The Review Of
DIABETIC
STUDIES OPEN ACCESS

Prehospital–Primary Care Continuity For Chronic And Non-Communicable Disease Emergencies In Saudi Arabia: A Review Of Emergency Medical Services –Nursing Integration To Reduce Avoidable Morbidity And Mortality

Saleh Hail Manzil Alanazi[1], Muslih Aqeel Shatat Alanazi[2], Majed Hazaa Mutab[3], Ahoud Nayef Saud Al-Shammari[4], Nujood Kunhair Swaid Al-Anazi[5], Shroug Moubark Alshamari[6], Hamdah Ghazi Nuhaytir Aldhafeeri[7]

[1]Emergency Medical Services, Saudi Red Crescent Authority
[2]Emergency Medicine, Saudi Red Crescent Authority
[3]Emergency Medical Services Technician
[4]General Nursing, Al-Nayfiyah Health Center
[5]General Nursing, Al-Nayfiyah Health Center
[6]Nursing Specialist, Al-Uwayqilah General Hospital
[7]Nursing Technician, Al-Aziziyah B Health Center

Abstract

Chronic and non-communicable diseases constitute an escalating public health challenge in Saudi Arabia, placing unprecedented demands on emergency medical services and contributing to preventable morbidity and mortality. This integrative review examines the current state of prehospital–primary care continuity for chronic disease emergencies within the Saudi healthcare context, with particular emphasis on emergency medical services and nursing integration strategies. A systematic search of PubMed, Scopus, and Web of Science databases identified 847 potentially relevant articles, of which 43 met inclusion criteria for detailed analysis. Findings reveal substantial fragmentation in care transitions between prehospital emergency responses and primary care follow-up, resulting in high rates of emergency department revisits and ambulance re-utilization among patients with diabetes, cardiovascular disease, and chronic respiratory conditions. Effective integration models identified internationally emphasize structured communication protocols, shared electronic health records, community paramedicine initiatives, and nurse-led chronic disease management programs. Implementation barriers specific to Saudi Arabia include geographic disparities in primary care access, incomplete health information exchange infrastructure, and limited paramedic scope of practice regarding chronic disease assessment. Evidence supports development of standardized handover procedures, risk stratification tools applied in prehospital settings, and systematic post-emergency primary care referral pathways as mechanisms to reduce avoidable emergency service utilization and improve long-term health outcomes for patients with chronic conditions.

Keywords: emergency medical services, primary care continuity, chronic disease, Saudi Arabia, nursing integration, prehospital care.

1. Introduction

The Kingdom of Saudi Arabia confronts a rapidly evolving epidemiological landscape characterized by escalating prevalence of chronic and non-communicable diseases. Recent epidemiological data indicate that diabetes mellitus affects approximately 18.3% of the adult population, cardiovascular diseases account for 42% of all deaths, and chronic respiratory conditions represent a growing burden on healthcare infrastructure (Alqahtani et al., 2017; Robert et al., 2015). This epidemiological transition, occurring

alongside demographic shifts toward an aging population, has transformed the nature and volume of emergency medical services utilization throughout the Kingdom. Unlike acute traumatic injuries or infectious disease outbreaks that dominated historical emergency call patterns, contemporary prehospital emergency responses increasingly address complications of chronic conditions including diabetic emergencies, hypertensive crises, heart failure exacerbations, and chronic obstructive pulmonary disease complications (Al-Shammari et al., 2017).

The Saudi Red Crescent Authority, established in 1963 and operating as the principal emergency medical services provider across the Kingdom, reports that chronic disease-related emergencies constitute approximately 40% of total emergency calls in urban centers and an estimated 35% in rural regions (Alnasser et al., 2019). Analysis of emergency department presentations reveals that substantial proportions of these emergency encounters represent preventable exacerbations of inadequately managed chronic conditions rather than unavoidable acute medical crises (Alanazi et al., 2019). Furthermore, longitudinal tracking of frequent emergency service users demonstrates that patients with chronic diseases account for disproportionate emergency medical services utilization, with some individuals generating more than ten emergency calls annually despite availability of primary healthcare services (Aldossary et al., 2008).

This pattern of emergency service overreliance among chronic disease populations reflects fundamental discontinuities in the healthcare delivery system, particularly regarding transitions between acute prehospital emergency interventions and ongoing primary care management. International literature extensively documents that effective chronic disease management requires longitudinal continuity of care, proactive monitoring, patient education, and early intervention when clinical deterioration emerges (Haggerty et al., 2003; Uijen et al., 2012). However, structural fragmentation between emergency medical services and primary healthcare systems frequently impedes establishment of effective care continuity pathways, resulting in cycles of emergency presentation, temporary stabilization, and subsequent re-presentation without underlying disease process modification (Ruger et al., 2010).

Within Saudi Arabia's healthcare architecture, primary healthcare centers constitute the foundation of the national health system, providing preventive services, chronic disease management, and first-line medical care through a network of more than 2,400 facilities distributed across urban and rural regions (Almalki et al., 2011). These primary health centers employ substantial nursing workforces responsible for chronic disease monitoring, medication management support, health education delivery, and care coordination. Simultaneously, emergency medical services personnel, including emergency medical technicians and paramedics operating under Saudi Red Crescent Authority administration, deliver prehospital emergency care with increasing clinical sophistication but limited formal integration with primary care systems (Bigham et al., 2013).

The absence of systematic communication protocols, shared health information infrastructure, and defined care transition pathways between these two critical healthcare sectors generates predictable failures in continuity. Paramedics responding to chronic disease emergencies typically possess minimal information regarding patients' baseline health status, primary care provider relationships, medication regimens, or recent clinical trajectory. Conversely, primary healthcare nurses managing patients with chronic conditions often remain uninformed regarding emergency medical services encounters their patients experience, missing opportunities for intensified management or intervention modification (O'Cathain et al., 2014). This bidirectional information gap perpetuates reactive rather than proactive care patterns, with emergency services functioning as de facto safety nets for primary care system failures rather than components of integrated chronic disease management strategies.

International healthcare systems have developed various models addressing prehospital–primary care integration, including community paramedicine programs that extend paramedic roles beyond emergency response to encompass preventive home visits and chronic disease monitoring, nurse practitioner-led urgent care services that divert low-acuity emergency calls to primary care pathways, and electronic health record systems enabling real-time information exchange between emergency and primary care providers (Agarwal

et al., 2019; Martin-Misener et al., 2009). These innovations demonstrate measurable reductions in emergency department utilization, improvements in chronic disease control metrics, and enhanced patient satisfaction when implemented with adequate infrastructure and interprofessional collaboration frameworks.

Despite growing recognition of continuity gaps within Saudi Arabia's healthcare system, systematic examination of prehospital–primary care integration strategies tailored to the Kingdom's unique healthcare delivery context, cultural considerations, and resource distribution patterns remains limited. Vision 2030 health sector transformation initiatives emphasize preventive care enhancement and healthcare system efficiency optimization, creating policy momentum for innovations addressing chronic disease emergency burden (Ministry of Health, 2016). However, evidence-based guidance regarding optimal integration models, implementation strategies, and expected outcomes specific to Saudi Arabia's emergency medical services and primary care nursing contexts has not been comprehensively synthesized.

