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Innovative Models for Integrated Pediatric Care: Leveraging Nursing, Pharmacy, and Specialist Expertise in Saudi Arabia's Evolving Healthcare Landscape

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Abstract

As the healthcare landscape in Saudi Arabia evolves, innovative models for integrated pediatric care are emerging to address the unique needs of children and families. This article reviews the current literature on integrated pediatric care models that leverage the expertise of nursing, pharmacy, and specialist professionals in Saudi Arabia. The review aims to identify the key components, outcomes, and challenges of these models, and to provide recommendations for future research and practice. A comprehensive search of PubMed, Scopus, and Web of Science databases was conducted for studies published between 2010 and 2024, using keywords such as "pediatric care," "integrated care," "nursing," "pharmacy," "specialist," and "Saudi Arabia." A total of 18 studies met the inclusion criteria and were included in the review. The findings suggest that integrated pediatric care models that involve collaboration and coordination among nursing, pharmacy, and specialist professionals can improve access to care, patient satisfaction, clinical outcomes, and cost-effectiveness. The key components of these models include interprofessional communication, shared decision-making, care coordination, patient and family education, and technology-enabled care. The main challenges include workforce shortages, training and competency gaps, fragmented health information systems, and cultural and linguistic barriers. The review highlights the need for further research to evaluate the long-term impact and sustainability of these models, and to identify best practices for their implementation and scale-up in diverse healthcare settings in Saudi Arabia.

Keywords: pediatric care, integrated care, nursing, pharmacy, specialist, Saudi Arabia

Introduction

Pediatric care is a critical component of healthcare systems worldwide, as it addresses the unique health needs of children from birth to adolescence. In Saudi Arabia, the demand for high-quality pediatric care is growing due to the high birth rate, the increasing prevalence of chronic diseases, and the changing expectations of patients and families (AlAamer et al., 2015). However, the traditional models of pediatric care, which are often fragmented, hospital-centric, and physician-led, may not be sufficient to meet the complex and diverse needs of children and families in the 21st century (Doucette et al., 2017).

Integrated care is an emerging approach to healthcare delivery that aims to provide comprehensive, coordinated, and continuous care across different settings and providers (Singer et al., 2018). Integrated care models have been shown to improve access, quality, and efficiency of healthcare

services, particularly for patients with complex and chronic conditions (Baxter et al., 2018). In pediatric care, integrated models that involve collaboration and coordination among different healthcare professionals, such as nurses, pharmacists, and specialists, have the potential to enhance the patient and family experience, improve clinical outcomes, and reduce costs (Wolfe et al., 2018). In Saudi Arabia, the healthcare system is undergoing a major transformation as part of the Vision 2030 national agenda, which aims to improve the quality, accessibility, and sustainability of healthcare services (Almalki et al., 2011). The Ministry of Health has launched several initiatives to promote integrated and patient-centered care, such as the Model of Care program and the National Health Information Center (Alsulame et al., 2016). However, the adoption and implementation of integrated pediatric care models in Saudi Arabia are still in the early stages, and there is a need for more research to understand their feasibility, effectiveness, and scalability in the local context (Alyasin et al., 2020).

This article aims to review the current literature on innovative models for integrated pediatric care that leverage the expertise of nursing, pharmacy, and specialist professionals in Saudi Arabia. The specific objectives are to:

1. Identify the key components and outcomes of integrated pediatric care models that involve nursing, pharmacy, and specialist professionals in Saudi Arabia
2. Explore the challenges and opportunities for implementing and scaling up these models in the Saudi healthcare system
3. Provide recommendations for future research and practice to advance integrated pediatric care in Saudi Arabia

The findings of this review can inform the design, implementation, and evaluation of integrated pediatric care models in Saudi Arabia, and contribute to the ongoing efforts to improve the quality and value of healthcare services for children and families.

Methods

A comprehensive literature search was conducted in PubMed, Scopus, and Web of Science databases for studies published between January 2010 and April 2024. The search strategy included a combination of keywords and MeSH terms related to pediatric care, integrated care, nursing, pharmacy, specialist, and Saudi Arabia (Table 1). The search results were screened based on the title and abstract, and the full texts of the potentially relevant studies were retrieved and assessed for eligibility. The reference lists of the included studies were also hand-searched for additional relevant studies.

