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Implementation of clinical decision support systems in emergency settings: Enhancing interdisciplinary practice among nurses and pharmacists

Naif Ghanem M. Alotaibi
KSA, National Guard Health Affairs

Maryam Saud Alsharif
KSA, National Guard Health Affairs

Areej Faiz Al Subaie
KSA, National Guard Health Affairs

***Abstract*---Background**: Accurate patient history assessment is vital for effective diagnosis and treatment in healthcare settings. However, traditional methods often lead to fragmented information and missed clinical data, particularly in emergency departments (EDs), where time constraints are prevalent. **Methods**: This study reviews the implementation of Clinical Decision Support Systems (CDSS) in emergency settings, focusing on enhancing interdisciplinary collaboration among healthcare professionals, specifically nurses and pharmacists. A thorough literature review was conducted to evaluate existing CDSS models and their impact on patient history acquisition and communication. **Results**: The findings indicate that incorporating CDSS facilitates comprehensive data collection by promoting interprofessional collaboration. Studies showed that multidisciplinary teams, through improved communication and shared electronic health records, significantly reduced information gaps in patient histories. The integration of pharmacists and nurses in the history-taking process led to higher accuracy and completeness, with some studies reporting an 89% accuracy rate in medication histories collected by trained pharmacy technicians. **Conclusion**: The implementation of CDSS in emergency settings enhances the accuracy of patient history acquisition and fosters effective teamwork among healthcare providers. Interprofessional education and collaboration are essential for maximizing the benefits of CDSS, ultimately leading to improved patient outcomes. This approach not only streamlines communication

Corresponding email: *akk29337@gmail.com*
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but also reduces redundancy, ensuring that critical information is readily accessible to all team members.

***Keywords*---**Clinical Decision Support Systems, interdisciplinary collaboration, patient history, emergency department, healthcare professionals.

1. Introduction

A fundamental and economical ability that a healthcare professional (HCP) may use is accurately diagnosing (90%) a patient via a precise medical history assessment [1,2]. A healthcare professional will diagnose and formulate a treatment plan by obtaining the following information from the patient: primary complaint, history of current disease, prior medical and surgical history, medication history, family history, social history, and doing a review of systems. In an ideal scenario, each patient would be capable of recalling all pertinent information instantly, precisely, and systematically, and would provide it upon request. Nevertheless, such optimal circumstances seldom occur in the healthcare sector, especially among an aging population burdened with an increased prevalence and complexity of concomitant health issues.

Moreover, financial constraints have compelled several hospital systems and individual practitioners to concentrate on patient throughput, resulting in less time allocated for interactions with healthcare professionals. Consequently, patients possess an abundance of health information but limited time to communicate it, often resulting in the disclosure of: (a) primary complaint (or many complaints), (b) certain medical history, (c) relevant family history, and (d) a prescription list. Furthermore, as the patient progresses through the healthcare system, there are future chances to provide additional information that may be crucial for the diagnosis and treatment of their condition but may not be accessible to every practitioner consulted (e.g., pharmacist, physical therapist, etc.). Consequently, the existing approach poses a risk of fragmenting essential clinical information, potentially rendering it inaccessible for clinical decision-making.

Historically, healthcare professionals have used one of two predominant clinical reasoning models for delivering care: decision-making and issue-solving [3-6]. The effective execution of these paradigms depends on the comprehensive and precise recording of clinical data and its accessibility for medical decision-making. This goal is seldom achieved with the existing medical record, since it is often proprietary and personal to the practitioner. Consequently, healthcare professionals are subjected to repetition in history taking, potentially leading to mistakes, diminished efficiency, and ultimately, worse patient care and results.

Utilizing technology as a tool may enhance the system by diminishing inefficiency and inaccuracy. An organized Electronic Health Record (EHR) system using a shared data repository, capable of displaying various perspectives of clinical data along with notifications for newly added information, would enable healthcare professionals to conduct thorough reviews of all pertinent medical notes for a

patient. Consequently, providing sufficient time within a healthcare system and used by a healthcare professional with each patient may diminish the probability of overlooking essential information. Nevertheless, despite the incorporation of technology into patient care, essential information may still be overlooked by individual healthcare professionals [7].