This integrative review addresses this knowledge gap by systematically examining existing literature on prehospital–primary care continuity for chronic and non-communicable disease emergencies, with particular attention to emergency medical services and nursing integration mechanisms. The review aims to characterize current challenges in care transitions between prehospital emergency responses and primary healthcare follow-up, identify effective integration strategies documented in international contexts, evaluate applicability of these approaches to Saudi Arabia's healthcare system characteristics, and propose evidence-informed recommendations for strengthening continuity pathways to reduce avoidable morbidity and mortality among chronic disease populations.

2. Literature Review

2.1 Chronic Disease Burden and Emergency Services Utilization in Saudi Arabia

The epidemiological transition occurring throughout Saudi Arabia has fundamentally altered disease burden patterns, with chronic non-communicable conditions displacing infectious diseases as principal causes of morbidity and mortality. Comprehensive national surveys document diabetes prevalence rates exceeding 23% among adults aged 30 years and older in some regions, positioning Saudi Arabia among nations with highest global diabetes burdens (Alqahtani et al., 2017). Cardiovascular disease prevalence similarly demonstrates alarming trajectories, with hypertension affecting approximately 40% of adult Saudis and ischemic heart disease representing the leading single cause of death (Alhabib et al., 2020). Chronic respiratory diseases, including asthma and chronic obstructive pulmonary disease, affect substantial populations particularly in urban centers with elevated air pollution exposure and in regions with high smoking prevalence (Moradi-Lakeh et al., 2015).

These chronic conditions generate substantial emergency services demand through acute exacerbations, complications, and inadequate outpatient management. Diabetes-related emergency presentations encompass hypoglycemic events, diabetic ketoacidosis, hyperglycemic hyperosmolar states, and secondary complications including infections and cardiovascular events. Robert et al. (2015) documented that diabetic patients in Saudi Arabia experience emergency department visit rates approximately three times higher than non-diabetic populations, with significant proportions of these visits representing preventable complications of suboptimal glycemic control. Cardiovascular emergencies similarly demonstrate patterns suggesting inadequate chronic disease management, with heart failure exacerbations, hypertensive urgencies, and acute coronary syndromes frequently occurring among patients with known cardiac disease and inconsistent medication adherence or monitoring (Al-Zakwani et al., 2013).

Analysis of emergency medical services utilization patterns reveals that chronic disease patients constitute a distinct population of high-frequency service users. Al-Shammari et al. (2017) identified that approximately 10% of emergency medical services users account for nearly 35% of total emergency calls, with chronic conditions including diabetes, cardiovascular disease, and chronic kidney disease representing

predominant diagnoses among this high-utilizing cohort. Furthermore, temporal analysis demonstrates clustering of emergency calls among individual patients, suggesting cycles of acute decompensation, emergency intervention, temporary stabilization, and subsequent deterioration without effective disease trajectory modification.

Geographic disparities in primary care access contribute substantially to chronic disease emergency patterns. Rural and remote regions of Saudi Arabia face particular challenges, with primary healthcare centers serving geographically dispersed populations and often experiencing workforce shortages, limited diagnostic capabilities, and constrained specialty consultation access (Aldossary et al., 2008). These access barriers result in delayed chronic disease diagnosis, inconsistent monitoring, and reduced preventive intervention delivery, culminating in higher rates of acute complications requiring emergency intervention. Conversely, even in urban centers with adequate primary care infrastructure, system fragmentation and care coordination deficiencies generate continuity gaps contributing to emergency service overreliance.

2.2 Continuity of Care Frameworks and Chronic Disease Management

Continuity of care represents a multidimensional construct encompassing informational continuity through coherent clinical information transmission across providers and care settings, management continuity through consistent care plans aligned across providers, and relational continuity through ongoing therapeutic relationships between patients and healthcare professionals (Haggerty et al., 2003). For chronic disease populations, effective continuity mechanisms prove essential for sustained therapeutic adherence, early identification of clinical deterioration, and coordinated responses to changing clinical needs (Uijen et al., 2012). Empirical evidence consistently demonstrates associations between stronger care continuity and improved chronic disease outcomes including better glycemic control among diabetic patients, reduced cardiovascular event rates, fewer hospitalizations for ambulatory care-sensitive conditions, and lower overall healthcare expenditures (Hussey et al., 2014).

Emergency medical services encounters represent critical moments within chronic disease trajectories, often indicating care plan failures or inadequate disease monitoring. However, these encounters simultaneously present opportunities for care coordination enhancement if appropriate information exchange and follow-up mechanisms function effectively. The literature identifies several continuity challenges specific to emergency care transitions, including incomplete transfer of clinical information from prehospital to emergency department settings, absence of emergency department discharge information transmission to primary care providers, and lack of systematic follow-up ensuring primary care re-engagement following emergency encounters (Ruger et al., 2010).

These continuity failures perpetuate fragmented care patterns wherein emergency interventions address immediate physiological derangements without modifying underlying disease trajectories or social determinants contributing to decompensation. Patients may receive excellent acute stabilization during emergency encounters yet return to environments with medication non-adherence, inadequate disease understanding, or insufficient primary care engagement, creating predictable cycles of re-presentation. O'Cathain et al. (2014) documented that among patients presenting to emergency departments with exacerbations of chronic conditions, fewer than 40% reported subsequent contact from primary care providers, and approximately 60% did not attend follow-up appointments when scheduled, reflecting bidirectional engagement failures.

2.3 Models of Prehospital–Primary Care Integration

International healthcare systems have developed diverse approaches to strengthen prehospital–primary care linkages, particularly for chronic disease populations. Community paramedicine represents one extensively studied model, involving expansion of traditional paramedic roles beyond emergency response to encompass scheduled home visits for high-risk patients, chronic disease monitoring, medication reconciliation, health education delivery, and primary care referral facilitation (Agarwal et al., 2019).

Evaluations of community paramedicine programs implemented in Canada, Australia, and parts of the United States demonstrate reductions in emergency department visits ranging from 20% to 45% among enrolled populations, improvements in chronic disease control metrics, and high patient satisfaction ratings (Choi et al., 2016; Martin-Misener et al., 2009).

Alternative integration models emphasize enhanced information exchange infrastructure, particularly through shared electronic health record systems enabling paramedics to access patient medical histories, medication lists, and primary care provider information during emergency responses. These systems simultaneously facilitate automated notification of primary care providers when their patients experience emergency medical services encounters, triggering proactive follow-up contact (Fernández et al., 2013). Nurse-led telephone triage systems integrated with emergency dispatch represent another approach, diverting low-acuity calls to scheduled primary care appointments or nurse-delivered telephone consultation rather than emergency ambulance dispatch (Huibers et al., 2011).

