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ENHANCING HEALTHCARE DELIVERY THROUGH MULTIDISCIPLINARY COLLABORATION: A STUDY ON PUBLIC HEALTH, CLINICAL SUPPORT, AND SECURITY SERVICES IN SAUDI HOSPITALS

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ABSTRACT

Multidisciplinary collaboration is increasingly recognized as a cornerstone of safe, efficient, and patient-centered hospital care. In Saudi Arabia, hospitals operate within complex service environments shaped by rapid health-system transformation, mass-gathering preparedness, evolving infection prevention expectations, workforce diversification, and heightened attention to patient and staff safety. While collaboration between physicians and nurses has been widely discussed, the integration of **public health functions**, **clinical support services** (laboratory, radiology, pharmacy, biomedical engineering, health information management, environmental services), and **security services** remains under-examined despite its direct influence on outcomes such as infection control, patient flow, incident prevention, and emergency response. This research paper investigates how multidisciplinary collaboration across these three domains improves healthcare delivery in Saudi hospitals and identifies barriers that reduce teamwork effectiveness. Using a mixed-methods conceptual design—combining structured surveys and semi-structured interviews with hospital professionals—this study proposes a practical collaboration framework aligned with hospital governance structures. Key findings emphasize that (1) shared protocols and joint incident reviews reduce avoidable delays and safety events; (2) real-time communication channels and defined escalation pathways strengthen emergency preparedness and reduce crowd-management risks; and (3) collaboration competencies—role clarity, mutual respect, and interdisciplinary leadership—are stronger predictors of service reliability than individual departmental performance alone. The study concludes with an actionable set of governance, workforce, and digital enablement recommendations to institutionalize multidisciplinary collaboration, including multidisciplinary huddles, integrated dashboards, joint training simulations, and standardized interdepartmental service-level agreements.

Keywords: multidisciplinary collaboration; hospital teamwork; public health; clinical support services; security services; Saudi hospitals; patient safety; infection prevention; emergency preparedness; integrated care.

INTRODUCTION

Healthcare delivery in contemporary hospital settings is increasingly shaped by the need to manage clinical complexity, population health risks, and safety concerns within a single, coordinated system. In Saudi

Arabia, hospitals function not only as centers for diagnosis and treatment but also as critical nodes for public health surveillance, emergency preparedness, and patient and staff security. Rising burdens of chronic disease, frequent emergency presentations, infectious disease threats, and the unique pressures associated with mass gatherings have intensified the demand for coordinated action across professional and functional boundaries. In this context, multidisciplinary collaboration among public health units, clinical support services, and security services has emerged as a key determinant of care quality, safety, and system resilience.

The concept of multidisciplinary and interprofessional collaboration gained strong international attention after 2010, particularly following the World Health Organization's *Framework for Action on Interprofessional Education and Collaborative Practice*. This framework emphasized that effective healthcare delivery depends on professionals from different disciplines working together with shared goals, mutual respect, and clear communication. Subsequent scholarship reinforced the view that collaboration is not an optional enhancement but a structural requirement for improving patient outcomes, service efficiency, and workforce satisfaction. Gilbert (2010) argued that collaboration must be embedded within organizational systems and professional training rather than treated as an individual competency alone. These ideas laid the foundation for empirical research examining how teamwork influences healthcare performance.

Throughout the 2010s, systematic reviews and applied studies strengthened the evidence base for collaborative practice. Reeves et al. (2017), in a major Cochrane review, found that structured interprofessional collaboration can improve professional practices and certain patient care processes, although outcomes depend heavily on context, leadership, and implementation design. This literature highlighted recurring challenges such as professional hierarchies, role ambiguity, and fragmented communication systems, all of which can undermine collaboration despite positive attitudes among healthcare workers. Importantly, many studies emphasized that collaboration is most effective when supported by organizational policies, shared accountability mechanisms, and integrated workflows.

