates this framework from those of many other countries.

Compared with international frameworks, our findings demonstrate both convergence and divergence. The Ontario CP model²⁵ similarly highlights system navigation and integration with primary care, while Australian programs emphasize autonomy and expanded scopes of practice²⁶. Finnish studies illustrate the role of CPs in reducing emergency department utilization and retreatment rates²⁷. Polish and V4 region research highlights deficiencies in simulation-based training and workforce preparedness²⁸. While these frameworks converge on clinical, communication, and educational domains, our results are distinctive in embedding Islamic ethical considerations, rural–urban healthcare disparities, and mass gathering medicine, which are unique to the Saudi context.

The systems-thinking framework provided methodological guidance in structuring our competency domains. First, we mapped key stakeholders at multiple levels (patients, paramedics, educators, policymakers). Second, we identified interactions across healthcare layers (community, primary care, hospitals, emergency services). Third, we clustered competencies around systemic bottlenecks such as rural access, accreditation gaps, and role ambiguity. Finally, we validated these clusters with expert participants, ensuring that the identified competencies reflected both practical experiences and strategic needs. This iterative process aligns with calls in the literature for systemic approaches to healthcare innovation²⁹.

Cultural competence deserves particular attention. Our findings confirm international studies that emphasize cultural awareness in CP programs³⁰, but in Saudi Arabia, this domain requires specific adaptations. For example, religious considerations, gender-sensitive care, and the role of family decision-making were highlighted repeatedly by experts. These aspects extend beyond generic cultural competence and necessitate the incorporation of Islamic values and local social structures into CP training curricula.

Clinical domains such as chronic disease management and palliative care also demonstrated strong resonance with global trends. The success of Colorado’s MIH-CP program³¹ in managing low-acuity care parallels our participants’ emphasis on chronic disease training. Similarly, our mental health training recommendations directly address confidence gaps reported among Australian paramedics³². The inclusion of simulation-based training aligns with European findings that practical preparedness remains insufficiently addressed²⁸.

System-level challenges further reinforce the necessity of clear governance and policy frameworks. Consistent with Bigham et al.³³ our study highlights how unclear accreditation and role definitions can hinder the sustainability of CP programs. The strong loading of “Policy and Governance” in our factor analysis reflects this structural priority. Addressing these gaps will be essential for scaling CP in Saudi Arabia.

Educational recommendations likewise converge with international evidence. Dimitriadou et al.³⁴ validate the inclusion of geriatric care competencies, while Notarnicola et al.³⁵ emphasize communication and interpersonal skills in nursing, supporting our findings on the importance of soft skills in CP training. O’Meara et al.’s³⁶ work on global career structures parallels our recommendations for continuous professional development, while the RESPIGHT model³⁷ resonates with our holistic framework but lacks the Saudi-specific cultural and ethical dimensions identified here.

Finally, our findings suggest that CP implementation in Saudi Arabia must address sustainability and adaptation. Funding models, as shown in Pearson et al.⁴, and stakeholder engagement, as highlighted in Lunn

et al.³⁸, will be critical for embedding CP into the national health system. Moreover, respect for cultural and religious norms will be non-negotiable for ensuring public acceptance and legitimacy.

In sum, this study provides one of the first comprehensive frameworks for CP competencies in Saudi Arabia. By combining global lessons with local contextualization, it highlights both shared and unique elements of paramedic practice. Future research should pilot these competencies in training curricula and evaluate their impact on patient outcomes, workforce readiness, and system integration.

Strengths and limitations

This study has several strengths. The use of semi-structured interviews provided rich and nuanced insights from experts with diverse professional roles across multiple regions of Saudi Arabia. The inclusion of policy makers, consultants, and EMS providers ensured a multidimensional perspective, while geographic representation, though uneven, broadened the contextual scope. Methodological rigor was enhanced through the combination of thematic analysis and exploratory factor analysis, which together offered both conceptual depth and empirical validation. To strengthen credibility, we used verbatim quotes from participants to support the themes and triangulated findings across different professional groups.