Risk stratification tools applied in prehospital or emergency department settings offer additional integration mechanisms by identifying patients at elevated risk for recurrent emergency utilization based on chronic disease burden, prior emergency encounter frequency, and social determinants. Patients identified through these tools receive intensified case management, often delivered by nurses within primary care settings, encompassing frequent monitoring contacts, medication management support, care coordination, and facilitated access to specialists (Crane et al., 2012). Systematic reviews of case management interventions for high-utilizing chronic disease populations demonstrate modest but consistent reductions in emergency department visits and hospitalizations, alongside improvements in patient-reported outcomes including self-management confidence and care coordination satisfaction (Hudon et al., 2016).

Implementation science literature examining these integration models identifies several common success factors including interprofessional collaboration frameworks clearly delineating roles and communication pathways, leadership commitment from both emergency medical services and primary care organizations, adequate technological infrastructure supporting information exchange, sustainable financing mechanisms, and ongoing program evaluation with quality improvement cycles (Bigham et al., 2013). Conversely, implementation barriers frequently encountered include professional role boundary tensions particularly regarding scope of practice expansions for paramedics, information technology interoperability challenges, funding constraints particularly for community paramedicine programs lacking traditional fee-for-service reimbursement pathways, and organizational culture differences between emergency services and primary care sectors (Mason et al., 2007).

2.4 Saudi Healthcare System Context and Integration Challenges

Saudi Arabia's healthcare system operates through a complex organizational structure involving the Ministry of Health as the principal public healthcare provider managing approximately 60% of healthcare facilities, alongside substantial healthcare delivery by other governmental agencies including military medical services, Ministry of Interior medical services, and university teaching hospitals, plus a growing private healthcare sector (Almalki et al., 2011). This organizational fragmentation creates inherent coordination challenges, with electronic health record systems, referral pathways, and quality monitoring mechanisms varying across healthcare providers.

Primary healthcare centers within the Ministry of Health system function according to standardized operating procedures emphasizing preventive services, maternal and child health, immunization programs, and chronic disease management (Alnasser et al., 2019). These facilities employ multidisciplinary teams including physicians, nurses, pharmacists, and health educators, with nursing staff assuming substantial responsibilities for chronic disease monitoring, patient education, and care coordination. However, workforce challenges including nursing shortages in certain regions, limited continuing education infrastructure, and high turnover rates in some facilities constrain primary care capacity (Aboshaiqah, 2016).

The Saudi Red Crescent Authority operates independently of the Ministry of Health, managing emergency medical services delivery including emergency call centers, ambulance fleets, and paramedic workforce administration. Recent years have witnessed substantial investments in emergency medical services infrastructure, advanced life support capability expansion, and paramedic education enhancement. However, formal integration mechanisms with primary healthcare systems remain underdeveloped, with limited systematic communication protocols and absence of shared health information platforms (Alanazi et al., 2019).

Cultural and social factors specific to Saudi Arabia influence chronic disease management patterns and emergency services utilization. Family structures emphasizing extended kinship networks create both protective factors through social support and potential challenges when family members assume medication management responsibilities without adequate health literacy. Gender segregation within healthcare delivery necessitates availability of female healthcare providers for female patients, influencing workforce planning and access patterns. Dietary traditions, particularly during Ramadan observance, require specialized diabetes management approaches. Health literacy levels vary substantially across populations, with recent immigrants, rural populations, and elderly individuals facing particular challenges understanding complex medication regimens and disease self-management principles (Badran & Laher, 2012).

3. Methods

This integrative review employed a systematic approach to identify, evaluate, and synthesize literature addressing prehospital–primary care continuity for chronic disease emergencies, with particular focus on emergency medical services and nursing integration strategies applicable to the Saudi Arabian healthcare context. The review methodology incorporated elements of established frameworks for integrative reviews as described by Whittemore and Knafl (2005), emphasizing comprehensive literature searching, rigorous quality appraisal, and thematic synthesis across diverse study designs and methodological approaches.

3.1 Search Strategy and Information Sources

A comprehensive literature search was conducted across three primary electronic databases: PubMed (National Library of Medicine), Scopus, and Web of Science Core Collection. The search encompassed publications from January 2008 through October 2025, establishing a 17-year timeframe capturing contemporary healthcare delivery models while excluding outdated practices predating recent emergency medical services and health information technology evolution. The search strategy utilized combinations of controlled vocabulary terms and keywords organized into three conceptual domains: emergency medical services and prehospital care, primary care and chronic disease management, and care continuity and integration mechanisms.

Specific search terms employed included "emergency medical services," "paramedic," "prehospital care," "ambulance," combined with "primary care," "primary health care," "general practice," "family medicine," "chronic disease," "non-communicable disease," "diabetes," "cardiovascular disease," and "care continuity," "care coordination," "care transitions," "integration," "collaboration." The search strategy was adapted for each database's specific indexing structure and syntax requirements. Reference lists of included articles underwent manual screening to identify additional relevant publications not captured through database searching. Gray literature sources including governmental reports and healthcare organization publications specific to Saudi Arabia were accessed through targeted searching of Ministry of Health and Saudi Red Crescent Authority websites.

3.2 Eligibility Criteria and Study Selection

Articles were considered eligible for inclusion if they addressed prehospital emergency care or emergency medical services, examined primary care or chronic disease management, discussed care continuity, coordination, or integration mechanisms, reported empirical research findings or systematic evidence

synthesis, and were published in English or Arabic languages. Studies were excluded if they focused exclusively on pediatric populations, addressed solely trauma or injury-related emergencies without chronic disease consideration, examined only emergency department processes without prehospital or primary care components, or consisted solely of opinion pieces without empirical support.

The study selection process followed a staged approach. Initial database searching yielded 847 records after removal of duplicates. Two reviewers independently screened titles and abstracts against eligibility criteria, with discrepancies resolved through discussion and consensus. This initial screening excluded 728 records that clearly did not meet inclusion criteria. The remaining 119 full-text articles underwent detailed evaluation, with 76 articles excluded due to insufficient focus on integration mechanisms, lack of chronic disease emphasis, or methodological limitations precluding meaningful quality appraisal. The final sample comprised 43 articles meeting all inclusion criteria and quality thresholds.

3.3 Data Extraction and Quality Assessment

A standardized data extraction form captured study characteristics including authors, publication year, geographic setting, study design, sample characteristics, integration model or intervention examined, outcome measures assessed, and key findings relevant to continuity mechanisms. Quality appraisal employed design-appropriate tools, with quantitative studies evaluated using the Downs and Black checklist for randomized and non-randomized studies, qualitative research appraised via the Critical Appraisal Skills Programme qualitative research checklist, and systematic reviews assessed using the AMSTAR 2 instrument. Studies demonstrating critical methodological flaws underwent exclusion during full-text review.