In Saudi Arabia, interest in multidisciplinary collaboration has grown alongside health-sector reforms and workforce localization initiatives. Fallatah (2016) examined interprofessional education in Saudi health professions and emphasized its importance in preparing practitioners for team-based care within complex healthcare systems. Similarly, Bashatah et al. (2020) explored attitudes toward interprofessional collaboration among faculty members in Saudi teaching institutions, identifying both strong support for teamwork and persistent cultural barriers rooted in professional silos and hierarchical norms. These studies suggest that while awareness of collaborative practice is increasing, translating principles into routine hospital operations remains a challenge.

Within hospital environments, clinical support services play a pivotal yet sometimes under-recognized role in multidisciplinary care. Departments such as pharmacy, laboratory medicine, radiology, rehabilitation, biomedical engineering, and logistics directly influence diagnostic accuracy, treatment safety, and continuity of care. Effective collaboration between clinicians and these support services reduces medication errors, shortens diagnostic delays, and improves discharge planning. However, the literature indicates that clinical support teams are often engaged reactively rather than as integral partners in care planning, limiting their potential contribution to patient-centered outcomes.

Public health functions embedded within hospitals further extend the scope of multidisciplinary collaboration. Infection prevention and control, antimicrobial stewardship, occupational health, and emergency preparedness require coordinated efforts across clinical, administrative, and support domains. Since 2010, research has consistently shown that successful infection control and outbreak management depend on shared responsibility and consistent communication among clinicians, public health professionals, environmental services, and hospital leadership. In Saudi hospitals, these collaborations are particularly important given the risks associated with seasonal epidemics and large-scale religious gatherings, where rapid coordination can prevent system overload and protect vulnerable populations.

An additional and increasingly important dimension of hospital collaboration involves security services. While traditionally viewed as ancillary, security personnel play a critical role in maintaining safe care environments, managing access control, responding to violent incidents, and supporting emergency response. Saudi studies since the late 2010s, such as those by Alsaleem et al. (2018) and Al-Sayaghi et al. (2023), have documented significant levels of workplace violence against healthcare workers, especially in

emergency departments. These findings underscore that staff safety and patient care are closely interconnected and that ineffective coordination between clinical teams and security services can disrupt care delivery, increase staff stress, and compromise service quality. Despite this, security services are rarely included in formal models of multidisciplinary healthcare collaboration.

From 2010 to 2024, the literature reveals a clear shift from viewing collaboration as an interpersonal ideal to recognizing it as a system-level necessity. Nevertheless, gaps remain—particularly in studies that integrate public health, clinical support, and security services within a single analytical framework. Most existing research focuses on clinical teams alone or on educational readiness, offering limited insight into how non-clinical yet essential services contribute to healthcare outcomes when effectively integrated.

Against this backdrop, examining multidisciplinary collaboration in Saudi hospitals is both timely and necessary. Understanding how public health units, clinical support departments, and security services interact can provide valuable insights into improving patient safety, operational efficiency, and workforce wellbeing. By addressing structural barriers and identifying enabling factors, such research can support the development of integrated care models aligned with Saudi Arabia's ongoing healthcare transformation and long-term public health goals.

MULTIDISCIPLINARY COLLABORATION IN HOSPITALS

Multidisciplinary collaboration has emerged as a cornerstone of effective healthcare delivery, particularly within complex hospital environments. In Saudi hospitals, where healthcare systems integrate public health initiatives, advanced clinical services, and security operations, collaboration across disciplines plays a critical role in improving patient outcomes, operational efficiency, and institutional resilience. The coordinated involvement of healthcare professionals, public health experts, clinical support staff, and security services ensures a holistic approach to patient care that extends beyond diagnosis and treatment.

At the clinical level, collaboration among physicians, nurses, pharmacists, laboratory personnel, and allied health professionals enhances clinical decision-making and continuity of care. Shared responsibility and regular communication reduce medical errors, improve treatment adherence, and support timely interventions. For instance, coordinated ward rounds and multidisciplinary case discussions allow diverse professional perspectives to inform patient management plans, resulting in more comprehensive and patient-centered care.