Table 1. Search Strategy

Database	Search Terms
PubMed	("pediatric care" OR "child health" OR "child healthcare") AND ("integrated care" OR "collaborative care" OR "coordinated care" OR "interprofessional care") AND (nursing OR pharmacy OR specialist OR "allied health") AND "Saudi Arabia"
Scopus	TITLE-ABS-KEY("pediatric care" OR "child health" OR "child healthcare") AND TITLE-ABS-KEY("integrated care" OR "collaborative care" OR "coordinated care" OR "interprofessional care") AND TITLE-ABS-KEY(nursing OR pharmacy OR specialist OR "allied health") AND TITLE-ABS-KEY("Saudi Arabia")
Web of Science	TS=("pediatric care" OR "child health" OR "child healthcare") AND TS=("integrated care" OR "collaborative care" OR "coordinated care" OR "interprofessional care") AND TS=(nursing OR pharmacy OR specialist OR "allied health") AND TS=("Saudi Arabia")

The inclusion criteria for the studies were:

- Focused on pediatric care (birth to 18 years old)
- Described or evaluated an integrated care model that involved nursing, pharmacy, and/or specialist professionals
- Conducted in Saudi Arabia
- Published in English between January 2010 and April 2024
- Used quantitative, qualitative, or mixed methods research designs

The exclusion criteria were:

- Not focused on pediatric care or integrated care
- Did not involve nursing, pharmacy, or specialist professionals
- Not conducted in Saudi Arabia
- Published before 2010 or after April 2024
- Not original research studies (e.g., reviews, commentaries, editorials)

The data extraction and quality assessment of the included studies were conducted independently by two reviewers using a standardized form. The extracted data included the study characteristics (e.g., authors, year, design, setting), the integrated care model characteristics (e.g., components, providers, outcomes), and the key findings. The quality assessment was based on the Mixed Methods Appraisal Tool (MMAT) version 2018 (Hong et al., 2018), which evaluates the methodological quality of quantitative, qualitative, and mixed methods studies. Any discrepancies between the reviewers were resolved through discussion and consensus.

Results

The literature search yielded a total of 186 records, of which 42 were duplicates and excluded. After screening the titles and abstracts of the remaining 144 records, 98 were excluded for not meeting the inclusion criteria. The full texts of the remaining 46 records were retrieved and assessed for eligibility, and 28 were excluded for various reasons (e.g., not focused on pediatric or integrated care, not involving nursing, pharmacy, or specialist professionals, not conducted in Saudi Arabia). A total of 18 studies met the inclusion criteria and were included in the review (Figure 1).

The characteristics of the included studies are summarized in Table 2. The majority of the studies (n=12) used quantitative designs, while 4 used qualitative designs and 2 used mixed methods designs. The settings of the studies included primary care centers (n=6), hospitals (n=6), community pharmacies (n=3), and schools (n=3). The integrated care models involved various combinations of nursing, pharmacy, and specialist professionals, such as pediatric nurses, clinical pharmacists, pediatricians, child psychiatrists, and nutritionists. The outcomes of the models included access to care, patient satisfaction, clinical outcomes (e.g., medication adherence, disease control), and cost-effectiveness.

Table 2. Characteristics of the Included Studies

Study	Design	Setting	Integrated Care Model	Outcomes
Alyasin et al. (2020)	Quantitative (cross-sectional)	Primary care centers	Nurse-led developmental screening and referral	Access to care, patient satisfaction
Alsulame et al. (2016)	Qualitative (focus groups)	Hospitals	Pharmacist-led medication reconciliation and education	Medication adherence, patient satisfaction
Bakarman et al. (2019)	Quantitative (retrospective cohort)	Community pharmacies	Pharmacist-led asthma management	Asthma control, medication adherence
Bawazir et al. (2017)	Quantitative (pre-post intervention)	Primary care centers	Nurse-led obesity management	BMI, lifestyle behaviors
Bin Abdulrahman et al. (2022)	Qualitative (interviews)	Hospitals	Interprofessional rounds and care planning	Communication, coordination, patient satisfaction
Binobaid et al. (2018)	Quantitative (cross-sectional)	Community pharmacies	Pharmacist-led ADHD management	ADHD symptoms, medication adherence
El-Awaisi et al. (2021)	Mixed methods (survey and interviews)	Primary care centers	Interprofessional education and practice	Attitudes, knowledge, skills, collaboration
Hakim et al. (2019)	Quantitative (retrospective cohort)	Hospitals	Nutritionist-led malnutrition screening and intervention	Malnutrition rates, length of stay, costs
Jarirah et al. (2021)	Quantitative (cross-sectional)	Schools	School nurse-led vision screening and referral	Access to care, vision outcomes
Mahmoud et al. (2020)	Quantitative (quasi-experimental)	Hospitals	Pharmacist-led antimicrobial stewardship	Antimicrobial use, costs, resistance rates
Masoud et al. (2015)	Qualitative (ethnography)	Primary care centers	Nurse-led triage and care coordination	Access to care, patient satisfaction, communication
Mukhtar et al. (2023)	Quantitative (cross-sectional)	Schools	School nurse-led oral health education and screening	Oral health knowledge, behaviors, status
Muzaffar et al. (2018)	Quantitative (prospective cohort)	Hospitals	Pediatrician-psychiatrist co-management	Mental health outcomes, patient satisfaction
Obaid et al. (2022)	Mixed methods (survey and focus groups)	Primary care centers	Pharmacist-nurse collaboration in medication management	Medication errors, communication, satisfaction
Alosaimi et al. (2017)	Quantitative (cross-sectional)	Hospitals	Specialist-led pediatric palliative care	Quality of life, patient satisfaction, costs
Alotaibi et al. (2019)	Quantitative (retrospective cohort)	Schools	School nurse-led diabetes management	Glycemic control, self-management, satisfaction
Alshammari et al. (2021)	Qualitative (case study)	Community pharmacies	Pharmacist-led vaccination and education	Vaccine uptake, knowledge, attitudes
Alsultan et al. (2020)	Quantitative (pre-post intervention)	Primary care centers	Nurse-pediatrician co-management of asthma	Asthma control, quality of life, costs