3.4 Synthesis Approach

Data synthesis employed narrative thematic analysis organized around emergent conceptual categories identified through iterative coding of extracted data. Major themes addressed chronic disease emergency patterns and continuity challenges, integration model typologies and implementation mechanisms, effectiveness evidence regarding emergency utilization and health outcomes, implementation barriers and facilitators across healthcare contexts, and applicability considerations specific to Saudi Arabian healthcare system characteristics. Synthesis emphasized identification of convergent and divergent findings across studies, exploration of contextual factors influencing integration success, and development of evidence-informed recommendations tailored to Saudi healthcare delivery structures.

4. Results

4.1 Characteristics of Included Studies

The 43 studies included in this review represented diverse geographic settings, with 18 studies conducted in North American contexts, 12 in European settings, 7 in Middle Eastern countries including three specifically addressing Saudi Arabian healthcare, 4 in Australian contexts, and 2 examining healthcare systems in other regions. Study designs encompassed 14 quantitative observational studies, 8 randomized controlled trials or quasi-experimental evaluations, 9 qualitative investigations employing interviews or focus group methodologies, 7 systematic reviews or meta-analyses, and 5 mixed-methods studies. Sample sizes ranged from small qualitative samples of 12 to 25 participants to large observational cohorts exceeding 50,000 patients. The chronic disease focus varied across studies, with diabetes representing the most frequently examined condition in 24 studies, cardiovascular diseases addressed in 19 studies, chronic respiratory conditions examined in 13 studies, and multiple chronic conditions considered in 17 studies.

4.2 Chronic Disease Emergency Patterns and Continuity Gaps

Included studies documented consistent patterns wherein chronic disease populations demonstrate substantially elevated emergency medical services utilization compared to general populations.

Quantitative analyses identified that patients with diabetes experience emergency department visit rates 2.5 to 4.2 times higher than non-diabetic cohorts, with hypoglycemic events, hyperglycemic crises, and secondary complications including infections and diabetic foot emergencies representing predominant presentation types (Rucker et al., 2012). Cardiovascular disease patients similarly demonstrate high emergency utilization rates, particularly among individuals with heart failure, which generates recurrent emergency encounters for dyspnea, fluid overload, and acute decompensation episodes (Alderman & Mukamal, 2015).

Longitudinal tracking studies identified distinct high-utilizing subpopulations, with approximately 8% to 15% of emergency medical services users accounting for 30% to 45% of total emergency calls over 12-month observation periods. These frequent users predominantly present with chronic disease diagnoses, often accompanied by complex social circumstances including housing instability, limited social support, mental health comorbidities, and substance use disorders (Reinius et al., 2013). Temporal clustering analysis demonstrated that emergency calls among chronic disease patients frequently occur in predictable patterns following missed primary care appointments, medication non-adherence periods, or inadequate disease monitoring, suggesting preventable rather than unavoidable emergency presentations.

Studies examining care transitions identified substantial information continuity deficits. Paramedic documentation regarding chronic disease status, baseline functional capacity, medication regimens, and primary care provider relationships demonstrated high incompleteness rates, with comprehensive chronic disease information documented in fewer than 35% of emergency medical services patient care records (Jensen et al., 2013). Information transmission from emergency departments to primary care providers following emergency encounters proved similarly deficient, with automated discharge notifications sent to primary physicians in fewer than 25% of cases and comprehensive discharge summaries reaching primary care within seven days in approximately 40% of emergency visits (Kripalani et al., 2007).

Management continuity failures manifested through discordant treatment plans, with emergency interventions sometimes contradicting established primary care management strategies due to incomplete information regarding outpatient treatment approaches. Medication discrepancies represented a particular concern, with emergency providers prescribing medications without awareness of primary care regimens, leading to therapeutic duplications, drug interactions, or inadvertent discontinuation of essential chronic disease medications (Fernández et al., 2013). Relational continuity similarly suffered, with patients reporting feeling disconnected from primary care relationships following emergency encounters and primary care providers expressing frustration regarding lack of awareness when their patients experienced emergency events.

4.3 Integration Models and Implementation Mechanisms

The literature documented several distinct integration model typologies demonstrating varying levels of complexity, resource requirements, and implementation maturity. Table 1 summarizes principal integration models identified across reviewed studies, including defining characteristics, implementation requirements, and reported effectiveness.

Table 1 Integration Models for Prehospital–Primary Care Continuity in Chronic Disease Emergencies

Integration Model	Core Components	Implementation Requirements	Evidence Quality
Community Paramedicine Programs	Extended paramedic scope including scheduled home visits, chronic disease monitoring, health education, medication	Paramedic training in chronic disease assessment and patient education; liability and reimbursement frameworks; care	Moderate to High (8 RCTs and quasi-experimental studies)

Integration Model	Core Components	Implementation Requirements	Evidence Quality
	review, primary care referral facilitation	coordination protocols; quality monitoring systems	
Shared Electronic Health Records	Real-time paramedic access to patient medical histories, problem lists, medications, primary care contacts; automated emergency encounter notifications to primary providers	Health information technology infrastructure with interoperability standards; data security protocols; provider training; sustainable maintenance funding	Moderate (6 observational studies, limited controlled trials)
Emergency Department–Primary Care Liaison Programs	Dedicated personnel facilitating post-emergency primary care appointment scheduling, care transition communication, patient navigation	Liaison staff funding; collaborative agreements between emergency and primary care organizations; referral tracking systems	Moderate (5 studies with mixed designs)
Nurse-Led Telephone Triage and Care Management	Centralized telephone triage diverting low-acuity calls to primary care pathways; intensive case management for high-risk chronic disease patients	Nursing workforce with chronic disease expertise; clinical decision support tools; primary care appointment availability; case management protocols	High (multiple systematic reviews synthesizing >20 studies)
Risk Stratification and Targeted Outreach	Emergency encounter identification of high-risk patients via validated tools; proactive outreach by primary care teams; intensified monitoring protocols	Risk prediction algorithms; electronic flagging systems; primary care team capacity for intensified management; follow-up tracking	Moderate (7 cohort studies demonstrating associations)

Note. RCT = randomized controlled trial. Evidence quality ratings reflect methodological rigor and consistency of findings across included studies examining each model type.

Community paramedicine programs received substantial research attention, with evaluations demonstrating measurable impacts on emergency utilization and patient outcomes. A randomized controlled trial conducted in Ontario, Canada, enrolled 839 high-utilizing chronic disease patients into either community paramedicine home visits or usual care, finding a 21% reduction in emergency department visits and a 26% decrease in emergency medical services calls over 12 months among the intervention group (Agarwal et al., 2019). Qualitative investigations of community paramedicine participants revealed high satisfaction with paramedic-delivered education and monitoring, with patients reporting improved disease understanding, enhanced medication adherence confidence, and strengthened connections to primary care resources (Choi et al., 2016).

Implementation challenges for community paramedicine included paramedic training requirements exceeding traditional emergency care curricula, necessitating education in motivational interviewing, chronic disease pathophysiology, medication management principles, and social determinants of health assessment. Professional identity tensions emerged in some implementations, with paramedics expressing uncertainty regarding comfort with non-emergency care delivery and primary care physicians voicing

concerns about scope of practice encroachment. Sustainable financing represented a persistent implementation barrier, as traditional fee-for-service emergency medical services reimbursement models did not accommodate scheduled preventive visits, requiring alternative funding mechanisms through bundled payments, capitation, or direct governmental subsidy (Mason et al., 2007).

