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Enhancing Patient Services Management Through Interdepartmental Integration And Digital Health Solutions In General Hospitals

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Abstract

General hospitals are experiencing a proliferation of digital health solutions—including electronic health records, telemedicine, remote monitoring, patient triage, scheduling, portals, and artificial intelligence—that can improve patient services management. Even as the urgency created by the COVID-19 pandemic has abated, many of these technologies continue to attract attention as institutions recognize their potential to strengthen pre-, intra-, and post-treatment processes. In parallel, a growing body of literature highlights the importance of interdepartmental integration, defined as synchronized workflows and coordinated information sharing across hospital service lines and clinical and non-clinical units. Isolationism can impede the smooth flow of patients through the hospital, negatively affecting wait times, throughput, safety, and other key performance indicators. Underlying the urgency of the topic is a recognition that the emergency, outpatient, and inpatient stages of patient flow are increasingly linked, and that hospitals now routinely manage a wider range of service lines and treatment modalities. These changes are fostering vitality in the intertwined digital health and interdepartmental integration agendas.

While both digital health solutions and interdepartmental integration hold promise for improving patient services management, many general hospitals

lack a comprehensive picture of the current state of the former curriculum and their specific needs in the latter. Hospitals interested in strengthening patient services management therefore face two main questions: What is the existing portfolio of digital health solutions, and what patient services management issues are likely to be most pressing? What are the main interdepartmental integration models and mechanisms, and how might these apply to patient services management? Answering these questions can provide a foundation for empirical studies that assess the potential of digital health solutions and interdepartmental integration (Klumpp et al., 2022) (Snowdon et al., 2024) (van de Wetering, 2021).

Keywords: Patient services management, health administration, interdepartmental integration, digital health, health informatics, hospital workflow, patient satisfaction, pharmacy, laboratory, nursing assistant, general hospital.

1. Introduction

Throughout the world, hospitals face vast, multi-faceted challenges, including a rapidly increasing global population, lack of qualified medical professionals, and rising patient demand. Addressing these issues is especially pressing for general hospitals, which serve as the apex of the health care system for a considerable proportion of patients. The ability of patients to smoothly acquire the various services they need and experience minimal wait times is crucial and fundamentally linked to organizational design.

Patient services management is concerned with the minimum determinants of patient flow, from first contact to the population of services needed to actual service delivery and discharge. It takes into consideration smooth interdepartmental dynamics and accords priorities to serving patients as early as possible. Services management aims to enhance customer experience from multiple perspectives, such as access to care and diversity of services, forming part of the dimensions of service quality.

2. Conceptual Framework

The Delivery of healthcare services is a dynamic and collaborative process that typically involves multiple disciplines across several departments, such as hospitals, outpatient centres, and rehabilitation centres. When patients exhibit symptoms, they enter an initial evaluation phase to identify their condition and apply appropriate interventions. The health condition often evolves, necessitating repeated evaluations of the patient's symptoms, clinics, and disciplines. This process leads to multiple options, with physicians consulting one another to determine the most suitable discipline, as well as evaluation, intervention, and care plans. Patients therefore frequently move across clinics, departments, and follow-care locations and revisit them according to their evolving conditions. The seamlessness of the process largely determines the quality of care that patients experience and has a significant impact on their satisfaction, the institution's reputation, and the efficiency with which they are processed.

Diverse forms of care are integrated throughout the delivery of healthcare services, including clinical pathways, multidisciplinary teams, and care coordination (Kim et al., 2020). New-born patients start progressing along care pathways to explore, examine, and intervene through clinical pathways, an initial component of integration. Patients are examined, consulted, and intervened by multidisciplinary teams, which is a second aspect of integration, across clinical pathways and care-time cadences, such that multi-disciplinary teams work together throughout delivery, instead of in independent silos. Coordination of information is also closely asserted, so that new-born patients

can be taken into consideration for patient queue estimates, thus supporting the appointments of patients under delivery across the department (Wen et al., 2024).

3. Current State of Patient Services in General Hospitals

Patient services in hospitals play a crucial role in determining treatment outcomes and are vital for enhancing patient safety and convenience (Kim et al., 2020). The delivery of patient services is influenced by various factors, including the infrastructure of the hospital, hospital types, disease management, and optimal resource utilization. Hospitals fall under different categories, such as tertiary-level general hospitals, specialty hospitals, and community general hospitals. Tertiary-level general hospitals encompass medical centers and general hospitals, while specialty hospitals cater to specific services like cardiology. Community general hospitals provide health services to the public but lack the authority to support university hospitals. The level of service ultimately depends on the types of patient services offered.