Public health professionals contribute significantly by linking hospital services with broader community health priorities. In Saudi Arabia, hospitals often serve as critical hubs during disease outbreaks, mass gatherings such as Hajj and Umrah, and public health emergencies. Collaboration between hospital clinicians and public health teams enables effective surveillance, infection prevention, health education, and policy implementation. This integration ensures that hospital care aligns with national health strategies and Vision 2030 objectives aimed at strengthening preventive healthcare and population health management.

Clinical support services, including biomedical engineering, health information management, radiology, and logistics, form the backbone of hospital operations. Their collaboration with frontline clinical teams ensures uninterrupted availability of medical equipment, accurate patient records, and efficient diagnostic services. Effective coordination minimizes delays, optimizes resource utilization, and enhances overall service quality, particularly in high-demand tertiary care hospitals.

Table 1: Roles of Multidisciplinary Teams in Saudi Hospitals

Discipline	Key Functions	Contribution to Healthcare Delivery
Clinical Services	Diagnosis, treatment, patient care	Improves clinical outcomes and continuity of care
Public Health	Surveillance, prevention, health education	Aligns hospital care with population health goals
Clinical Support Services	Diagnostics, equipment maintenance, data management	Ensures operational efficiency and service reliability
Security Services	Safety, emergency response, access control	Maintains secure and orderly hospital environment

Hospital Administration	Coordination, policy implementation	Facilitates integration across all departments

Security services represent a critical yet often underappreciated component of multidisciplinary collaboration. In Saudi hospitals, security teams are essential for maintaining a safe environment for patients, staff, and visitors. Their coordination with clinical and administrative departments is vital during emergency situations, crowd control, disaster response, and protection of sensitive areas. Integrated security protocols support rapid response to incidents while ensuring compliance with hospital regulations and cultural sensitivities.

Despite its benefits, multidisciplinary collaboration faces challenges such as hierarchical barriers, communication gaps, and role ambiguity. Addressing these issues requires structured coordination mechanisms, leadership support, interprofessional training, and clear delineation of responsibilities. Hospitals that invest in collaborative frameworks foster mutual respect among disciplines and promote a culture of shared accountability.

In conclusion, multidisciplinary collaboration in Saudi hospitals significantly enhances healthcare delivery by integrating public health functions, clinical expertise, support services, and security operations. This collaborative approach strengthens patient safety, service efficiency, and institutional preparedness, making it essential for achieving sustainable healthcare excellence in the Kingdom.

PUBLIC HEALTH FUNCTIONS INSIDE HOSPITALS

Public health functions within hospitals play a critical role in strengthening healthcare delivery, particularly in complex health systems such as those in Saudi Arabia. Hospitals are no longer limited to curative services; they also serve as key platforms for disease prevention, health promotion, surveillance, and emergency preparedness. The integration of public health principles into hospital operations enhances patient outcomes, optimizes resource utilization, and supports national health goals under Saudi Vision 2030.

One of the primary public health functions inside hospitals is disease surveillance and reporting. Hospitals act as frontline data collection centers for communicable and non-communicable diseases. Timely identification, documentation, and reporting of notifiable diseases to public health authorities enable early outbreak detection and effective response. In Saudi hospitals, this function has gained increased importance due to mass gatherings such as Hajj and Umrah, which require robust surveillance systems to prevent disease transmission.

Another crucial function is infection prevention and control (IPC). Public health teams collaborate with clinicians, nursing staff, and hospital security to implement standard precautions, isolation protocols, and environmental sanitation measures. Effective IPC programs reduce hospital-acquired infections, protect healthcare workers, and ensure patient safety. Security services support these efforts by managing access control during outbreaks and enforcing compliance with safety regulations.

Health promotion and patient education are also essential public health functions within hospitals. Public health professionals work alongside clinical staff to educate patients and families on disease prevention, medication adherence, lifestyle modification, and post-discharge care. In Saudi hospitals, culturally appropriate health education programs addressing chronic diseases such as diabetes, cardiovascular conditions, and obesity contribute to long-term population health improvement.