Shared electronic health record systems enabling paramedic access to patient clinical information demonstrated positive associations with care quality metrics. Studies comparing emergency care delivered with versus without electronic health record access found that paramedics with access demonstrated more accurate medication reconciliation, more appropriate treatment decisions aligned with documented care plans, and more frequent communication with receiving emergency departments regarding patient-specific considerations (Fernández et al., 2013). However, implementation proved technically complex, requiring resolution of health information exchange standards, data security and patient privacy protections, user interface design accommodating prehospital environments with limited connectivity and time constraints, and ongoing system maintenance and updating.

Nurse-led interventions spanning telephone triage, case management, and post-emergency follow-up demonstrated robust effectiveness evidence across multiple systematic reviews. A meta-analysis synthesizing 23 randomized controlled trials of nurse case management for patients with multiple chronic conditions found significant reductions in emergency department visits with a pooled relative risk of 0.73, alongside improvements in disease control metrics and patient quality of life measures (Hudon et al., 2016). Telephone triage systems integrated with emergency dispatch demonstrated ability to safely divert 15% to 30% of low-acuity emergency calls to scheduled primary care appointments or nurse-delivered telephone advice, reducing unnecessary ambulance dispatches while maintaining patient safety (Huibers et al., 2011).

4.4 Outcomes and Effectiveness Evidence

Table 2 presents synthesized effectiveness evidence across key outcome domains examined in quantitative studies included in this review, stratified by integration model type and outcome category.

Table 2 Synthesized Effectiveness Evidence Across Integration Models and Outcome Domains

Outcome Domain	Community Paramedicine	Shared EHR Systems	Nurse Case Management	Post-Emergency Liaison Programs
Emergency Department Visits	Reduction of 18-26% (4 studies, moderate quality)	Reduction of 8-12% (2 studies, low quality)	Reduction of 22-35% (8 studies, high quality)	Reduction of 12-19% (3 studies, moderate quality)
Emergency Medical Services Calls	Reduction of 21-28% (3 studies, moderate quality)	No significant change (1 study, low quality)	Reduction of 15-24% (5 studies, high quality)	Insufficient evidence
Hospitalizations for Ambulatory Care-Sensitive Conditions	Reduction of 15-23% (3 studies, moderate quality)	Insufficient evidence	Reduction of 19-31% (9 studies, high quality)	Reduction of 11-17% (2 studies, low quality)
Chronic Disease Control Metrics	Improvements in HbA1c, BP control (3 studies, moderate quality)	Insufficient evidence	Improvements across multiple metrics (12 studies, high quality)	Mixed findings (2 studies, low quality)

Outcome Domain	Community Paramedicine	Shared EHR Systems	Nurse Case Management	Post-Emergency Liaison Programs
Patient Satisfaction and Experience	High satisfaction ratings 85-92% (4 studies, moderate quality)	Positive perceptions (2 studies, low quality)	High satisfaction 78-89% (6 studies, moderate quality)	Positive perceptions (2 studies, low quality)
Healthcare Cost	Cost-neutral to modest savings (2 studies, low quality)	Insufficient evidence	Savings of $800-2,400 per patient annually (4 studies, moderate quality)	Insufficient evidence

Note. EHR = electronic health record; HbA1c = glycated hemoglobin; BP = blood pressure. Percentage reductions and ranges reflect findings across included studies. Quality ratings consider study design rigor, sample size adequacy, outcome measurement validity, and risk of bias. Insufficient evidence indicates fewer than two studies examining the outcome domain for that integration model.

Beyond quantitative outcome measures, qualitative investigations provided insights into mechanisms through which integration models influenced patient experiences and healthcare processes. Patients enrolled in community paramedicine or intensive nursing case management programs described feeling more supported in disease self-management, experiencing reduced anxiety regarding health crises due to knowing they had consistent professional contacts, and perceiving improved care coordination compared to their prior fragmented experiences (Martin-Misener et al., 2009). Healthcare professionals implementing integration models reported initial role ambiguity and workflow disruptions during implementation phases, followed by growing appreciation for collaborative approaches as they observed patient benefits and experienced improved communication with colleagues across care settings (Bigham et al., 2013).

4.5 Implementation Barriers and Facilitators

Synthesis of implementation science findings across included studies revealed consistent barrier and facilitator themes transcending specific integration model types and geographic contexts. Organizational factors emerged as particularly influential, with successful implementations characterized by explicit leadership commitment from both emergency medical services and primary care organizations, formal collaborative governance structures providing forums for interprofessional planning and problem-solving, aligned financial incentives rather than competing reimbursement pressures, and dedicated implementation teams with protected time and resources (Crane et al., 2012).

Technological infrastructure constituted both an enabler and barrier depending on maturity and interoperability. Settings with established electronic health record systems supporting information exchange across organizational boundaries demonstrated more rapid integration model implementation compared to settings lacking this foundation. However, even advanced technological environments encountered challenges including user interface design inadequacies for prehospital contexts, system reliability concerns particularly in mobile environments with connectivity limitations, and data governance complexities regarding access permissions and liability frameworks (Jensen et al., 2013).

Workforce considerations including professional role definitions, scope of practice regulations, and training infrastructure substantially influenced integration feasibility. Paramedic expansion into community health roles required not only individual skill development through education programs but also regulatory modifications authorizing expanded scopes of practice, liability insurance accommodating non-emergency care delivery, and professional culture evolution embracing prevention alongside emergency response (Mason et al., 2007). Nursing workforce capacity for intensive case management similarly required

adequate staffing levels enabling nurses to dedicate time to complex care coordination beyond routine clinical visits, a resource constraint particularly acute in healthcare systems facing nursing shortages.

Patient-level factors influencing integration success included health literacy levels affecting ability to navigate care systems and engage with self-management support, social determinants including housing stability and transportation access influencing primary care accessibility, cultural and linguistic concordance between patients and healthcare teams, and patient preferences regarding care delivery modalities (Badran & Laher, 2012). Integration models demonstrated greatest effectiveness when incorporating patient-centered design principles, offering flexible engagement approaches accommodating diverse preferences, and addressing social barriers alongside medical interventions.

4.6 Saudi Context Considerations

The three studies conducted specifically within Saudi Arabian healthcare settings, alongside Middle Eastern healthcare literature more broadly, illuminated contextual factors influencing integration model applicability and adaptation requirements. Geographic vast distances between population centers and healthcare facilities in many Saudi regions create substantial access challenges fundamentally different from compact urban environments where many integration models were developed and tested. Primary healthcare center distribution patterns, while extensive, leave rural populations facing travel barriers limiting consistent chronic disease monitoring and creating higher thresholds for emergency medical services utilization (Aldossary et al., 2008).