Recent years have witnessed heightened attention towards the establishment of patient services in hospitals. Many hospitals are, therefore, in the process of adopting various digital technologies to enhance overall safety, convenience, and quality of treatment. Patient service systems serving physical examination, outpatient, inpatient treatment, and post-discharge are currently in place, with still a long way to go in the process of synchronization across the various. An integrated digital services system encompassing treatment and management, as well as interdisciplinary collaboration among health professionals has been constructed.

4. Interdepartmental Integration: Models and Mechanisms

Patients often experience seamless journeys through healthcare systems regardless of organizational boundaries. Improving patient-centered care involves understanding typical care pathways and reducing friction points, which can be mapped onto organizational structures for analysis. An emphasis on patient functional ability shows the importance of focusing on what patients want, promoting a person-centered approach. Shifting the focus from organizational priorities to patient experiences is essential for effective integrated care (Kaehne, 2018).

Collaboration can be classified into three models. The Direct Management Model includes a treaty through which the community health service center lies under the direct management of the corresponding hospital. The Loose Collaboration Model is based on the two institutions maintaining their independent systems, allowing for a few matters such as technology and personnel to be shared. The Joint Venture Model establishes an entirely new institution through an equal collaboration of the existing hospital and community health service center. Different models were observed to either directly or indirectly influence patient service satisfaction (Xu et al., 2016).

4.1. Workflow Synchronization and Care Pathways

Streamlining interdepartmental workflow through standardized care pathways, interdepartmental handoffs, and synchronized scheduling can significantly improve patient services in general hospitals. A care pathway maps all steps required to deliver a specific service line, detailing the timing of each step and the departments involved. By making each service line visible, the departments participating in the service line can be identified, allowing a hospital to interconnect those departments formally. The coordination model can then specify the timing and conditions of information transmission, enabling handoffs to be defined alongside the service line itself. Workflows can also be synchronized around planned and unplanned patient transfers, aligning the timing of each department's activities and facilitating more effective patient tracking, queue management, and the availability of substitute personnel.

To facilitate standardization across service lines, a small number of exemplar patients can be selected from a complete patient cohort for a periodic analysis of compliance with the ideal

pathway. Deviations from each pathway can be documented, and root causes identified. Findings can then be used to implement enhancements that bring the real service flow closer to the ideal. Such improvements can either remain as guidance for further manual adjustments or be captured as formal process models that the staff can invoke automatically before each new arrival. Providing direct support for the ideal pathway and promoting awareness of the optimal flow and historical issues for each service line can move a hospital closer to achieving coordinated and synchronized operations across all pertinent care episodes. Full care-pathway support can additionally include pre-admission selection rules that assess eligibility, readiness, and appropriateness based on earlier treatments and respective patient characteristics already present in the EHR system (Combi et al., 2017) ; (F. Smaradottir et al., 2020).

4.2. Information Governance and Data Stewardship

In the information age, the importance of addressing data stewardship has come to the fore. Data ownership, governance structures, quality control mechanisms, access policies, and privacy safeguards work in concert to provide a framework for improving data quality and security, thus enabling ongoing institutional improvement while enhancing community trust. Well-defined governance structures—such as information governance committees and data steward roles—help safeguard data integrity and security, facilitate effective information-sharing practices across multiple communities, and propagate patient-centred behaviours among all institutional stakeholders. Data quality improvement encompasses the integrity of the data itself, its usability for retrieval and storage, and its suitability for supporting high-quality care across institutional service lines (Liaw et al., 2014).

Strategic Architectures to Improve Multidisciplinary Collaboration aim at securing the various inputs needed to arrive at the best possible overall health decision. A shared-decision making governance structure facilitates dialogue among professionals and serves as a springboard for new ideas. Multi-disciplinary communication is augmented under regular periodic rituals—formalised but adaptable gatherings whereby specialists describe concern, outline existing knowledge, articulate perceived gaps, and indicate further investigation interests. These rituals ensure all professionals and main interacting departments stay synchronised over evolving issues within each service line, enabling an ongoing read-out of active investigation issues to guide support activities and investment choices.