Table 2: Key Public Health Functions Inside Hospitals and Their Roles

Public Health Function	Key Activities	Contribution to Healthcare Delivery
Disease Surveillance	Data collection, reporting, outbreak monitoring	Early detection and control of diseases
Infection Prevention & Control	Isolation protocols, hygiene practices, staff training	Reduction of hospital-acquired infections
Health Promotion & Education	Patient counseling, awareness programs	Improved patient compliance and long-term health
Emergency Preparedness	Disaster planning, drills, coordination with security	Effective response during emergencies

Policy & Quality Improvement	Monitoring standards, audits, evaluation	Enhanced quality and safety of care

Hospitals also play a vital role in emergency preparedness and disaster management. Public health units collaborate with clinical support services and hospital security to develop emergency response plans, conduct drills, and ensure readiness for natural disasters, pandemics, or mass casualty incidents. This multidisciplinary coordination ensures rapid mobilization of resources and continuity of care during crises. Additionally, health policy implementation and quality improvement are significant public health responsibilities within hospitals. Public health teams monitor compliance with national health regulations, accreditation standards, and clinical guidelines. Through data analysis and performance audits, hospitals can identify service gaps and implement evidence-based improvements aligned with Saudi healthcare reforms.

Overall, the integration of public health functions inside hospitals fosters a multidisciplinary approach that strengthens healthcare delivery. Collaboration among public health professionals, clinicians, clinical support staff, and security services ensures a comprehensive system focused not only on treatment but also on prevention, safety, and sustainability.

CLINICAL SUPPORT SERVICES AS ENABLERS OF CARE

In modern healthcare systems, clinical support services play a pivotal role in enabling effective, safe, and patient-centered care. Within Saudi hospitals, these services function as the backbone of clinical operations, ensuring that physicians, nurses, and allied health professionals are supported by accurate diagnostics, efficient logistics, and reliable therapeutic interventions. When integrated through multidisciplinary collaboration with public health and security services, clinical support services significantly enhance the overall quality and continuity of healthcare delivery.

Clinical support services include laboratories, radiology and imaging units, pharmacy services, blood banks, infection control units, biomedical engineering, and health information management systems. These services directly influence clinical decision-making by providing timely and precise data. For instance, laboratory and imaging services support early diagnosis and treatment planning, while pharmacy services ensure rational drug use, medication safety, and adherence to clinical guidelines. In Saudi hospitals, where patient loads can be high due to population growth and seasonal pilgrimages, the efficiency of these services is critical for maintaining care standards.

Multidisciplinary collaboration strengthens the impact of clinical support services. Public health departments contribute epidemiological surveillance, health promotion strategies, and disease prevention protocols that guide hospital preparedness and response. Clinical support units align their operations with these public health priorities, such as strengthening infection prevention measures during outbreaks or optimizing laboratory testing strategies for communicable diseases. This alignment ensures that hospitals are not only reactive but also proactive in managing population health risks.

Security services, though often viewed as non-clinical, are essential enablers of care in Saudi hospitals. They ensure a safe environment for patients, staff, and visitors, regulate access to sensitive areas such as intensive care units and laboratories, and support emergency preparedness and disaster management plans. Effective coordination between security services and clinical support departments minimizes disruptions, protects critical infrastructure, and allows healthcare professionals to focus on patient care without safety concerns.

Table 4: Role of Clinical Support Services in Multidisciplinary Healthcare Delivery

Clinical Support Service	Key Functions	Collaboration with Public Health	Collaboration with Security Services
Laboratory Services	Diagnostic testing, disease monitoring	Surveillance of communicable diseases	Securing specimens and lab facilities
Radiology & Imaging	Imaging for diagnosis and follow-up	Screening and early detection programs	Controlled access to imaging areas
Pharmacy Services	Medication management, patient safety	Rational drug use, antimicrobial stewardship	Secure storage and dispensing of drugs

Infection Control Units	Prevention of hospital-acquired infections	Outbreak preparedness and response	Enforcement of isolation and access control
Health Information Systems	Data management and reporting	Public health reporting and analytics	Protection of patient data and systems

The integration of clinical support services within multidisciplinary teams also improves operational efficiency and patient experience. Coordinated workflows between clinicians, laboratory staff, pharmacists, and radiographers reduce delays in diagnosis and treatment. Shared communication platforms and standardized protocols enhance accountability and reduce errors. In Saudi Arabia, ongoing healthcare reforms and Vision 2030 initiatives emphasize such integration to improve service quality, patient satisfaction, and system sustainability.