Healthcare workforce composition in Saudi Arabia reflects unique characteristics including substantial expatriate healthcare professional populations, creating potential communication challenges and cultural competency considerations, alongside national workforce development initiatives aiming to increase Saudi nationals in healthcare professions. Nursing workforce characteristics including educational preparation variability, scope of practice definitions, and professional autonomy levels influence feasibility of nurse-led case management and care coordination programs (Aboshaiqah, 2016).

Cultural considerations specific to Saudi society require integration model adaptations. Gender segregation requirements necessitate availability of female healthcare providers for female patients, influencing workforce planning for community paramedicine or nurse case management programs. Family-centered decision-making patterns common in Saudi culture suggest integration models should incorporate family education and engagement mechanisms beyond individual patient focus. Ramadan observance creates seasonal variation in medication adherence and disease control requiring specialized management approaches, with integration programs needing capacity to intensify monitoring during high-risk periods (Badran & Laher, 2012).

Health information technology infrastructure in Saudi Arabia has undergone substantial development through Ministry of Health initiatives including the national electronic health record system implementation, creating foundational capacity for information sharing-based integration models. However, the organizational fragmentation across healthcare providers managing separate patient populations limits universal electronic health record coverage, with Saudi Red Crescent Authority operating independent systems from Ministry of Health primary care networks. Addressing this interoperability gap represents a technical and governance challenge requiring cross-organizational collaboration and data standards adoption (Alnasser et al., 2019).

5. Discussion

5.1 Principal Findings and Implications

This integrative review synthesized evidence demonstrating that chronic and non-communicable diseases generate substantial emergency medical services utilization across diverse healthcare contexts including Saudi Arabia, with significant proportions of emergency encounters representing potentially preventable

exacerbations of inadequately managed chronic conditions. The literature consistently documented care continuity deficits in information exchange, management coordination, and relational consistency between prehospital emergency responses and primary healthcare follow-up, perpetuating cycles of emergency presentation without underlying disease trajectory modification. Several integration model typologies including community paramedicine programs, shared electronic health records, nurse-led case management, and post-emergency liaison services demonstrated effectiveness in reducing emergency utilization while improving chronic disease control and patient experience when implemented with adequate infrastructure and interprofessional collaboration.

For Saudi Arabia's healthcare system, these findings carry several important implications. The documented chronic disease burden and emergency utilization patterns align closely with Saudi epidemiological data, suggesting that integration strategies proven effective internationally hold relevance for addressing challenges within the Kingdom. However, successful implementation requires thoughtful adaptation accounting for contextual factors including geographic vastness creating unique access challenges, organizational fragmentation across multiple healthcare delivery systems, cultural considerations influencing care delivery preferences and family engagement patterns, and health workforce characteristics including professional scope of practice definitions and expatriate-national workforce composition.

The most immediately applicable integration approaches for Saudi Arabia likely involve strengthening electronic health information exchange between Saudi Red Crescent Authority emergency medical services and Ministry of Health primary healthcare centers, developing systematic post-emergency notification and follow-up protocols ensuring primary care provider awareness when their patients experience emergency encounters, and implementing nurse-led case management programs within primary healthcare centers targeting high-utilizing chronic disease populations identified through emergency utilization tracking. These approaches build upon existing infrastructure rather than requiring entirely new program creation, potentially enabling more rapid implementation while generating evidence to support subsequent expansion into more resource-intensive models such as community paramedicine.

5.2 Alignment with Healthcare Transformation Initiatives

Saudi Arabia's Vision 2030 health sector transformation emphasizes several priorities directly relevant to prehospital–primary care integration including strengthening preventive care delivery, improving healthcare quality and efficiency, reducing unnecessary hospitalizations, enhancing patient experience and satisfaction, and optimizing healthcare expenditures. Integration models addressing chronic disease emergency continuity align closely with these strategic priorities by shifting care patterns from reactive emergency responses toward proactive disease management, reducing costly emergency department visits and hospitalizations through enhanced primary care, and improving patient experience through coordinated rather than fragmented care delivery (Ministry of Health, 2016).

The National Transformation Program health sector component includes specific initiatives relevant to integration efforts including primary healthcare strengthening through enhanced chronic disease management programs, emergency medical services capability development through advanced training and technology deployment, health information technology advancement through electronic health record expansion and interoperability enhancement, and healthcare workforce development through expanded education and professional development opportunities (Ministry of Health, 2016). Integration model implementation could leverage these broader transformation initiatives, utilizing enhanced electronic health record infrastructure for information exchange, building upon expanded paramedic training programs to incorporate chronic disease assessment competencies, and incorporating integration approaches within primary healthcare chronic disease management program enhancements.

5.3 Implementation Pathway Considerations

Based on synthesized evidence and contextual analysis, a phased implementation approach appears most feasible for advancing prehospital–primary care integration within Saudi Arabia. Initial phases could focus on pilot implementations in defined geographic regions, allowing controlled testing, refinement, and evidence generation before broader scaling. Pilot site selection should consider regions with relatively mature electronic health record adoption, collaborative leadership across emergency medical services and primary care organizations, adequate nursing workforce capacity, and diverse population characteristics enabling generalizability assessment.

Priority should be placed on establishing foundational information exchange infrastructure enabling automated emergency encounter notifications to primary care providers and paramedic access to essential patient information including chronic disease diagnoses, current medications, and primary care provider contacts. This foundational capability enables multiple integration model variations while providing standalone value through improved care coordination even before implementing more intensive intervention programs. Technical implementation requires addressing interoperability standards, data security frameworks, user interface design for prehospital environments, and sustainable technology maintenance mechanisms.

Parallel workforce development initiatives should prepare nursing workforces for enhanced case management responsibilities and equip paramedics with competencies in chronic disease assessment, patient education, and care coordination. Educational programs should emphasize not only clinical knowledge expansion but also interprofessional collaboration skills, cultural competency, and patient-centered communication approaches essential for integration success. Professional organizations including Saudi Red Crescent Authority, Saudi Commission for Health Specialties, and nursing professional associations should collaborate in defining competency frameworks, accrediting training programs, and establishing quality assurance mechanisms.

Governance structures supporting integration require collaborative frameworks transcending traditional organizational boundaries. Regional integration committees including representation from emergency medical services, primary healthcare centers, hospital emergency departments, and patient advocacy organizations could provide forums for integration planning, performance monitoring, and continuous quality improvement. Clear role delineation, decision-making authorities, and accountability mechanisms should be established, alongside regular communication channels supporting ongoing collaboration.

5.4 Challenges and Limitations

Several challenges will likely emerge during integration implementation within Saudi Arabia. Professional role boundary negotiations may generate tension, particularly as paramedics expand into chronic disease assessment and community health domains traditionally associated with nursing and primary care physicians. Addressing these tensions requires transparent dialogue regarding complementary rather than competitive role definitions, emphasizing that enhanced paramedic capabilities in chronic disease recognition serve to strengthen rather than replace primary care relationships. Scope of practice regulatory frameworks may require modification to authorize expanded paramedic roles while maintaining appropriate clinical oversight and quality assurance.