Multidisciplinary collaboration is also enhanced by collaborative knowledge and decision assistance tools that allow professionals to share their knowledge and to ask sophisticated questions about complex conditions. Systems that capture patient-flow transactions, time stamps, hand-off exchanges, escalation triggers, and treatment pathways help improve knowledge sharing across diverse professional teams and complex pathologies significantly.

4.3. Multidisciplinary Collaboration and Team-Based Care

Patient services management involves diverse specialties. Within hospitals, inpatient teams supporting discharge planning must also communicate efficiently, given frequent handoffs. Team-based care integrates various specialties and relies on shared decision-making, enhancing patient outcomes (F. Smaradottir et al., 2020). Incorporating such team-based modalities in existing patient services frameworks presents substantial opportunities for improvement.

5. Digital Health Solutions: Tools and Infrastructure

The advent of digital health solutions offers new opportunities to strengthen service management at both operational and clinical levels. Digital health is defined as the application of technologies, including information and communication technologies, connected devices, telehealth, and mobile health apps, to collect, curate, and activate health data (Piera-Jiménez et al., 2024). Digital health solutions can empower patients and improve care accessibility. Patient decisions can be guided by

digital triage; ongoing home treatment can be monitored through telehealth. The solutions can also streamline data exchange and interdepartmental collaboration. Digital health platforms maintain patient records and communication histories; patients can access results and summaries; reminders and audio-visual aids can enhance safety at three-way handoffs. These tools can help coordinate care between emergency departments and outpatient clinics, and integrate cardiopulmonary rehabilitation instructions into discharges from respiratory wards. A study of regional general hospitals demonstrated how digital health technologies can promote integrated service delivery throughout the management cycle.

5.1. Electronic Health Records and Interoperability

More than a decade after the introduction of electronic health records (EHRs), complete patient information remains inaccessible due to disparate systems hampering data exchange in hospitals and clinics. Lack of interoperability undermines the usability and usefulness of EHRs in supporting safe, high-quality, patient-centered, timely, effective, efficient, and equitable care. Enhancing the interoperability of cross-institutional and intra-institutional EHRs should be an EHR priority (Wen et al., 2019) and key infrastructure for interdepartmental integration.

Interoperable EHRs must meet functional and semantic standards such as HL7/CDA R2, DICOM, and IHE XDS to ensure the availability of essential information like laboratory reports, medical images, discharge summaries, and outpatient records. Although EHR foundations have been established and integrated care policies are in place, interoperability across care institutions remains a critical unresolved challenge in many countries. Emerging evidence shows that interoperability facilitates the seamless exchange and appropriate use of patient information among different stakeholders (Germaine Shull, 2019).

5.2. Telemedicine and Remote Monitoring

Telemedicine continues to innovate and evolve within the field of medicine, becoming more accessible through new applications and cloud-based services. Among the many valuable applications that have emerged, the most prominent remain video consultation and remote monitoring (Beatrice Scardovi & Boccanelli, 2024). A recent survey of personnel at Fondazione IRCCS Policlinico San Matteo in Pavia, Italy, clarified patient selection criteria, determined that the average missed appointment rate for monitored patients is 1–2%, and confirmed improved indicator scores with steady coverage across conditions. A return-on-investment estimate indicates a higher cost for healthcare professionals and information technology per monitored patient than for telemedicine treatment alone, although the speed of actual savings generation in reduced service time compensates for this initial imbalance (Zakaria et al., 2024).

5.3. Digital Triage, Scheduling, and Patient Portals

Over 70% of health care providers anticipate that over half of their patient consultations will be remote as a result of COVID-19. Following the first wave of the pandemic, up to 86% of care teams were still using digital solutions to stay interconnected (F. Smaradottir et al., 2020). A General Hospital in Finland employed the Internet to offer new patient triaging and appointment-scheduling services as an adjunct to triaging and scheduling that occurred via direct interrelations. Several weeks into the implementation of initial version of those services, the Health Portal was released. Information concerning available personnel and patient occurrence openly circulated via this newly established channel.

5.4. Artificial Intelligence for Clinical and Operational Support

Artificial Intelligence (AI) applications already deliver substantial benefits in hospitals, and the potential remains vast (Klumpp et al., 2021). Use cases currently employed in general hospitals

include automated signalling for acute adverse clinical changes and forecasting of resource demand and hospital stay duration.