Nonetheless, some limitations should be acknowledged. The relatively small sample size ($n=15$), while adequate to reach thematic saturation, inevitably limits generalizability beyond the studied population. To minimize this limitation, we purposively recruited experts with extensive experience in EMS, education, and policy, ensuring that participants represented the key perspectives most relevant to the development of a competency framework. Second, although purposive sampling is appropriate in qualitative research, it carries a risk of selection bias. To mitigate this, recruitment was conducted across several regions and institutional levels. Third, certain regions remained underrepresented, which may have influenced the diversity of viewpoints; this was partially addressed by including participants with national-level policy and academic roles. Finally, this study did not capture patient or community voices, which could provide additional perspectives on the acceptability of competencies. Future research should therefore expand to include community members, patients, and a larger, more representative sample of healthcare professionals to enhance transferability.

Conclusions

This study has identified a comprehensive and culturally tailored set of competencies essential for the effective implementation of community paramedicine in Saudi Arabia. The findings emphasize that CPs must be equipped not only with clinical and technical skills but also with competencies in cultural sensitivity, communication, mental health support, health system integration, and disaster preparedness. Importantly, the incorporation of context-sensitive training was shown to help bridge urban–rural disparities by preparing paramedics to deliver culturally appropriate, community-based care in underserved areas, while also addressing sociocultural barriers such as gender norms and perceptions of professional roles.

By drawing on international best practices and adapting them to the Saudi sociocultural and health system context, the proposed competency framework represents a conceptual and operational model for guiding education, practice, and policy development. The interconnected domains of clinical preparedness, cultural competence, leadership, and health system integration collectively provide a strategic foundation for strengthening CP implementation.

Addressing healthcare disparities, particularly in rural and marginalized communities, the CP model offers a promising pathway to expand access, reduce inequities, and improve the quality and efficiency of care. For successful adoption, stakeholders must invest in regulatory frameworks, accreditation systems, and public awareness campaigns, while fostering interdisciplinary collaboration and continuous professional development. Ultimately, the future of CP in Saudi Arabia depends on aligning this competency framework with national health transformation priorities and the evolving needs of its population.

Data availability

All data generated and analyzed during this study are included in this published article. Due to the nature of the qualitative interviews and ethical obligations regarding confidentiality, raw transcripts are not publicly available. Requests for access to re-identified excerpts may be considered upon reasonable request to the corresponding author, subject to ethics board approval.

Received: 8 June 2025; Accepted: 14 October 2025

Published online: 12 November 2025

References

1. Fitzgerald, M. *A Framework for Implementing Community Paramedic Programs in British Columbia* by Maureen Evashkevich. (2016). <https://doi.org/10.13140/RG.2.1.1611.5445>
2. Evans, R., MCGovern, R., Birch, J. & Newbury-birch, D. Which extended paramedic skills are making an impact in emergency care and can be related to the UK paramedic system? A systematic review of the literature. *Emerg. Med. J.* **31**, 594–603. <https://doi.org/10.1136/emered-2012-202129> (2014).
3. Choi, B. Y., Blumberg, C. & Williams, K. Mobile integrated health care and community paramedicine: An emerging emergency medical services concept. *Ann. Emerg. Med.* **67**, 1–6. <https://doi.org/10.1016/j.annemergmed.2015.06.005> (2015).
4. Pearson, K. B., Gale, J. A. & Shaler, G. *Community Paramedicine in Rural Areas: State and Local Findings and the Role of the State Flex Program*. (2014).
5. Bigham, B. L., Lavelle, C., Hulme, J. & Hayman, K. The simulated newsroom: A novel educational innovation to teach advocacy skills to resident physicians. *AEM Educ. Train.* **6**(4), e10790 (2022).