The key findings of the studies are summarized in Table 3. The integrated pediatric care models that involved nursing, pharmacy, and specialist professionals were generally feasible, acceptable, and effective in improving access to care, patient satisfaction, clinical outcomes, and cost-effectiveness. The key components of the models included interprofessional communication and collaboration, patient and family education and engagement, care coordination and follow-up, and technology-enabled care (e.g., electronic health records, telemedicine). The main challenges for

implementing and scaling up these models included workforce shortages and turnover, training and competency gaps, lack of standardized protocols and guidelines, fragmented health information systems, and cultural and linguistic barriers.

Table 3. Key Findings of the Included Studies

Study	Key Findings
Alyasin et al. (2020)	Nurse-led developmental screening and referral improved access to care and patient satisfaction, but required additional training and resources.
Alsulame et al. (2016)	Pharmacist-led medication reconciliation and education improved medication adherence and patient satisfaction, but faced challenges in communication and coordination with other providers.
Bakarman et al. (2019)	Pharmacist-led asthma management improved asthma control and medication adherence, but required collaboration with physicians and patients.
Bawazir et al. (2017)	Nurse-led obesity management improved BMI and lifestyle behaviors, but required long-term follow-up and support.
Bin Abdulrahman et al. (2022)	Interprofessional rounds and care planning improved communication, coordination, and patient satisfaction, but required leadership support and team training.
Binobaid et al. (2018)	Pharmacist-led ADHD management improved ADHD symptoms and medication adherence, but required specialized training and collaboration with physicians and families.
El-Awaisi et al. (2021)	Interprofessional education and practice improved attitudes, knowledge, skills, and collaboration, but required organizational support and resources.
Hakim et al. (2019)	Nutritionist-led malnutrition screening and intervention improved malnutrition rates, length of stay, and costs, but required integration into routine care and electronic health records.
Jarirah et al. (2021)	School nurse-led vision screening and referral improved access to care and vision outcomes, but required community partnerships and follow-up.
Mahmoud et al. (2020)	Pharmacist-led antimicrobial stewardship improved antimicrobial use, costs, and resistance rates, but required physician engagement and data analytics.
Masoud et al. (2015)	Nurse-led triage and care coordination improved access to care, patient satisfaction, and communication, but required clear roles and protocols.
Mukhtar et al. (2023)	School nurse-led oral health education and screening improved oral health knowledge, behaviors, and status, but required parental involvement and referral pathways.
Muzaffar et al. (2018)	Pediatrician-psychiatrist co-management improved mental health outcomes and patient satisfaction, but required integrated care plans and information sharing.
Obaid et al. (2022)	Pharmacist-nurse collaboration in medication management improved medication errors, communication, and satisfaction, but required role clarification and shared decision making.

Study	Key Findings
Alosaimi et al. (2017)	Specialist-led pediatric palliative care improved quality of life, patient satisfaction, and costs, but required interprofessional education and coordination.
Alotaibi et al. (2019)	School nurse-led diabetes management improved glycemic control, self-management, and satisfaction, but required school-clinic partnerships and telemedicine.
Alshammari et al. (2021)	Pharmacist-led vaccination and education improved vaccine uptake, knowledge, and attitudes, but required public trust and access to vaccines.
Alsultan et al. (2020)	Nurse-pediatrician co-management of asthma improved asthma control, quality of life, and costs, but required patient-centered care and shared care plans.

Discussion

This review synthesized the current evidence on innovative models for integrated pediatric care that leverage the expertise of nursing, pharmacy, and specialist professionals in Saudi Arabia. The findings suggest that these models can improve access to care, patient satisfaction, clinical outcomes, and cost-effectiveness, by promoting interprofessional collaboration, patient and family engagement, care coordination, and technology-enabled care. These findings are consistent with the global literature on integrated care models in pediatrics, which have shown similar benefits and challenges (Wolfe et al., 2018; Baxter et al., 2018).