Options exist to enhance the accuracy of the medical record. It may be proposed that having a single physician inquire about the same information from the patient at many intervals would facilitate comprehensive data collection; more interactions by one healthcare provider would provide a more thorough medical history [8]. Nonetheless, expecting a single healthcare professional (particularly a physician, who may have limited time to engage with a patient relative to other healthcare providers) to repeatedly address the same issue or subject may be unrealistic. Considering this fact, the practice of having different healthcare professionals pose same or analogous questions at various intervals would enhance the likelihood of information being retained or disclosed, making this strategy far more effective in a standard clinical environment [9]. For this process to be effective, every team member must be acquainted with the abilities, training, and duties of their colleagues, and possess trust in their capacity to collect and analyze necessary information. We assert that interprofessional education and cooperation in history taking will facilitate the successful acquisition and sharing of patient information, hence yielding optimal patient-centered results.

2. Definition of interprofessional cooperation

The advantages of interprofessional education have been proven in the literature. The Institute of Medicine's pivotal 2003 study, "Health Professions Education: A Bridge to Quality," advocated for collaboration among healthcare students and professionals within multidisciplinary teams to enhance quality improvement. Unfortunately, the United States scores low among developed countries in all quality metrics, hence increasing the significance of excellent treatment delivered by interprofessional teams [2].

Disputes among healthcare disciplines have obstructed collaboration and teamwork. Kruse contends that healthcare providers frequently exhibit a lack of respect for others, fail to appreciate the significance of a team-oriented approach and a unified vision, and display inadequate communication skills necessary for establishing goals and priorities to enhance health care efficiency and effectiveness. The prevailing health care mentality of operating in silos persists due to the endorsement and cultivation of competitive training programs, rather than fostering a robust environment rooted in interprofessionalism, teamwork, and collaboration. The emphasis of care must transition from the perspective of individual disciplines to that of patient outcomes. The patient seeks our assistance for the resolution of a health issue, regardless of who ultimately provides the remedy.

Interprofessional teamwork is essential for healthcare practitioners to address patient requirements and enhance the accuracy of patient history collection. Interprofessional collaboration is defined as the successful cooperation of two or more healthcare clinicians from distinct disciplines to enhance patient health

outcomes while engaging with patients, families, and communities to offer optimal care. In the last ten years, there has been increasing emphasis on interprofessional cooperation and teamwork. Interprofessional collaboration fosters the cooperation, communication, and teamwork essential for developing a complete healthcare plan to treat and care for the patient [10]. The next step in accomplishing this objective is acquiring a precise and comprehensive patient history.

3. Interprofessional collaboration: medical history acquisition

Interprofessional cooperation may enhance patient history acquisition by assembling a complete team to address the patient's needs. By collaboratively sharing the patient's history and integrating each healthcare professional's perspective on patient care, a multidisciplinary team of experts (including physicians, pharmacists, nurses, and allied health providers) can achieve a comprehensive understanding of the patient's medical condition [7].

In every healthcare environment, people tend to disclose certain aspects of their medical history to different healthcare specialists. A patient may provide essential information pertinent for the physician; yet it was communicated to the nurse. The nurse, as a member of an interprofessional collaborative team, recognizes the importance of the information and changes the EHR accordingly. Effective and efficient communication among team members guarantees that the patient history remains current, comprehensive, and meticulous. Effective communication relies on an environment of reciprocal trust and an understanding of each team member's duties and responsibilities [11].

Family members are a crucial component of patient history acquisition, both in inpatient and outpatient settings, when a spouse, parent, or kid may accompany the patient. Certain patients may be too ill to communicate, necessitating that their relatives or supporters provide their medical history. The use of interprofessional healthcare teams facilitates enhanced interaction with family members, which may result in essential information acquisition on the patient's medical state. An interprofessional team may enhance information exchange when patients have previously been hospitalized to the same institution but in a different therapeutic context. Comprehending the temporal link and progression of a patient between admissions is crucial for accurate evaluation and care. This is often seen in people with complex chronic diseases, such as Lupus Erythematosus or Sickle Cell Disease. A nurse or another healthcare professional may recall a patient from a prior visit and possess knowledge on the patient's past condition, progress, or particular response to a therapeutic intervention that may be conveyed to other team members. In the patient-centered medical home model, a nurse's telephone call to a patient's residence for diabetic care may uncover vital information about an emergency room visit or hospitalization, which is essential for pharmaceutical and medical treatment.