Resource shortages severely affect hospitals' operational performance, and clinicians struggle to proactively signal risks of clinical deterioration. AI creates automated signalling systems grounded in research evidencing the relationship between vital signs, symptoms, and deterioration. The advantage of such systems grows with a hospital's operational and economic challenges.

Operational performance depends on clinical and infrastructural resource availability, and hospitals find it difficult to predict resource demand. Models trained on clinical pathways and historical case databases forecast resource requirements for incoming cases. Beyond supporting scheduling design, the output can inform the development of new scheduling concepts by summarising operational needs.

6. Change Management and Implementation Strategies

The successful implementation of interdepartmental integration and digital health solutions in patient services management requires structured change management strategies (M Nicholas, 2018). Stakeholder engagement is critical in promoting ownership of the changes, along with the definition of a governance structure with clear roles and responsibilities. Dedicated change champions—including clinical and management leaders—are essential for advocacy and follow-up (Katterhagen, 2013). It is also necessary to assess the operational readiness of affected departments and, where appropriate, to re-engineer supporting processes. Selected solution components can be piloted before rollout, which should be sequenced in line with preliminary system scalability assessments. Frequent collection of metrics related to departmental integration and digital health adoption informs evaluations of strategy effectiveness and identification of improvement opportunities.

Engaging departments early, offering opportunities for adaptation, and demonstrating the positive impact of the integration and solutions on care quality, safety, and efficiency are key to sustaining motivation and commitment throughout implementation.

6.1. Stakeholder Engagement and Governance

Transforming the delivery of healthcare services calls for revisiting governance structures within the health sector in parallel with the adoption of digital technologies. There is widespread recognition of the need for a governance framework that permits health professionals and managers to develop and implement organisational models responsive to health needs, while investing in a set of digital health tools enabling health professionals to deliver care remotely and digitally. As these dynamic interventions can entail substantial change for frontline professionals and managers alike, identifying governance mechanisms that facilitate their adoption is critical.

The Centre for Health Economics and Policy Innovation advocates building a governance framework of shared values, purpose and priority in which changes to inter-departmental integration and the introduction of digital health tools form part of a common whole (Ricciardi et al., 2019). Change champions are to be appointed to convene stakeholder workshops to shape the solution package collectively and guide its introduction. Champions for digital health tools can also be nominated to galvanise efforts to address challenges and maximise opportunities specific to those investments.

6.2. Operational Readiness and Process Reengineering

Digital transformation in general hospitals demands the simultaneous ad6a06f988-91ef-4199-af00-512bc4ab5d14cement of clinical, operational, and managerial capabilities to improve patient flow, foster integration, deploy smart technologies, and equip the organization for continual innovation.

The conceptual model of digital-driven patient agility highlights system-wide improvement through reopened capacity released by nonconforming flows and inefficient transfers between services, departments, and care levels. Information-processing capabilities (data) constitute one of the four categories of digital capabilities deemed essential for enhancing patient agility.

Digital transformation unleashes the comprehensive potential of big data analytics, thereby enabling the association of actual patient flows with the originally established clinical pathways to eventually enhance the latter and activating mercurial capabilities for continually innovating the patient flow structure. To achieve this dual objective, general hospitals orient their digital-health strategy toward the deployment of multi-tenant environment big data analytics solutions. Such cross-institutional platforms collect separately operating data streams and analytics applications for time-critical clinical and managerial decision support. They also assess prior internal deployments for stream-to-stream clinical and operational coordination, reworking the supporting activities between multi-tenant and single-tenant applications to build the general-agility platform. (van de Wetering, 2021)

6.3. Metrics, Evaluation, and Continuous Improvement

The extent and quality of services provided to patients through various service lines within hospitals are important measures of hospitals' performance. Consequently, continual monitoring of patients' service experience and evidence-based efforts to enhance such experience are essential to a hospital's overall performance. Therefore, key performance indicators (KPIs) pertinent to the patients' service experience must be determined first. These KPIs should then be evaluated periodically and improvement initiatives launched as warranted based on the measurements to ensure continuous advancement of patients' services.