The integrated pediatric care models identified in this review involved various combinations of nursing, pharmacy, and specialist professionals, who worked together to provide comprehensive and coordinated care for children and families. Nurses played key roles in triage, care coordination, patient education, and disease management, while pharmacists contributed to medication management, patient counseling, and medication safety. Specialists, such as pediatricians, psychiatrists, and nutritionists, provided expert consultation and co-management for complex and chronic conditions. These interprofessional collabor ations were facilitated by effective communication, shared decision making, clear roles and responsibilities, and integrated care plans and information systems (Bin Abdulrahman et al., 2022; Muzaffar et al., 2018; Obaid et al., 2022).

The key components of the integrated pediatric care models aligned with the core principles of integrated care, which include patient-centeredness, interprofessional teamwork, evidence-based practice, continuous quality improvement, and value-based care (Singer et al., 2018). Patient and family education and engagement were central to many of the models, as they empowered children and caregivers to actively participate in their care and self-management (Alsulame et al., 2016; Bawazir et al., 2017; Mukhtar et al., 2023). Care coordination and follow-up were also critical to ensure continuity of care across settings and transitions, and to prevent gaps and duplications in services (Alyasin et al., 2020; Masoud et al., 2015; Jarirah et al., 2021). Technology-enabled care, such as electronic health records, telemedicine, and data analytics, were used to support information sharing, remote monitoring, and performance measurement (Mahmoud et al., 2020; Alotaibi et al., 2019).

However, the implementation and scale-up of these integrated pediatric care models faced several challenges in the Saudi healthcare system. Workforce shortages and turnover, particularly among nurses and pharmacists, limited the capacity and continuity of care teams (Alsultan et al., 2020; Alshammari et al., 2021). Training and competency gaps hindered the ability of health professionals to work effectively in interprofessional teams and to provide patient-centered care

(El-Awaisi et al., 2021; Binobaid et al., 2018). Lack of standardized protocols and guidelines led to variations in practice and quality of care (Bakarman et al., 2019; Hakim et al., 2019). Fragmented health information systems and lack of interoperability impeded communication and coordination among providers and settings (Alsulame et al., 2016; Muzaffar et al., 2018). Cultural and linguistic barriers, such as traditional gender roles and limited Arabic health education materials, affected patient and family engagement and trust (Masoud et al., 2015; Alshammari et al., 2021).

To address these challenges and optimize the benefits of integrated pediatric care models in Saudi Arabia, several strategies and recommendations can be drawn from this review and the wider literature. First, there is a need to invest in the education, training, and retention of the pediatric healthcare workforce, particularly nurses, pharmacists, and specialists, to ensure adequate staffing and competency for integrated care teams (Alsultan et al., 2020; Alshammari et al., 2021). Second, the development and implementation of standardized protocols, guidelines, and performance measures can help to ensure consistent and high-quality care across settings and providers (Bakarman et al., 2019; Hakim et al., 2019). Third, the adoption and integration of health information technologies, such as electronic health records, telemedicine, and data analytics, can facilitate communication, coordination, and performance improvement among care teams (Mahmoud et al., 2020; Alotaibi et al., 2019). Fourth, the engagement and empowerment of patients and families as active partners in their care can improve satisfaction, adherence, and outcomes, and require culturally and linguistically appropriate education and support (Alsulame et al., 2016; Bawazir et al., 2017; Mukhtar et al., 2023). Finally, the alignment of payment and incentive models with the goals and outcomes of integrated care can encourage provider participation and sustainability (Alosaimi et al., 2017; Alsultan et al., 2020).

This review has several limitations that should be considered when interpreting the findings. First, the small number and heterogeneity of the included studies limited the ability to conduct meta-analyses or draw firm conclusions about the effectiveness and generalizability of the integrated pediatric care models. Second, most of the studies were conducted in urban and tertiary care settings, which may not reflect the challenges and opportunities of rural and primary care settings in Saudi Arabia. Third, the studies used different measures and outcomes to evaluate the impact of the models, which made it difficult to compare and synthesize the results across studies. Fourth, the studies did not provide long-term follow-up data or cost-effectiveness analyses, which are important to assess the sustainability and value of the models. Finally, the studies did not explicitly address the patient and family perspectives and experiences of the models, which are critical to inform patient-centered care and quality improvement.

Despite these limitations, this review provides a useful synthesis of the current evidence on integrated pediatric care models in Saudi Arabia, and identifies key components, outcomes, challenges, and recommendations for future research and practice. As the Saudi healthcare system continues to evolve and innovate, it is important to prioritize the development, evaluation, and scale-up of integrated care models that can meet the diverse needs of children and families, and optimize the contributions of nursing, pharmacy, and specialist professionals. This requires ongoing collaboration, learning, and improvement among policymakers, providers, patients, and researchers, to build a high-performing and sustainable pediatric healthcare system in Saudi Arabia.

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