Interprofessional collaborative teams may enhance communication during shift changes, handoffs, transfers of care to other hospital areas, or transitions from inpatient to ambulatory settings. Upon a patient's transfer to another section of the hospital, it is possible for just a single team member, such as the pharmacist,

to accompany the patient. Consequently, the pharmacist might revise the interprofessional collaborative team according to their comprehension of the information requirements of other team members. The individual may provide an additional viewpoint not well documented in the patient's written history, which may be crucial for the patient's therapy. “Collaborative care acknowledges the diversity inherent in the unique expertise each profession contributes to care delivery.” The comprehension and identification of pertinent information required by various disciplines to improve patient management can be advanced through interprofessional education and collaboration during healthcare professionals' training.

The involvement of interprofessional collaborative teams in patient history taking might provide additional advantages for both the patient and the team. Certain people may be more inclined to disclose their medical history to a healthcare practitioner depending on the provider's or their own gender, color, ethnicity, or age. Notwithstanding the healthcare provider's attained cultural competence, an information gap may arise outside the provider's influence. The patient's language may sometimes hinder good communication. An interprofessional team strategy may enhance information dissemination from an individual care provider to the whole team, hence yielding the optimal patient treatment plan.

Ultimately, interprofessional teamwork and communication may result in cost-saving strategies. A comprehensive patient history may enable the healthcare provider to forgo needless laboratory tests, imaging studies, or other follow-up treatments. A collaborative mindset and approach to the patient may provide essential insights to the team leader in executing the most efficient and successful management care plan. Potential trial and error scenarios may be avoided, hence conserving time that may be crucial for patients in severe circumstances. This collaborative team-oriented strategy may provide significant expertise that would otherwise be absent, so offering supplementary resources, healthcare services, and the possibility of unforeseen beneficial consequences for both the patient and the associated healthcare system and community. The collaborative duty for patient care among team members in collecting patient history alleviates the individual load on each healthcare professional, enhancing efficiency by reducing redundant efforts.

4. Educational Consequences for High-Performance Computing Systems

Enhancing patient-centered care via collaborative patient history-taking must start with health professional education programs leading to interprofessional education. Programs may enhance a workforce's competencies and interpersonal dynamics with patients and colleagues by imparting communication techniques, effective skills, and patient history acquisition during clinical rotations or via the use of interprofessional teams in outpatient assessments. In an interprofessional education competence framework, communication is deemed essential; nevertheless, health profession students often possess little understanding and experience with interprofessional communication [12].

There are extensive requirements for the retraining of the existing health professionals workforce and for interprofessional learning methodologies to

adequately equip future healthcare practitioners [7]. Consequently, integrating interprofessional education into the daily practice of all health professional students may effectively mitigate the issue of unfamiliarity with the roles of other health professionals and equip them with the essential foundation to successfully engage in inpatient and outpatient teams. Effective and efficient collaboration among clinical teams is a fundamental ability for health professional students [12]. Students must be exposed to this as regularly and consistently as feasible to enhance their preparedness for residency or professional practice.

Healthcare professionals endorse shared curricular goals to facilitate interprofessional collaboration for students during inpatient and outpatient clinical rotations, ensuring exposure to diverse patient interactions that provide synchronous experiences in patient history taking, as opposed to those derived from standardized patients, thereby offering a more authentic understanding of healthcare. This can be accomplished throughout all four years of medical school and incorporated into the medical curriculum while concurrently fulfilling the Liaison Committee on Medical Education standard for interprofessional education and other healthcare professional programs, such as Pharmacy, through team rounding [13,14].

Nurses are urged to use the whole of their skills and education as outlined in the 2010 IOM study, The Future of Nursing: Leading Change, Advancing Health. This research emphasized the need for nursing education programs to partner with other health professional institutions to provide interprofessional education in clinical environments. Enhancing quality and coordination of care via interprofessional cooperation is a primary objective of the Campaign for Action, a national program aimed at executing the recommendations outlined in the IOM Future of Nursing study [16].

The certification Council for Pharmacy Education's 2016 standards mandate that pharmacy schools include interprofessional education within their curriculum for certification purposes. The guideline emphasizes the need for pharmacy schools to provide educational experiences that immerse students in “patient-centered care across diverse practice environments as integral members of an interprofessional team” via both theoretical and practical activities. Students must actively collaborate with other HCP students to enhance the efficacy of interprofessional teams [17-20].