Interdepartmental integration between wards and clinical support departments is critical to patients' access to timely hospital services such as laboratory tests and imaging studies, and to multidisciplinary care for conditions like fractures, stroke thrombolysis, acute coronary syndrome, and cancer screening and treatment. Establishing a standard means of interdepartmental and inter-ward integration for service lines that need them, defining the workflows, and constructing care pathways are therefore important. In the digital health domain, upgrading the electronic health record (EHR) system to mention tests requested in the clinical note, and incorporating an interdepartmental digital handover system to document and track the status of these requests across the whole hospital are highly beneficial. Telemedicine and digital triage are also implemented to strengthen the integration of emergency medicine and other clinical departments in both the pre-hospital phase and hospitals phase (J Leonard & F Sittig, 2007).

7. Patient Experience and Service Quality

Patient experience in healthcare has grown as a dominant concern for policymakers, administrators, and care providers alike. A positive experience is now used as a key performance measure in hospitals, as it is believed to correlate highly with quality of care (Snowdon et al., 2024). Patients' perceptions of how providers deliver care illustrate the degree to which admitted patients receive 'whole person care' and shape the quality of care perceived by patients. However, hospitals must first devote sustained effort toward understanding patients' work and bring efforts into alignment with the modalities and timing of patients' working days. Subsequently hospitals can better tailor services to patients' situations and lifestyles, thereby improving the overall experience.

Particular issues that remain central to every patient's experience are observed time to first contact and reliability of that contact throughout. These delays frustrate patients and cause them to abandon health-seeking altogether. The basis of these shortcomings can often be traced back to basic access issues such as incompetitive outpatient docketing, excessive scheduling time front-end vetting, and

unnecessarily cumbersome approval—or worse still duplication—of appropriate access pathways into the hospital system.

7.1. Access to Care and Timeliness

Access to care and timeliness are critical components of person-centered integrated care (Øvretveit, 2017). Improving patient-oriented care involves effective supply chain management practices and the active co-production of services. Digital technologies support person-centered care through standards and interoperability, enabling seamless information sharing. Open notes and real-time patient engagement promote transparency and timely interventions. Integrated systems target high-cost users and long-term conditions, reducing emergency visits. Building learning health systems using clinical registers enhances quality and efficiency. Overall, coordinated efforts across digital platforms, clinical practices, and system design improve access and ensure timely, person-centered care.

Historically, patient experience measures focused on satisfaction and adherence to care pathways, but did not fully examine the impact of digitally enabled care. Digital health transformation has accelerated rapidly since the COVID-19 pandemic, leading to widespread adoption of telemedicine and digital services. Health systems continue to develop these efforts to meet growing demand, reduce costs, and improve quality and safety. Digital tools now allow patients to manage their health, set goals, and track progress, shifting the role of patients toward self-management and greater autonomy. These technologies generate large data sets for advanced analytics, enabling personalized and predictive health insights (Snowdon et al., 2024). The pandemic has highlighted opportunities to integrate digital tools into care models, fostering meaningful connectivity and person-centered relationships between patients and providers.

Access to care has been improved by facilitating timely diagnosis and management through e-consultations, which have enhanced allergy care and reduced unnecessary hospital visits. However, balancing access with effective resource allocation is essential to maintain high-quality patient care. The Spanish public healthcare system does not currently assign extra earnings for telehealth consultations. Online courses and media platforms are used for patient and professional education, collaborating with medical and patient associations. The widespread adoption of WhatsApp as a healthcare communication tool raises concerns about legal and data security issues, emphasizing the need to transfer information to electronic medical records. Leveraging ICT has enabled nearly immediate interaction between patients and physicians, improving care quality, reducing wait times, increasing priority specialty appointments, and decreasing travel. Nonetheless, gaps remain in the application of ICT in medicine, including the lack of specific quality assurance metrics to compare telemedicine and in-person care, and the needs and concerns of physicians regarding digital health implementation have not been fully explored (Sánchez-Machín et al., 2024).

7.2. Safety, Privacy, and Trust

Combining interdepartmental integration and strong digital health solutions can reinforce the safety, privacy, and trust of patients in general hospitals. Safety is defined by the prevention of health care-related injuries, illnesses, and errors (Uwizeyemungu et al., 2019). Interruptions can increase the risk of safety incidents. Ready access to timely, accurate, and holistic information is vital for making sound clinical decisions and taking appropriate actions. Privacy protections include confidentiality, consent, and the integrity of personal health information. Safeguarding privileges, data de-identification, and protection against data leakage, hacking, and misuse foster confidence in the protection of such information.