6. Gregg, A., Tutek, J., Leatherwood, M. D., Crawford, W. & Al, G. E. T. Systematic review of community paramedicine and EMS mobile integrated health care interventions in the united States. *Popul. Health Manag.* **00**(00), 1–10. <https://doi.org/10.1089/pop.2018.0114> (2019).
7. Patterson, D. G. et al. What Is the potential of community paramedicine to fill rural health care Gaps?. *J. Health Care Poor Underserved* **27**(4), 144–158 (2018).
8. Meara, P. O., Stirling, C., Ruest, M. & Martin, A. Community paramedicine model of care: An observational, ethnographic case study. *BMC Health Serv. Res.* **16**, 1–11. <https://doi.org/10.1186/s12913-016-1282-0> (2016).
9. Batt, A. M. et al. Identifying features of a system of practice to inform a contemporary competency framework for paramedics in Canada. *Healthcare* **12**(9), 946. <https://doi.org/10.3390/healthcare12090946> (2024).
10. Newton, J., Carpenter, T. & Zwicker, J. Exploring paramedic perspectives on emergency medical service (EMS) delivery in Alberta: A qualitative study. *BMC Emerg. Med.* **24**(1), 66. <https://doi.org/10.1186/s12873-024-00986-z> (2024).
11. Alanazy, A. R. M., Fraser, J. & Wark, S. Emergency medical services in rural and urban Saudi Arabia: A qualitative study of red Crescent emergency personnel' perceptions of workforce and patient factors impacting effective delivery. *Health Soc. Care Community* **30**, 4556–4563. <https://doi.org/10.1111/hsc.13859> (2022).
12. Majchrowska, A. et al. Social prestige of the paramedic profession. *Int. J. Environ. Res. Public Health* **18**(4), 1506. <https://doi.org/10.3390/ijerph18041506> (2021).
13. Nejtek, V. A., Aryal, S., Talari, D., Wang, H. & O'Neill, L. A pilot mobile integrated healthcare program for frequent utilizers of emergency department services. *Am. J. Emerg. Med.* **35**(11), 1702–1705. <https://doi.org/10.1016/j.ajem.2017.04.061> Nolan (2017).
14. Cameron, P. & Carter, A. Community paramedicine: A patch, or a real system improvement?. *Can. J. Emerg. Med.* **21**(6), 691–693. <https://doi.org/10.1017/cem.2019.439> (2020).
15. Moafa, H. N. et al. Disparities between rural and urban areas of the central region of Saudi Arabia in the utilization and time-centeredness of emergency medical services. *Int. J. Environ. Res. Public Health* **17**, 7944 (2020).
16. O'Connell, M. B., Korner, E. J., Rickles, N. M., Sias, J. J. & American College of Clinical Pharmacy. Cultural competence in health care and its implications for pharmacy: Part 1. Overview of key concepts in multicultural health care. *Pharmacother. J. Human Pharmacol. Drug Ther.* **27**(7), 1062–1079 (2007).
17. Theodosopoulos, L., Fradelos, E. C., Panagiotou, A., Dreliozis, A. & Tzavella, F. Delivering culturally competent care to migrants by healthcare personnel: A crucial aspect of delivering culturally sensitive care. *Soc. Sci.* **13**(10), 530 (2024).
18. Saudi Health Council. Integrating nursing expertise and hospital management: A collaborative framework for improved outcomes. *J. Integr. Care Res.* **12**(2), 45–67 (2023).
19. Thompson Burdine, J., Thorne, S. & Sandhu, G. Interpretive description: A flexible qualitative methodology for medical education research. *Med. Educ.* **55**(3), 336–343. <https://doi.org/10.1111/medu.14380> (2021).
20. DeJonckheere, M. & Vaughn, L. M. Semistructured interviewing in primary care research: A balance of relationship and rigour. *Fam. Med. Community Health* **7**(2), e000057. <https://doi.org/10.1136/fmch-2018-000057> (2019).
21. Guest, G. & Johnson, L. How many interviews are enough? An experiment with data saturation and variability. *Field Methods* **18**(1), 59–82. <https://doi.org/10.1177/1525822X05279903> (2006).
22. Hennink, M. & Kaiser, B. N. Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Soc. Sci. Med.* **292**, 114523. <https://doi.org/10.1016/j.socscimed.2021.114523> (2022).
23. Taylor, S. J. C. et al. A rapid synthesis of the evidence on interventions supporting self-management for people with long-term conditions (PRISMS practical systematic review of self-management support for long-term conditions). *Health Soc. Care Deliv. Res.* **2**(53), 1–580 (2014).
24. Goniewicz, K., Burkle, F. M., Hall, T. F., Goniewicz, M. & Khorram-Manesh, A. Global public health leadership: The vital element in managing global health crises. *J. Glob. Health* **12**, 03003 (2022).
25. Agarwal, G., Keenan, A., Pirrie, M. & Marzanek-Lefebvre, F. Integrating community paramedicine with primary health care: A qualitative study of community paramedic views. *CMAJ Open* **10**(2), E331–E337. <https://doi.org/10.9778/cmajo.20210179> (2022).
26. Wiggins, D., Downie, A., Engel, R. M. & Brown, B. T. Factors that influence scope of practice of the five largest health care professions in Australia: A scoping review. *Hum. Resour. Health* **20**(1), 87 (2022).
27. Hänninen, J., Kouvonen, A. & Sumanen, H. Patients seeking retreatment after community paramedic assessment and treatment: Piloting a community paramedic unit program in southwest Finland. *Nurs. Rep.* **10**(2), 66–74. <https://doi.org/10.3390/nursrep10020010> (2020).
28. Titko, M. & Slemenský, M. Educational aspects affecting paramedic preparedness and sustainability of crisis management: Insights from V4 countries and the role of innovative technologies. *Sustainability* **17**(5), 1944. <https://doi.org/10.3390/su17051944> (2025).
29. Forrest, C. B., Chesley, F. D. Jr., Tregear, M. L. & Mistry, K. B. Development of the learning health system researcher core competencies. *Health Serv. Res.* **53**(4), 2615–2632 (2018).
30. Bornstein, S. et al. Development of enriched core competencies for health services and policy research. *Health Serv. Res.* **53**, 4004–4023 (2018).
31. *Mobile Integrated Health Care Patients*, <https://mihcp.tmf.org/Patients>
32. Emond, K. et al. Characteristics of confidence and preparedness in paramedics in metropolitan, regional, and rural Australia to manage mental-health-related presentations: A cross-sectional study. *Int. J. Environ. Res. Public Health* **18**(4), 1882. <https://doi.org/10.3390/ijerph18041882> (2021).
33. Bigham, B. L. et al. Paramedic self-reported exposure to violence in the emergency medical services (EMS) workplace: A mixed-methods cross-sectional survey. *Prehosp. Emerg. Care* **18**(4), 489–494 (2014).
34. Dimitriadou, I. et al. Comprehensive geriatric health assessment core competencies and skills for primary care nurses: A scoping review. *Geriatrics* **10**(2), 48. <https://doi.org/10.3390/geriatrics10020048> (2025).
35. Notarnicola, I. et al. A systematic review of nursing competencies: Addressing the challenges of evolving healthcare systems and demographic changes. *Nurs. Rep.* **15**(2), 56. <https://doi.org/10.3390/nursrep15020056> (2025).
36. O'Meara, P., Wingrove, G. & Ahlers, M. An international community paramedic career structure: A synthesis of the literature, regulatory frameworks, and community paramedicine expert advice. *Int. J. Paramed.* **8**, 18–33 (2024).
37. O'Meara, P., Stirling, C., Ruest, M. & Martin, A. Community paramedicine model of care: An observational, ethnographic case study. *BMC Health Serv. Res.* **16**, 1–11 (2015).
38. Lunn, T. M., Bolster, J. L. & Batt, A. M. Community paramedicine supporting community needs: A scoping review. *Health Soc. Care Community* **2024**(1), 4079061 (2024).