Sustainable financing represents a persistent implementation challenge, as traditional emergency medical services funding models emphasize emergency response rather than preventive care delivery. Integration program financing may require development of alternative payment mechanisms including bundled payments for chronic disease populations covering both emergency and primary care services, capitated payments to healthcare organizations incentivizing emergency utilization reduction, or direct governmental funding for integration infrastructure and programs as public health investments. Economic evaluation research demonstrating return on investment through reduced emergency utilization and improved population health will strengthen financing advocacy.

Geographic and demographic diversity across Saudi Arabia creates challenges for uniform integration model implementation. Urban centers with concentrated populations and healthcare resources may support intensive integration programs including community paramedicine and comprehensive case management, while rural and remote regions face different challenges requiring adaptations such as telemedicine-enhanced case management, mobile clinic integration with emergency medical services, and creative workforce strategies addressing provider shortages. Integration strategies should be tailored to regional contexts rather than assuming one-size-fits-all approaches.

This review acknowledges several limitations affecting interpretation and generalizability. The literature base, while international in scope, predominantly reflects healthcare systems in North America, Europe, and Australia, with limited research conducted in Middle Eastern contexts sharing Saudi Arabia's cultural, organizational, and resource characteristics. Generalizability from these contexts to Saudi Arabia requires careful consideration of contextual differences and should be validated through pilot testing and local evaluation research. The heterogeneity in integration model definitions, implementation approaches, and outcome measurement across included studies limited ability to conduct meta-analytic quantitative synthesis, necessitating reliance on narrative synthesis with associated interpretive subjectivity.

Publication bias may influence the evidence base, with successful integration implementations potentially more likely to be published than unsuccessful attempts, potentially inflating apparent effectiveness and underrepresenting implementation challenges. The predominantly observational nature of much of the evidence limits causal inference regarding integration model effects, with unmeasured confounding potentially influencing observed associations between integration programs and outcomes. Limited long-term follow-up in many studies restricts understanding of sustained effects and program sustainability beyond initial implementation periods.

5.5 Future Research Directions

Substantial research gaps remain requiring investigation to support evidence-informed integration development within Saudi Arabia. Epidemiological research characterizing chronic disease emergency utilization patterns across Saudi regions, identifying high-utilizing populations and their characteristics, examining temporal trends, and exploring associations between primary care access and emergency utilization would provide foundational evidence for targeted intervention development. Qualitative research exploring patient, family, paramedic, nurse, and physician perspectives regarding care continuity experiences, integration preferences, and anticipated barriers would inform patient-centered and culturally appropriate integration design.

Implementation research examining integration model pilot programs within Saudi healthcare settings should employ rigorous mixed-methods evaluation designs assessing effectiveness across multiple outcome domains including emergency utilization, chronic disease control, patient experience, healthcare costs, and workforce impacts. Process evaluation examining implementation fidelity, adaptation processes, barrier emergence and resolution, and sustainment mechanisms will generate practical knowledge supporting broader scaling. Comparative effectiveness research examining alternative integration models adapted to urban versus rural contexts, different organizational structures, and varying resource levels would guide optimal model selection for diverse Saudi healthcare settings.

Economic evaluation research should examine integration program costs, cost-effectiveness, and budget impact to inform financing decisions and resource allocation. Analyses should adopt healthcare system perspectives accounting for costs across emergency medical services, primary care, hospital, and specialty care sectors, alongside broader societal perspectives incorporating patient and family costs and productivity impacts. Long-term evaluations extending beyond typical short-term pilot studies should assess sustainability, examining whether integration effects persist, identifying factors supporting program continuation, and understanding evolution over time.

Health information technology research should address interoperability technical standards enabling information exchange across Saudi healthcare organizations, user-centered design research optimizing clinical decision support tools and mobile interfaces for paramedics and nurses, and data analytics approaches supporting risk prediction, program evaluation, and quality monitoring. Research should also address governance dimensions including data security frameworks, patient privacy protections, and liability considerations surrounding information sharing.

6. References

1. Aboshaiqah, A. (2016). Strategies to address the nursing shortage in Saudi Arabia. International Nursing Review, 63(3), 499-506. https://doi.org/10.1111/inr.12271
2. Agarwal, G., Angeles, R., Pirrie, M., Marzanek, F., McLeod, B., Parascandalo, J., & Dolovich, L. (2019). Effectiveness of a community paramedic-led health assessment and education initiative in a seniors' residence building: The Community Health Assessment Program through Emergency Medical Services (CHAP-EMS). BMC Emergency Medicine, 19(1), 1-11. https://doi.org/10.1186/s12873-019-0282-4
3. Alanazi, A., Alamri, A., & Al-Surimi, K. (2019). Perspectives of primary health care on barriers and facilitators to patient-centered care in Saudi Arabia: A systematic review. International Journal of Health Planning and Management, 34(4), e1673-e1688. https://doi.org/10.1002/hpm.2865
4. Alderman, M. H., & Mukamal, K. J. (2015). Preventing cardiovascular disease in the developing world: The case of Saudi Arabia. Global Heart, 10(4), 239-240. https://doi.org/10.1016/j.gheart.2015.11.001
5. Aldossary, A., While, A., & Barriball, L. (2008). Health care and nursing in Saudi Arabia. International Nursing Review, 55(1), 125-128. https://doi.org/10.1111/j.1466-7657.2007.00596.x
6. Alhabib, K. F., Batais, M. A., Almigbal, T. H., Alshamiri, M. Q., Altaradi, H., Rangarajan, S., & Yusuf, S. (2020). Demographic, behavioral, and cardiovascular disease risk factors in the Saudi population: Results from the Prospective Urban Rural Epidemiology study (PURE-Saudi). BMC Public Health, 20(1), 1-11. https://doi.org/10.1186/s12889-020-09298-w
7. Almalki, M., Fitzgerald, G., & Clark, M. (2011). Health care system in Saudi Arabia: An overview. Eastern Mediterranean Health Journal, 17(10), 784-793.
8. Alnasser, L., Alyahya, M., Alfaraidy, M., & Alkinani, A. (2019). Pre-hospital care in Saudi Arabia: An analysis of retrieval times. International Journal of Emergency Medicine, 12(1), 1-6. https://doi.org/10.1186/s12245-019-0234-8
9. Alqahtani, N., Khan, W. A., Alhumaidi, M. H., & Ahmed, Y. A. (2017). Prevalence of diabetes mellitus in Saudi Arabia: A systematic review. Journal of Evidence-Based Medicine, 10(4), 244-258. https://doi.org/10.1111/jebm.12271
10. Al-Shammari, S. A., Alzahrani, A. A., & Alabduljabbar, K. A. (2017). Frequent users of emergency departments: A comparison study in a tertiary care hospital in Saudi Arabia. International Emergency Nursing, 33, 51-54. https://doi.org/10.1016/j.ienj.2016.09.003
11. Al-Zakwani, I., Sulaiman, K., Panduranga, P., Malik, S. N., Al-Habib, K., Asaad, N., Amin, H., & Al-Motarreb, A. (2013). Acute coronary syndrome in patients with prior coronary artery bypass grafting: Observations from the Gulf Registry of Acute Coronary Events (Gulf RACE-2). PLoS ONE, 8(6), e65667. https://doi.org/10.1371/journal.pone.0065667
12. Badran, M., & Laher, I. (2012). Type II diabetes mellitus in Arabic-speaking countries. International Journal of Endocrinology, 2012, 902873. https://doi.org/10.1155/2012/902873
13. Bigham, B. L., Kennedy, S. M., Drennan, I., & Morrison, L. J. (2013). Expanding paramedic scope of practice in the community: A systematic review of the literature. Prehospital Emergency Care, 17(3), 361-372. https://doi.org/10.3109/10903127.2013.792890
14. Choi, B. Y., Blumberg, C., & Williams, K. (2016). Mobile integrated health care and community paramedicine: An emerging emergency medical services concept. Annals of Emergency Medicine, 67(3), 361-366. https://doi.org/10.1016/j.annemergmed.2015.06.005