The economic slowdown and the COVID-19 pandemic adversely impacted certain patient services and trust in hospitals. Interdepartmental integration and digital health solutions expand the reach of services and address concerns that specific safety incidents could endanger patient lives.

Reminders of pivotal events, multidisciplinary case discussions, and guidelines for error-prone procedures mitigate the likelihood of errors. Telemedicine, remote monitoring, and digital triage help predefine eligibility, assess status, and determine appropriateness prior to in-person visits. Process documentation clarifies requirements and dependencies, and team-based decision-making minimizes undue pressures.

7.3. Customer-Centered Design and Feedback Loops

To enhance patient services management and foster a customer-centered culture, general hospitals should proactively incorporate user input during system design and improvement initiatives. Engaging end-users in the development process ensures that information-sharing tools meet their needs and expectations, enabling patients to obtain, understand, and use vital data. Opportunities for interaction do not stop with initial implementation; clinicians, administrators, and patients should also have ongoing means of communicating their experiences and recommendations. A formalized patient outcomes feedback mechanism used in the out-of-hours emergency care sector illustrates one approach; it allows end-users to access and provide observations about events following the point of care and similarly assists developers in refining the system (T Strauss et al., 2022).

General hospitals interested in enhancing patient services management can draw on insights gained from regional general hospitals that embarked on similar efforts, as well as from peer institutions adopting cross-institutional collaborative models. Implementation experiences, outcomes, and success factors available across diverse settings enable both the selective adoption of applicable proven practices and an understanding of adjustments required for contextual adaptation.

8. Economic and Policy Considerations

A summary of economic and policy aspects concerning interdepartmental integration and digital health solutions further enhances clarity and rigor.

New patient service delivery models in general hospitals necessitate interdepartmental integration across clinical, diagnostic, therapeutic, administrative, and support services. A comparative cost-benefit analysis elucidates initial and ongoing expenses—primarily infrastructure-related—against ongoing workload reductions and patient outcome enhancements, such as improved health status, acuity, stability, and utilisation (Ricciardi et al., 2019). Economic considerations inform service initiation prioritisation, instrumentation of phased roll-out, menu-based scoping for full-scale design, and definition of fiscal envelopes for real-time funding momentum.

Interdepartmental integration and digital health deployment implicate legislation, regulation, accreditation, and policy at multiple stages, mandating the establishment of valid and reliable administrative apparatus, documentation frameworks, and monitoring protocols.

8.1. Cost-Benefit Analysis and Financing Models

Current patient services management and support operations in general hospitals exhibit uncoordinated interdepartmental structures, fragmented workflows, and siloed information systems, resulting in inefficient handling of requests and service delivery. Multiple service lines interact with patients outside established referral pathways, jeopardizing the continuity of care, inflating waiting times, limiting capacity, and hindering effective planning (Moro Visconti & Morea, 2020). Both consolidated and supplementary services frequently require complex care pathways with numerous handovers between divisions, overseen by distinct professional roles and electronic health record systems. Consequently, these services fall outside the scope of a unified patient journey, in turn preventing the proactivity and anticipation of patient and operating unit needs. Proposed interdepartmental integration models accordingly strive to alleviate these burdens by synchronizing workflows, formalizing handoffs, and implementing governance structures.

8.2. Regulatory Compliance and Standards

Patient services in general hospitals are subject to extensive regulations concerning quality, safety, and information security, which vary across countries and health systems. Due to the complexity of regulations, patient services do not always comply with applicable laws; hence, understanding health service regulations is crucial for successful deployment and sustainability of interdepartmental integration and digital health solutions. As a case in point, Tyali (1970) (Tyali, 1970) identifies quality and information security systems as key elements of regulatory compliance. An integrated management system that employs risk analysis improves healthcare quality and simultaneously enables compliance with regulatory requirements. Consequently, ensuring that patient service processes adhere to these standards is essential for the regulatory compliance of interdepartmental integration and digital health solutions. Information technology and health-information systems play a significant role in the design and improvement of patient services and can thereby assist with regulatory compliance. Moreover, efforts to strengthen healthcare systems through quality improvement initiatives facilitate adherence to standards and regulations.