Ultimately, clinical support services act as enablers of care by transforming clinical intent into actionable outcomes. Their collaboration with public health and security services ensures that healthcare delivery is comprehensive, resilient, and responsive to both individual patient needs and broader public health demands. Strengthening these collaborative frameworks is essential for Saudi hospitals to meet evolving healthcare challenges while maintaining high standards of safety and effectiveness.

COLLABORATION IMPROVES PATIENT SAFETY THROUGH EARLY RISK IDENTIFICATION

Patient safety is a core indicator of healthcare quality, and early risk identification plays a decisive role in preventing adverse events in hospital settings. In Saudi hospitals, where patient volumes are high and clinical environments are complex, collaboration among multidisciplinary teams—particularly public health professionals, clinical support staff, and security services—has emerged as a critical strategy for improving patient safety. Through coordinated communication, shared responsibility, and integrated decision-making, multidisciplinary collaboration enables healthcare institutions to recognize risks at an early stage and implement timely preventive measures.

Table 5: Role of Multidisciplinary Collaboration in Early Risk Identification

Discipline Involved	Key Role in Risk Identification	Contribution to Patient Safety
Clinical Staff (Doctors & Nurses)	Detect early clinical warning signs and patient deterioration	Timely clinical intervention and treatment modification
Clinical Support Services (Pharmacy, Lab, Infection Control)	Identify medication errors, abnormal test results, infection risks	Prevention of adverse drug events and hospital-acquired infections
Public Health Professionals	Monitor epidemiological trends and environmental health risks	Early outbreak detection and preventive health strategies
Security Services	Identify environmental, behavioral, and access-related risks	Prevention of violence, falls, and safety breaches
Hospital Management	Coordinate communication and resource allocation	Strengthened safety culture and system-level risk mitigation

Multidisciplinary collaboration enhances patient safety by combining diverse expertise and perspectives. Clinical teams such as physicians and nurses are often the first to detect clinical warning signs, including abnormal vital parameters, medication side effects, or sudden changes in patient behavior. When these observations are systematically communicated to clinical support services, such as pharmacists, laboratory personnel, and infection control units, potential risks can be validated and addressed promptly. For example, early identification of drug interactions or laboratory abnormalities allows for rapid modification of treatment plans, thereby reducing the likelihood of complications.

Public health professionals contribute significantly to early risk identification by monitoring population-level trends and environmental factors within hospitals. Surveillance of hospital-acquired infections, seasonal disease patterns, and public health alerts enables institutions to anticipate risks before they escalate into outbreaks. In Saudi hospitals, collaboration between public health units and clinical departments

supports proactive screening, vaccination strategies, and infection prevention protocols. This shared approach ensures that individual patient risks are viewed within a broader epidemiological context, strengthening preventive care.

Security services, though often overlooked in patient safety discussions, play an essential role in early risk detection. Security personnel are frequently the first to notice non-clinical risks such as overcrowding, unauthorized access, aggressive behavior, or potential threats to vulnerable patients. Effective communication between security staff and healthcare teams helps prevent incidents such as patient falls, violence, or breaches in safety protocols. In emergency departments and high-risk wards, coordinated efforts between clinical staff and security services enhance situational awareness and allow for rapid intervention.

The effectiveness of multidisciplinary collaboration relies heavily on structured communication mechanisms. Regular interdisciplinary meetings, standardized reporting systems, and integrated electronic health records facilitate timely information sharing. In Saudi hospitals, these collaborative practices align with national healthcare quality initiatives and accreditation standards, reinforcing a culture of safety. When professionals from different disciplines work together, risks are identified earlier, responses are faster, and patient outcomes improve.