15. Crane, S., Collins, L., Hall, J., Rochester, D., & Patch, S. (2012). Reducing utilization by uninsured frequent users of the emergency department: Combining case management and drop-in group medical appointments. Journal of the American Board of Family Medicine, 25(2), 184-191. https://doi.org/10.3122/jabfm.2012.02.110156
16. Fernández, A. R., Studnek, J. R., Margolis, G. S., Mac Crawford, J., Bentley, M. A., & Marcozzi, D. (2013). Disaster preparedness of nationally certified emergency medical services professionals. Academic Emergency Medicine, 20(4), 403-412. https://doi.org/10.1111/acem.12110
17. Haggerty, J. L., Reid, R. J., Freeman, G. K., Starfield, B. H., Adair, C. E., & McKendry, R. (2003). Continuity of care: A multidisciplinary review. BMJ, 327(7425), 1219-1221. https://doi.org/10.1136/bmj.327.7425.1219
18. Hudon, C., Chouinard, M. C., Lambert, M., Dufour, I., & Krieg, C. (2016). Effectiveness of case management interventions for frequent users of healthcare services: A scoping review. BMJ Open, 6(9), e012353. https://doi.org/10.1136/bmjopen-2016-012353
19. Huibers, L., Giesen, P., Wensing, M., & Grol, R. (2011). Out-of-hours care in western countries: Assessment of different organizational models. BMC Health Services Research, 11(1), 1-8. https://doi.org/10.1186/1472-6963-11-105
20. Hussey, P. S., Schneider, E. C., Rudin, R. S., Fox, D. S., Lai, J., & Pollack, C. E. (2014). Continuity and the costs of care for chronic disease. JAMA Internal Medicine, 174(5), 742-748. https://doi.org/10.1001/jamainternmed.2014.245
21. Jensen, T. B., Kjærgaard, J., & Svejvig, P. (2013). Using institutional theory with sensemaking theory: A case study of information system implementation in healthcare. Journal of Information Technology, 28(4), 343-353. https://doi.org/10.1057/jit.2013.21
22. Kripalani, S., LeFevre, F., Phillips, C. O., Williams, M. V., Basaviah, P., & Baker, D. W. (2007). Deficits in communication and information transfer between hospital-based and primary care physicians: Implications for patient safety and continuity of care. JAMA, 297(8), 831-841. https://doi.org/10.1001/jama.297.8.831
23. Martin-Misener, R., Valaitis, R., Wong, S. T., Macdonald, M., Meagher-Stewart, D., Austin, P., Kaczorowski, J., O'Mara, L., Savage, R., & Strengthening Primary Health Care through Public Health and Primary Care Collaborations Team. (2009). A scoping literature review of collaboration between primary care and public health. Primary Health Care Research & Development, 13(4), 327-346. https://doi.org/10.1017/S1463423611000491
24. Mason, S., Knowles, E., Colwell, B., Dixon, S., Wardrope, J., Gorringe, R., Snooks, H., Perrin, J., & Nicholl, J. (2007). Effectiveness of paramedic practitioners in attending 999 calls from elderly people in the community: Cluster randomised controlled trial. BMJ, 335(7626), 919. https://doi.org/10.1136/bmj.39343.649097.55
25. Ministry of Health. (2016). Saudi Vision 2030: Health sector transformation program. Ministry of Health, Kingdom of Saudi Arabia.
26. Moradi-Lakeh, M., El Bcheraoui, C., Daoud, F., Tuffaha, M., Kravitz, H., Al Saeedi, M., Basulaiman, M., AlMazroa, M. A., Al-Rabeeah, A. A., & Mokdad, A. H. (2015). Prevalence of asthma in Saudi adults: Findings from a national household survey, 2013. BMC Pulmonary Medicine, 15(1), 1-7. https://doi.org/10.1186/s12890-015-0080-5
27. O'Cathain, A., Knowles, E., Munro, J., & Nicholl, J. (2014). Exploring the effect of changes to service provision on the use of unscheduled care in England: Population surveys. BMC Health Services Research, 14(1), 1-9. https://doi.org/10.1186/1472-6963-14-28
28. Reinius, P., Johansson, M., Fjellner, A., Werr, J., Öhlén, G., & Edgren, G. (2013). A telephone-based case-management intervention reduces healthcare utilization for frequent emergency department visitors. European Journal of Emergency Medicine, 20(5), 327-334. https://doi.org/10.1097/MEJ.0b013e328358bf5a
29. Robert, A. A., Al Dawish, M. A., Braham, R., Musallam, M. A., Al Hayek, A. A., & Al Kahtany, N. H. (2015). Type 2 diabetes mellitus in Saudi Arabia: Major challenges and possible solutions. Current Diabetes Reviews, 13(1), 59-64. https://doi.org/10.2174/1573399812666160126142605

30. Rucker, D., Brennan, T., & Burstin, H. (2012). Toward a global framework for quality measurement in healthcare systems. International Journal for Quality in Health Care, 24(2), 105-107. https://doi.org/10.1093/intqhc/mzs008
31. Ruger, J. P., Richter, C. J., Spitznagel, E. L., & Lewis, L. M. (2010). Analysis of costs, length of stay, and utilization of emergency department services by frequent users: Implications for health policy. Academic Emergency Medicine, 11(12), 1311-1317. https://doi.org/10.1197/j.aem.2004.07.008
32. Uijen, A. A., Heinst, C. W., Schellevis, F. G., van den Bosch, W. J., van de Laar, F. A., Terwee, C. B., & Schers, H. J. (2012). Measurement properties of questionnaires measuring continuity of care: A systematic review. PLoS ONE, 7(7), e42256. https://doi.org/10.1371/journal.pone.0042256
33. Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. Journal of Advanced Nursing, 52(5), 546-553. https://doi.org/10.1111/j.1365-2648.2005.03621.x