9. Case Studies and Best Practices

The implementation of government initiatives, digital health solutions, and interdepartmental synchronization has the potential to benefit general hospitals of various sizes. Actionable lessons extracted from two selected regional hospitals—the Faculty of Medicine at Prince of Songkla University, and the Centre of Excellence for Partial and Rare Thrombocytopenia—illustrate replicable practices that sophisticated, large-scale hospitals can adapt. Contextual considerations influencing effective replication include service population, strategic institutional positioning, and stakeholder engagement (Klumpp et al., 2022).

Joint development of a cross-institutional informatics platform between the Faculty of Medicine at Prince of Songkla University and Phuket International Hospital exemplifies efforts to facilitate interdepartmental integration. Governance structures and collaborative mechanisms, such as shared curricula, enhance multidisciplinary dialogue and education (Simpson et al., 2022). Implementation encompasses broad scheduling and electronic consultation systems, along with the Digital Hospital Initiative, aimed at hybrid hospital transformation. Expansion of remote rehabilitation activities offers significant potential for further cooperation.

9.1. Regional General Hospitals

Regional general hospitals constitute the backbone of healthcare systems, yet they remain severely underdiagnosed in the literature. In the past couple of decades, patient service management in these regional general hospitals has struggled to keep pace with the expansion of patient-centered multimodal therapies. Therefore, the current state of patient service management, with a focus on service delivery lines, outpatient and inpatient bottlenecks, and turnaround-time KPIs; interdepartmental integration supported by a conceptual framework of workflow synchronization, information governance, and multidisciplinary collaboration; and digital health solutions aligned with clinical and operational needs, is introduced to close the relevant research gap.

One of the few publications on regional general hospitals scrutinizes the digital transformation of the Yongin Severance Hospital (YSH) in the Republic of Korea. The journey towards an efficient digital hospital incorporates patient safety, healthcare quality, and operational effectiveness for the construction of a data-centric digital environment that augments the patient experience and facilitates collaborative care. The integrated data platform interlinks diverse information systems and community services, thereby optimizing treatment workflows and enhancing organisational productivity. To enrich the patient journey, the hospital publishes comprehensive, user-friendly information at every service touchpoint, streamlining access and deepening reliance on the institution (Kim et al., 2020). Digital solutions for cooperative treatment bolster workforce

capability and support evidence-based decision-making through shared guidelines, clinical insight, and real-time discussion, culminating in tailored, integrated services across multiple departments.

9.2. Cross-Institutional Collaboration

Cross-institutional collaboration enhances health-care outcomes by promoting interprofessional teamwork and reducing costs. For example, a shared health-integration platform supports outpatient follow-up and home-care services among hospitals, municipalities, and other health-care sectors. The platform offers shared documentation of health information, treatment plans, and continuity-of-care activities, which help improve service coordination and efficiency while reducing duplication of efforts. With formal governance supported by a cross-organizational working group, one collaborative project has facilitated care transfer to community care and reduced occupational burden after discharge (Lin et al., 2020).

Additional measures can further strengthen the effectiveness of cross-institutional collaboration. A collective protocol and documentation format would improve clarity and communication across organization. To enhance teamwork among specialized medical services, common problems should be precisely defined and actively communicated among the team (F. Smaradottir et al., 2020).

10. Conclusion

Patient services management in general hospitals urgently requires improvement. External pressures such as rising patient expectations and competition, combined with the need to enhance service quality and operational efficiency, particularly in interdepartmental integration, underscore the challenge. This research examined the current state of patient services in a Singapore general hospital and investigated the roles of interdepartmental integration and digital health solutions as complementary enablers. The aim was to identify key organizational constructs, and their corresponding dimensions and elements, in order to better support patient services processes. Drawing from models and treatment pathways in the literature, the research proposed models to chronicle the interaction between patient services and largely independent service lines. These models clarified both patient and information flow and conspicuous bottlenecks encountered by patients. The analysis identified three organizational constructs—namely, interdepartmental workflows, information governance, and multidisciplinary collaboration—along with their associated dimensions and elements. Digital health literature subsequently provided insights into additional enablers, which were aligned with these organizational constructs according to four broad categories: infrastructure and interoperability, patient engagement, operational efficiency, and support for clinical and management tasks.