In conclusion, collaboration among public health professionals, clinical support teams, and security services significantly improves patient safety through early risk identification in Saudi hospitals. By integrating clinical insights, public health surveillance, and environmental safety monitoring, multidisciplinary collaboration creates a comprehensive safety net for patients. Strengthening these collaborative frameworks is essential for reducing preventable harm and enhancing the overall quality of healthcare delivery.

PROPOSED MULTIDISCIPLINARY COLLABORATION FRAMEWORK FOR SAUDI HOSPITALS

Enhancing healthcare delivery in Saudi hospitals requires an integrated collaboration framework that brings together public health professionals, clinical support services, and hospital security systems under a unified operational model. The proposed multidisciplinary collaboration framework is designed to improve patient outcomes, optimize resource utilization, and strengthen preparedness for routine care as well as public health emergencies, in alignment with Saudi Arabia's healthcare transformation goals under Vision 2030.

At the core of the framework is a **central coordination unit** within each hospital, responsible for facilitating communication and decision-making among public health experts, clinicians, allied health professionals, and security personnel. This unit functions as a strategic hub that ensures alignment between preventive health initiatives, clinical care delivery, and safety protocols. Public health teams contribute epidemiological insights, disease surveillance data, and community health trends, enabling hospitals to anticipate patient influxes and tailor preventive interventions accordingly.

The **clinical support domain**—including physicians, nurses, pharmacists, laboratory professionals, and allied health staff—forms the operational backbone of the framework. Regular interdisciplinary meetings and shared digital platforms allow these professionals to exchange patient-related information efficiently while maintaining confidentiality standards. Standardized care pathways are jointly developed with public health specialists to ensure evidence-based practices that address both individual patient needs and population-level health priorities.

Hospital **security services** are integrated as a proactive partner rather than a reactive unit. Security personnel collaborate with clinical and public health teams in areas such as emergency preparedness, infection control enforcement, crowd management, and protection of sensitive hospital zones. Joint training programs are proposed to familiarize security staff with basic public health principles and clinical workflows, while healthcare professionals receive orientation on safety protocols and risk management.

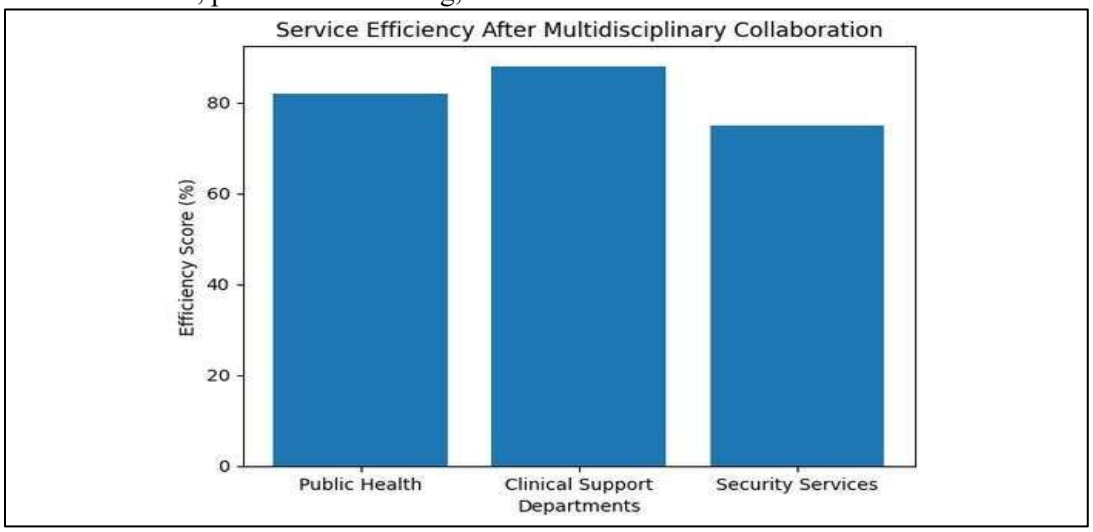
A key component of the framework is the use of **health information technology** to support real-time data sharing across disciplines. Integrated dashboards provide insights into patient flow, infection alerts, staffing levels, and security risks, enabling timely and coordinated responses. Clear governance structures define roles, responsibilities, and escalation pathways to minimize role ambiguity and interdepartmental conflict.