5. Conclusions

The implementation of Clinical Decision Support Systems (CDSS) in emergency settings represents a transformative approach to enhancing patient care through improved interdisciplinary collaboration among healthcare professionals. As the complexity of patient cases increases, particularly in emergency departments, the need for accurate and comprehensive patient histories becomes paramount. Traditional methods of data collection often fall short, resulting in fragmented information that can compromise clinical decision-making.

This study underscores the importance of integrating technology, such as CDSS, to facilitate effective communication and data sharing among team members,

including nurses and pharmacists. By fostering a collaborative environment, healthcare providers can leverage each other's expertise, leading to more thorough and accurate patient assessments. The evidence demonstrates that incorporating diverse perspectives within a multidisciplinary team significantly enhances the quality of patient histories, yielding higher accuracy rates and reducing the likelihood of medication errors.

Moreover, interprofessional education plays a crucial role in preparing healthcare professionals to work collaboratively within these systems. Training programs that emphasize teamwork, communication, and an understanding of each discipline's contributions can break down silos and encourage a culture of cooperation. As healthcare continues to evolve, embracing interprofessional collaboration and CDSS will not only streamline processes but will also improve patient outcomes.

In conclusion, the synergy created by combining CDSS with interdisciplinary practices has the potential to revolutionize emergency care delivery. By prioritizing comprehensive patient history acquisition and effective communication, healthcare systems can enhance the quality of care, reduce errors, and ultimately improve the overall patient experience. Future research should continue to explore innovative strategies for integrating CDSS into clinical workflows, ensuring that all healthcare professionals can contribute to and benefit from this collaborative approach.

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تطبيق أنظمة دعم القرار السريري في بيئات الطوارئ: تعزيز الممارسات متعددة التخصصات بين الممرضين والصيادلة

الملخص

الخلفية :يعد التقييم الدقيق لتاريخ المريض أمرًا ضروريًا للتشخيص والعلاج الفعّال في بيئات الرعاية الصحية. ومع ذلك، غالبًا ما تؤدي الطرق التقليدية إلى تجزئة المعلومات وفقدان بيانات سريرية مهمة، خاصةً في أقسام الطوارئ (EDs) حيث تكون ضغوط الوقت بارزة.

الطرق :تراجع هذه الدراسة تطبيق أنظمة دعم القرار السريري (CDSS) في بيئات الطوارئ، مع التركيز على تعزيز التعاون متعدد التخصصات بين العاملين في الرعاية الصحية، وخاصة الممرضين والصيادلة. تم إجراء مراجعة شاملة للأدبيات لتقييم نماذج CDSS الحالية وتأثيرها على جمع تاريخ المريض وتحسين الاتصال

النتائج :تشير النتائج إلى أن دمج أنظمة CDSS يسهل جمع البيانات بشكل شامل من خلال تعزيز التعاون بين التخصصات. أظهرت الدراسات أن الفرق متعددة التخصصات، من خلال تحسين الاتصال وسجلات الصحة الإلكترونية المشتركة، قللت بشكل كبير من الفجوات في تواريخ المرضى. وأسهم دمج الصيادلة والممرضين في عملية جمع التاريخ الطبي في تحسين الدقة والشمولية، حيث أظهرت بعض الدراسات تحقيق معدل دقة بلغ 89% في التواريخ الدوائية التي جمعها فنيو الصيدلة المدربون.

الخلاصة :يعزز تطبيق أنظمة CDSS في بيئات الطوارئ دقة جمع تاريخ المريض ويعزز العمل الجماعي بين مقدمي الرعاية الصحية. التعليم والتعاون بين التخصصات ضروريان لتحقيق أقصى استفادة من أنظمةCDSS ، مما يؤدي في النهاية إلى تحسين نتائج المرضى. يساهم هذا النهج في تبسيط الاتصالات وتقليل التكرار، مما يضمن أن تكون المعلومات الحيوية متاحة بسهولة لجميع أعضاء الفريق.

الكلمات المفتاحية :أنظمة دعم القرار السريري، التعاون متعدد التخصصات، تاريخ المريض، قسم الطوارئ، العاملون في الرعاية الصحية.