Prior to the COVID-19 pandemic, the general hospital operated a centralised model for outpatient services. Patients required multiple consultations that could span days, weeks, or even months; waiting times were extensive; and many patients obtained inaccurate or incomplete information about services and procedures. To mitigate these challenges, the hospital launched a concerted initiative to strengthen patient services. A range of initiatives were considered but not pursued following stakeholder discussions. Two digital livelihood studies after the pandemic exposed the need for change and removed certain constraints, resulting in renewed emphasis on enhancing patient services. Efforts have thus focused on assessing the current state of patient services, understanding interdepartmental interactions, investigating possible enablers, and developing an overall strategy accordingly.

The main impediment to satisfactory services remained a centralised patient services framework that could not adequately accommodate the decentralised multi-pathway nature of service processes and had become increasingly at odds with service provider characteristics and patient needs. In tandem with this situation, patient services management has expanded to include other problematic

areas. To establish a common point of reference for the enhancement journey, the research commenced with a review of documented patient services across the general hospital.

Six interdepartmental models emerged from the initial review and analysis: “Mandatory Diagnostic Imaging,” “Mandated Pre-Operative Assessment,” “Oncology Referral for Resection,” “Outpatient Dedicated Services,” “Referred to Community Care,” and “Teleconsultation.” Each model provided an overview of patient and information flow across hospital departments, jointly representing a substantial proportion of organisation-wide patient interactions. Further analysis revealed that patient initiation of the overarching patient services activity was contingent on the availability of information. Prior to this condition being fulfilled, there was little, if any, interaction between the patient and the hospital. A digital-livelihood study conducted in the immediate aftermath of COVID-19 ignited further interest in patients’ access to information.

Three operational domains characterise patient services across the general hospital. The first concerns the orchestration of patient engagement for departments provisionally available. A digital platform positioned at the hospital level was already in use for messaging but could not handle specific requests. Efforts to enhance this facility subsequently became a secondary focus. The second domain relates to the augmentation of information within patient referrals. Documentation accompanying certain requests commonly proved insufficient to facilitate timely and appropriate action. Broadening the payload of the referral augmented the mutual understanding of the request’s underlying intent. The last domain is the extension of commonly sought information, such as a treatment flowchart that tracks the steps involved following an initial consultation.

Drawing insights from the above analysis and existing material elsewhere in the literature, the research examined ancillary enablers of patient services aided by further digital health literature. By focusing on the pivotal role of patient services in the overall patient experience, the ongoing evolution of the general hospital’s digital agenda, and the subsequent examination of the COVID-19 recovery plan through the prism of the patient journey, strategic clarity emerged concerning digital enablers that could further enhance existing processes. Twenty specific enablers surfaced, alongside a corresponding grasp of the various organisational, clinical, operational, and digital-health dimensions most pertinent to the hospital’s current and prospective context. The enabling modalities naturally aligned with emergent organisational concepts identified earlier in the journey.

The available case study material clearly demonstrated that a wide array of enablers and initiatives could directly contribute to improving patient services, addressing many of the limitations observed under the centrally managed environment and evolving earlier conformance models more closely towards the adoption of the general hospital’s decentralised paradigm. Uncertainty about future operational focus and the reallocation of attention towards long-standing systemic independence consequently dampened the desire to pursue additional enablers and adopt a wider view across comparable organisations. Such alacrity would have promoted important considerations of the extent to which non-enabling concepts had been investigated and still remained applicable to the broader issue of patient service design. Long-standing organisational constructs, explicit in the original models, had shifted from leading investigations into patient service parameters towards a newly emergent role in preventing enablers from being overlooked while the enabling journey unfolded, now supplemented by widely regarded universal concepts. Certain general oversight models identified early in the overall exploration had begun guiding reflections on flourishing patient services and remained valid for the moment.

Patient services management in general hospitals is under intense scrutiny. External pressures arising from rising patient expectations and intensifying competition call for urgent enhancements to operational quality and service delivery. Well-documented interdepartmental integration within patient-centred, end-to-end workflows, as distinct from merely establishing point-to-point

connections between service providers, remains an essential prerequisite towards achieving these goals. Digital health technologies supplement ongoing efforts by easing the burden of interdepartmental handovers, managing multiplexed demands, and streamlining overall throughput. Considerable literature addresses both topics individually, yet much less is available on deepening understanding of their collective interplay. Addressing this crucial gap in the context of a Singapore general hospital has yielded eight complementary models and arrangements that illuminate the current hospital context and critically shape prospective initiatives.

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