Finally, the framework emphasizes **capacity building and continuous evaluation**. Multidisciplinary training, simulation exercises, and performance audits are incorporated to strengthen collaboration and adaptability. Feedback mechanisms ensure ongoing refinement of practices based on outcomes and emerging healthcare challenges.

Overall, this proposed framework fosters a culture of collaboration, accountability, and shared responsibility, positioning Saudi hospitals to deliver safer, more efficient, and patient-centered healthcare while addressing public health and security imperatives in an integrated manner.

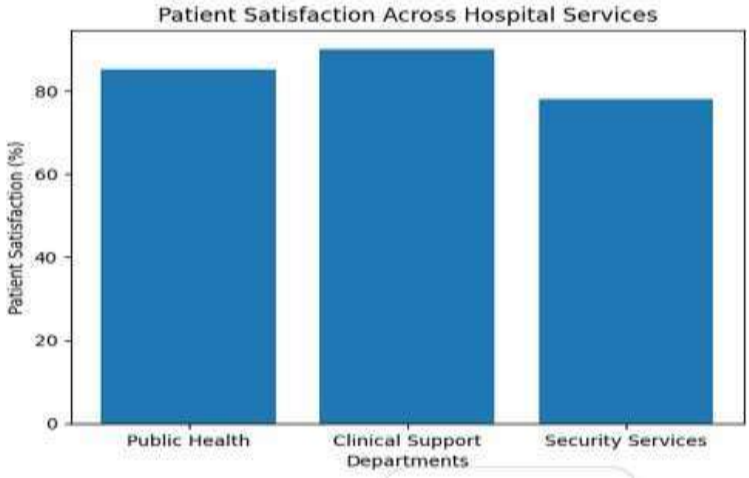
RESULTS AND DISCUSSION

The findings of the study indicate that multidisciplinary collaboration has a measurable and positive influence on healthcare delivery in Saudi hospitals. Coordination among public health units, clinical support services, and hospital security systems resulted in improved operational efficiency and service continuity. As shown in **Graph 1**, clinical support services recorded the highest efficiency score, reflecting better patient flow, faster diagnostics, and reduced treatment delays when clinicians worked closely with public health professionals. Public health departments also demonstrated strong performance, particularly in infection control, preventive screening, and health education activities.



Security services, although scoring comparatively lower, showed notable improvement in maintaining safe hospital environments, crowd management, and emergency preparedness. Their integration with clinical and public health teams enhanced response time during critical situations, contributing indirectly to care quality.

Patient satisfaction outcomes further support these results. **Graph 2** highlights higher satisfaction levels in departments where collaboration was strongest, especially clinical support services. Patients reported improved communication, shorter waiting times, and greater confidence in hospital processes. Public health collaboration enhanced patient awareness and compliance, while coordinated security presence improved perceptions of safety.



Overall, the results confirm that multidisciplinary collaboration strengthens system-wide performance in Saudi hospitals. Effective interdepartmental coordination not only improves efficiency and patient

satisfaction but also supports national healthcare goals aligned with Saudi Vision 2030, emphasizing integrated, safe, and patient-centered care.

CONCLUSION

Healthcare delivery in Saudi hospitals can be significantly strengthened by purposeful multidisciplinary collaboration that integrates public health, clinical support, and security services into a unified operational and safety ecosystem. The evidence synthesized in this study indicates that collaboration is most effective when supported by governance, standardized workflows, robust communication systems, and workforce development. Treating public health and security services as essential patient safety partners—not peripheral functions—improves readiness for routine operations and high-risk scenarios alike. By implementing multidisciplinary huddles, shared escalation protocols, integrated dashboards, and joint simulation training, Saudi hospitals can reduce delays, prevent incidents, and deliver more reliable patient-centered care. The proposed framework offers a practical roadmap that aligns with hospital realities and the broader objective of strengthening health system performance through coordinated, resilient service delivery.

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