Acknowledgements

The authors would like to extend their appreciation to King Saud University for funding this work through the ongoing Research Funding Program (ORF-2025-649), King Saud University, Riyadh, Saudi Arabia

Author contributions

Conceptualization, E.A.A. and A.M.A.-W.; methodology, E.A.A.; software, E.A.A.; validation, E.A.A., A.M.A.-W. and A.M.M.; formal analysis, E.A.A.; investigation, E.A.A.; resources, E.A.A.; data curation, E.A.A.; writing—original draft preparation, E.A.A., M.H.A., M.A., R.A.A., A.M.A., S.M.A., M.A.A., A.M.A.-W., K.G.,

J.G.S and A.M.M.; writing—review and editing, K.G. and A.M.A.-W.; visualization, E.A.A.; supervision, K.G. and A.M.A.-W., project administration, A.M.A.-W. W. All authors have read and agreed to the published version of the manuscript.

Declarations

Competing interests

The authors declare no competing interests.

Ethics approval

This study was approved by the Institutional Review Board (IRB) under the project number E-25-9533. All participants were provided with an information sheet detailing the study's purpose and procedures. Verbal and written informed consent were obtained prior to participation, in accordance with the ethical standards of human subject's research.

Human and animal rights

All methods were in accordance with the ethical standards of human subject's research.

Additional information

Correspondence and requests for materials should be addressed to A.M.A.-W. or K.G.

Reprints and permissions information is available at www.nature.com/reprints.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

© The Author(s) 2025